A MORE NUANCED APPROACH TO ENVIRONMENTAL HAZARDS? A CRITICAL REVIEW OF THE EXISTENCE, PRIORITIES AND SCOPE OF THE MINAMATA CONVENTION ON MERCURY

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Abstract

International environmental law contains a suite of treaties that seek to manage hazardous substances at a global level. The 2013 Minamata Convention is the latest and seeks “to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.” This agreement enters a field where there has been a proliferation of multilateral environmental agreements (MEAs) that have made poor progress against their goals. There were also already a range of MEAs that addressed mercury air emissions, trade and waste, and there are other toxic heavy metals that are not the subjects of individual treaties. This raises the question of why a new treaty was necessary and why it only covered mercury.

Nevertheless, the Minamata Convention includes a few unique elements that have not been seen elsewhere in international environmental law: in particular, a specific article on artisanal and small-scale gold mining (ASGM) and a specific article on health impacts. This broadening scope raises questions of priority as the international community addresses livelihoods that depend on mercury and health impacts caused by mercury simultaneously in the same agreement. The Minamata Convention also has a wide range of potential co-benefits beyond its objective of protecting human health and the environment from mercury. While the Convention could be conceived as narrow by focusing only on mercury rather than heavy metals more generally, its depth and breadth of potential co-benefits expand the scope of what international environmental law can achieve.

This thesis asks the question of whether the Minamata Convention signals a new dawn of comprehensive, adaptive and innovative environmental agreements or whether it was an unnecessary, duplicative, overly narrow agreement with inequitable priorities. It concludes that as a one-off agreement, based on its text, the Minamata Convention is a significant achievement for international environmental law. However, its success in reducing harm from mercury will be greatly dependent on the implementation of its non-binding provisions on ASGM and point sources of mercury emissions such as coal-fired power plants. Finally, more consideration must be given to efficiency in creating treaties in the future to address new environmental problems.

Preface

This thesis is original, unpublished, independent work by the author, Andrea Bassett.

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CHAPTER 1: Introduction

1.1 Introduction

International environmental law contains a suite of treaties that seek to manage hazardous substances at a global level. On the 10th of October 2013, after four years of negotiations, a new hazardous substance treaty joined the ranks: the Minamata Convention on Mercury ('Minamata Convention').[1] The Minamata Convention seeks "to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds."[2] Mercury is a highly toxic heavy metal that affects the nervous, digestive and immune systems, as well as the lungs, kidneys, skin and eyes.[3] It is a substance of global concern not just because of its toxicity but because its properties enable it to travel globally in the atmosphere and the oceans, persist in the environment for very long periods of time and bioaccumulate and biomagnify in the food chain.

The Minamata Convention raises a number of questions about the direction of international environmental law. There were already a range of multilateral environmental agreements (MEAs) that dealt with mercury prior to the Minamata Convention. They addressed mercury air emissions, trade and waste. Furthermore, there are other heavy metals that pose problems to human health and the environment that are not the subjects of individual treaties. This context raises the question of why a new treaty was necessary and why it only covered mercury.

The treaty that was created included a few unique elements that have not been seen elsewhere in international environmental law. One of these is the specific article on artisanal and small scale gold mining (ASGM), which is the largest anthropogenic contributor to mercury emissions. The Minamata Convention is also the first MEA to include a specific article on health impacts, which calls for public health strategies. This broadening scope raises questions of priority as the international community addresses livelihoods that depend on mercury and health impacts caused by mercury simultaneously in the same agreement.

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[1] *Minamata Convention on Mercury*, opened for signature 10 October 2013 (not yet in force) ('*Minamata Convention*').
[2] *Minamata Convention* art 1.
[3] World Health Organisation, *Mercury and Health: Fact Sheet N°316* (January 2016) <http://www.who.int/mediacentre/factsheets/fs361/en>.

Finally, the Minamata Convention has a wide range of potential co-benefits beyond its objective of protecting human health and the environment from mercury. While the Convention could be conceived as narrow by focusing only on mercury rather than other heavy metals, its depth and breadth of potential co-benefits may expand the scope of what international environmental law can achieve.

This thesis will explore each of these elements as it asks the question of whether the Minamata Convention signals a new dawn of comprehensive, adaptive and innovative environmental agreements or whether it was an unnecessary, duplicative, overly narrow agreement with inequitable priorities. The methodology used to investigate this was mostly a desktop review of scholarship from a range of disciplines; the official documents and reports of the Minamata Convention negotiations; and publications and resources from multiple United Nation agencies and intergovernmental organisations.

This introductory chapter will provide a context on the burgeoning field of international environmental law and the downsides to proliferating agreements. It will also outline why mercury is such a problem globally and give a brief overview of the Minamata Convention. The introduction will conclude with an outline of the subsequent chapters.

1.2 Proliferation of International Environmental Law

In order to assess the contribution and consequences of the Minamata Convention it is necessary to understand the surrounding context of international environmental law. According to the University of Oregon's International Environmental Agreements Database, there are currently over 1,190 MEAs, over 1,500 bilateral environmental agreements, and over 250 other environmental agreements.[4] Even under a more conservative measure, the United Nations Environment Programme (UNEP) still puts the figure at over 500 international environmental agreements that have been concluded since the 1972 Stockholm Conference on Environment and Development and the formation of UNEP.[5] Despite this proliferation of agreements, the condition of the global environment has been in decline. In its fifth Global Environmental Outlook (GEO) assessment in 2012 UNEP measured progress against global environmental goals as agreed in MEAs.[6] The results were disappointing: "Out of 90 goals and objectives assessed, significant progress could only be shown for four. Of equal concern, progress

[4] Ronald B Mitchell, *International Environmental Agreements Database Project (Version 2014.3)* (2016) <http://iea.uoregon.edu>. This list includes a number of minor procedural and amendment agreements.
[5] United Nations Environment Programme, *Measuring Progress: Environmental Goals & Gaps* (UNEP, 2012) at ii.
[6] UNEP, *Global Environmental Outlook 5: Environment for the future we want* (UNEP, 2012).

could not be appraised for 14 goals and objectives simply because data were lacking."[7] On top of that, there was little to no progress, or further deterioration, on about half the goals and objectives.[8]

The GEO assessed outcomes against agreed goals but there may also be benefits beyond the key objectives of a Convention that enhance its worth. These include raising awareness, creating international norms, providing financial and technical resources, and actions that have multiple benefits for the environment and society. Accordingly, this thesis will explore the potential for success in co-benefits in Chapter 4. Nevertheless, the ongoing failure of MEAs to significantly improve the environmental problems they were created to address requires close examination. MEAs are expensive to negotiate.[9] They are also time consuming in not only the years taken to negotiate but the implementation meetings thereafter. In 2011, for example, the negotiations for the Minamata Convention plus the three major hazardous substance treaties and the Strategic Approach to International Chemicals Management (SAICM) created "eight important negotiations and meetings lasting about a week each, not including the substantial amounts of time and resources required to prepare for and travel to the meetings."[10] The time and money required for treaty implementation should be used to create tangible progress rather than bureaucratic activity.

In addition, the GEO assessment demonstrates that MEAs also risk creating the impression of progress when none is actually occurring. This can delay the pursuit of real improvements for the sake of symbolic or trophy texts. Susskind and Ali describe this as a debate between pragmatists and idealists on the measure of success for MEAs: the former appreciating any step forward as progress and the latter worrying that empty promises "let politicians off the hook" and can be worse than no agreement at all.[11] The GEO assessment looks for the tangible measures of success amongst the agreements, thereby taking an idealist approach. This thesis will also be looking for actual measures of success as it attempts to foresee the consequences of an agreement that has yet to enter into force.

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[7] Ibid xvii.
[8] UNEP, above n 5, 31.
[9] For example, "[t]he costs of negotiating the Rotterdam Convention were about US $3.2 million …the Stockholm Convention was slightly less than $6 million… and the non-legally binding Strategic Approach to International Chemicals Management (SAICM) has been estimated at about $6.5 million": Ad hoc Open-ended Working Group on Mercury, Study on options for global control of mercury, 1st mtg, UN Doc UNEP(DTIE)/Hg/OEWG.1/2 (20 August 2007) 20.
[10] Daryl Ditz and Baskut Tuncak, 'Bridging the Divide between Toxic Risks and Global Chemicals Governance' (2014) 23(2) *Review of European Community & International Environmental Law* 181, 193.
[11] Lawrence E Susskind and Saleem H Ali, *Environmental Diplomacy: Negotiating More Effective Global Agreements* (Oxford University Press, 2nd ed, 2015) 11.

The environmental agreements that had achieved success in the GEO assessment included measurable, defined targets rather than merely requiring actions from the parties. Other factors that increase the chance of success include "support from an organised scientific community, scientific consensus on the problem, leadership from international institutions and cost-effective solutions to the problem."[12] These GEO assessment criteria will be used to assess the success of the Minamata Convention in this thesis. It is also important to note that there are options for managing international environmental problems that do not involve new treaties. Soft law and non-regulatory actions have had significant impacts on global environmental problems. A full discussion of the value of soft law versus hard law is beyond the scope of this thesis, but some of the voluntary international activities on mercury such as the Global Mercury Partnership will be discussed in further detail in Chapter 2. The success of such non-regulatory actions also brings into question the value of creating new international laws.

1.3 Mercury

Mercury is an elemental metal that is liquid at room temperature. It can be converted by bacteria into its most toxic, organic form *methylmercury* which is easier for animals to absorb.[13] Methylmercury in the oceans is taken up by plankton and absorbed by each animal higher in the food chain that consumes contaminated animals, a process known as *biomagnification*. This process leads to high levels of mercury contamination in indigenous populations that consume animals such as seals and whales, as well as people who consume large quantities of predatory fish such as tuna.[14] The other major avenue of human exposure to mercury is through the inhalation of mercury vapours from industrial processes.[15] Ongoing low level exposure can also lead to health impacts for human populations.

Mercury is highly toxic to humans and the environment in both its inorganic and organic forms. In humans mercury can affect the nervous, digestive and immune systems, and the lungs, kidneys, skin and eyes. It can cause symptoms such as tremors, insomnia, memory loss, neuromuscular effects, headaches and cognitive and motor dysfunction, and is particularly harmful to foetuses where a mother's exposure can affect a child's cognitive thinking, memory, attention, language, and fine motor

[12] UNEP, above n 5, 31.
[13] United National Environment Programme, *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport* (UNEP Chemicals Branch, 2013) 27 ('*Global Mercury Assessment 2013*').
[14] Ibid.
[15] WHO, above n 3.

and visual spatial skills.[16] The hazards of mercury first received global attention with the Minamata Bay tragedy in Japan in the 1950s and 1960s, where large scale poisoning of a community who ate contaminated fish resulted in thousands of deaths and disabilities. This event inspired the name "Minamata Disease" to describe the harmful effect of long term mercury exposure.

Mercury enters the environment from a number of natural and anthropogenic sources. Current emissions of mercury into the air can be attributed to anthropogenic sources (approximately 30%), natural sources such as volcanos and geothermal activity (10%) and recirculating emissions of mercury that have been previously released and are now emitting from built up deposits in surface soils and oceans (60%).[17] It is thought that the mercury deposits that are recirculating are mostly from anthropogenic sources originally.[18] The main anthropogenic activities that are releasing mercury into the atmosphere are ASGM, coal combustion, and metal-ore smelting. Emissions to water are less well documented and include industrial sites such as power plants and factories, contaminated sites such as old mines and landfills, ASGM and deforestation.[19] Mercury has historically been included in a number of consumer and health products such as dental fillings, vaccines, thermometers, light bulbs, paints and batteries, and still occurs in many of these products.

1.4 Overview of the Minamata Convention

With the health and environmental effects of mercury in mind, the international community began negotiations for a global agreement in 2009. The objective of the Minamata Convention, as noted previously, is "to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds."[20] The preamble includes a reaffirmation of the principles of the Rio Declaration on Environment and Development, with a particular mention of the principle of common but differentiated responsibilities. The preamble also includes references to the well-recognised international environmental law principles of responsibility for transboundary harm; preventative action; inter-generational and intra-generational equity; and financial, technical, technological, and capacity-building support. The preamble to the Convention does not include an explicit reference to the polluter-pays principle, despite frequent allusions to this principle in the

[16] Ibid.
[17] *Global Mercury Assessment 2013,* above n 13, i.
[18] Ibid i.
[19] Ibid iii.
[20] *Minamata Convention* art 1.

negotiations. The preamble also excludes the precautionary principle which has featured in most of the recent MEAs. It has been suggested that "the risks and negative impacts of mercury are well established and do not involve scientific uncertainty [therefore] mercury does in fact not raise an issue of precaution but rather an issue of prevention".[21]

The Minamata Convention includes articles addressing mercury mining, supply, trade, mercury-added products, manufacturing processes, air emissions, land and water releases, storage, wastes and contaminated sites. It includes provisions establishing the Global Environmental Facility Trust Fund as the financial mechanism to provide support for developing country parties. The Convention includes provisions for capacity building, technical assistance and technology transfer. It is the first MEA to include a specific article on public health. Article 16 calls for the development of public health strategies and coordination with the World Health Organisation to minimise health impacts. It is also the first MEA to include an article on artisanal and small-scale gold mining (ASGM) to specifically address this major contributor to mercury pollution. These articles directly address the problem at a micro scale and identifies ways to mitigate and adapt to the risks for individuals and communities. The way that these articles may operate on the ground will be discussed in more detail in Chapter 3.

The Minamata Convention sits within a suite of hazardous substance MEAs. Some of them take a similar "lifecycle approach" as the Minamata Convention and seek to manage the impact of specific substances from their creation to their disposal, such as the 2001 Stockholm Convention on Persistent Organic Pollutants.[22] Others manage particular aspects of a broad range of hazardous substances and have included mercury within their scope. The 1989 Basel Convention on the Transboundary Movement of Hazardous Waste regulates the transport of hazardous wastes (including mercury wastes). The 1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade promotes shared responsibility and cooperation in the safe trade of hazardous substances with an emphasis on information exchange (including mercury compounds). The 1979 Convention on Long-Range Transboundary Air Pollution, while largely a regional agreement, includes mercury air emissions in its 1998 Protocol on Heavy Metals. The way that these hazardous

[21] Henrik Hallgrim Eriksen and Franz Xaver Perrez, 'The Minamata Convention: A Comprehensive Response to a Global Problem' (2014) 23(2) *Review of European Community & International Environmental Law* 195, 201.
[22] *Stockholm Convention on Persistent Organic Pollutants*, opened for signature 22 May 2001, 2256 UNTS 119 (entered into force 17 May 2004) ('Stockholm Convention').

substance MEAs link and interact with each other and the Minamata Convention will be discussed in Chapter 2.

1.5 Literature Context

There is currently no literature on the Minamata Convention from a purely legal perspective. The literature that does engage with legal analysis mostly views the Minamata Convention as an achievement in international environmental law that has improved upon past agreements. Henrik Selin, with expertise in global and regional politics and policy making on environment and sustainable development, has written some key pieces on the political and regulatory context of the Minamata Convention. These include a review of the linkages between the Minamata Convention and other hazardous chemical MEAs,[23] how the hazardous substance MEA framework operates and regulatory lifecycle approaches to substance management.[24] Noelle Eckley Selin, an expert in atmospheric chemistry modelling to inform decision-making, has also contributed literature on the policy elements of the Minamata Convention including the links between mercury science and policies[25] and the projected outcomes of the Minamata Convention.[26] Together, Selin and Selin[27] conducted an analysis on how to manage the global mercury problem seven years prior to the conclusion of the Minamata Convention. This article is an important source for this thesis as it provides useful history on mercury regulation around the world and the context of the early UN mercury discussions.

Most of the literature on the Minamata Convention comes from the mining, development and environmental management disciplines. In particular, there is much literature on artisanal and small-scale gold mining (ASGM) from these fields which is field-based and looks closely at the implementation the Minamata Convention on the ground and its social and economic implications. Another key source for this thesis is work by Samuel Spiegel, Susan Keane, Steve Metcalf and Marcello Veiga[28] whose

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[23] Henrik Selin, 'Global Environmental Law and Treaty-Making on Hazardous Substances: The *Minamata Convention* and Mercury Abatement' (2014) 14(1) *Global Environmental Politics* 1.
[24] Jonathan Krueger and Henrik Selin, 'Governance for Sound Chemicals Management: The Need for a More Comprehensive Global Strategy' (2002) 8 *Global Governance* 323.
[25] Noelle E Selin, 'Science and strategies to reduce mercury risks: a critical review' (2011) 13 *Journal of Environmental Monitoring* 2389.
[26] Noelle E Selin, 'Global change and mercury cycling: Challenges for implementing a global mercury treaty' (2014) 33(6) *Environmental Toxicology and Chemistry* 1202.
[27] Noelle Eckley Selin and Henrik Selin, 'Global Politics of Mercury Pollution: The Need for Multi-Scale Governance' (2006) 15(3) *Review of European Community & International Environmental Law* 258, 258.
[28] Samuel Spiegel et al, 'Implications of the Minamata Convention on Mercury for informal gold mining in Sub-Saharan Africa: from global policy debates to grassroots implementation?' (2015) 17(4) *Environment, Development and Sustainability* 765.

expertise range across international development, environmental health and mining engineering respectively. Their joint work focuses on a range of issues for ASGM in sub-Saharan African following the completion of the Minamata Convention such as the political context of the negotiations, the financing option chosen, the risk of further marginalizing artisanal workers, technology alternatives, social and economic empowerment of communities, domestic mining policies. Research such as this has greatly contributed to understanding the wide range of implications of the Minamata Convention in ASGM communities discussed throughout this thesis.

The literature on ASGM tends to be location-specific and addresses political, geographic, economic and social factors. For example, this thesis uses the work of Buccella reviewing the Minamata in the context of Peruvian illegal artisanal gold mining[29] and García et al reporting on a successful mercury reduction project in Antioquia, Colombia.[30] There has been a lot of research into mercury alternatives and pilot projects in ASGM and how the Minamata Convention with help or hinder these activities. This work tends to stress the importance of working closely with individual ASGM communities and avoiding any generic approaches to reducing mercury. In general, the literature from the field-based work is less optimistic about the benefits of the Minamata Convention than the political literature due mostly to practical issues, such as the lack of alternatives to using mercury in ASGM and the lack of institutional and enforcement capacities in the relevant countries.[31] This thesis will act as a bridge between this technical, field-based research and the high-level political literature as well as contributing a specifically legal analysis of the Minamata Convention

1.6 Thesis Outline

This introduction has outlined the global mercury problem and why international action was needed. It also drew upon the GEO assessment to discuss the effectiveness of treaties in reducing environmental harms and to provide indicators to measure the potential for success. The Minamata

[29] Alina Buccella, 'Can the Minamata Convention on Mercury Solve Peru's Illegal Artisanal Gold Mining Problem?' (2014) 24(1) *Yearbook of International Environmental Law* 166.
[30] Oseas García et al, 'Artisanal gold mining in Antioquia, Colombia: a successful case of mercury reduction' (2015) 90 *Journal of Cleaner Production* 244.
[31] For example: Marcello M Veiga, Gustavo Angeloci-Santos and John A Meech, 'Review of barriers to reduce mercury use in artisanal gold mining' (2014) 1 *The Extractive Industries and Society* 351; George R Davies, 'A toxic free future: Is there a role for alternatives to mercury in small-scale gold mining?' (2014) 62 *Futures* 113; Martin J Clifford, 'Future strategies for tackling mercury pollution in the artisanal gold mining sector: Making the Minamata Convention work' (2014) 62 *Futures* 106; Charles W Schmidt, 'Quicksilver & Gold: Mercury Pollution from Artisanal and Small-Scale Gold Mining' (2012) 120(11) *Environmental Health Perspectives* 424.

Convention was outlined and placed in the context of other hazardous substance MEAs. Existing literature on the Minamata Convention was summarised to demonstrate the scope of academic research in this area to date and to place the focus of this thesis into context.

Chapter 2 is a doctrinal evaluation of the content of the Minamata Convention. It will firstly describe where and how mercury was already regulated in international law prior to the Minamata Convention. The international hazardous substance framework that was introduced in this chapter will be expanded on to demonstrate how the Minamata Convention will work with other MEAs and further question the need for another agreement. Having explained what regulation is currently in place, Chapter 2 will proceed through a doctrinal analysis of the control measures in the Minamata Convention to see how it covers the gaps in international mercury regulation. This facilitates an understanding of exactly what new contributions the Minamata Convention made to manage the global mercury problem, and whether it was necessary at all.

Chapter 3 takes a closer look at two unique contributions of the Minamata Convention – ASGM regulation and health – to challenge the priorities of the global community. It compares the treatment in the Minamata Convention of two distinct communities whose health and livelihoods are affected by mercury: ASGM communities and aboriginal subsistence whalers. The balance of attention given to these groups, and the balance of focus between mitigation and adaptation of mercury's harm, indicate what and who the international community is prioritising through this agreement.

Chapter 4 posits the Minamata Convention as a narrow but deep agreement. The reason it is narrow is by excluding other heavy metals. This chapter will present a potential structure for a heavy metals agreement that would be legally and politically feasible. This discussion is for the purpose of questioning whether the Minamata Convention created a short-term solution by isolating mercury and what longer-term decision-making on hazardous substances might look like. Considering the Convention as it was made, this chapter will then explore its breadth of regulation despite only focusing on mercury. There are many benefits of the resulting agreement beyond protecting human health and the environment from mercury, and a discussion of these leads to a reconsideration of what it means to make a broad environmental agreement.

This thesis concludes in Chapter 5 by reviewing the resulting Minamata Convention holistically and, drawing on the GEO assessment, suggesting what may be the decisive factors in its effectiveness at addressing the problem of global mercury pollution. The Convention itself recalls "decision 25/5 of 20

February 2009 of the Governing Council of the United Nations Environment Programme to initiate international action to manage mercury in an efficient, effective and coherent manner".[32] This thesis will seek to explore if the approach of a new convention itself, as well as the resulting text, was supportive of or counter to this objective. It draws together the preceding chapters to critically ask whether the Minamata Convention has created new precedent in both its scope and priorities and whether these are positive steps forward in international environmental law.

[32] *Minamata Convention* preamble.

CHAPTER 2: The Minamata Convention and the hazardous substance regulatory framework: addressing the gaps or duplication?

2.1 Introduction

Hazardous substances are regulated under a broad array of international instruments. The early international agreements sought to address particular aspects of hazardous substances such as air emissions and waste movement before moving into more lifecycle approaches that cover substances from their creation through to their disposal. Underlying these agreements has been the changing scientific understanding of which substances are hazardous to human health and the environment and of the best way to address the risks they pose. Changing international relations and North-South dynamics have also played a role, as evidenced by the initial focus of these agreements on regulating the transport of hazardous substances from industrialised to developing countries followed by a move to prevent the production of these substances at their sources.

Mercury has been included in many of these hazardous substance instruments. Prior to the Minamata Convention, the different focuses of the hazardous substance MEAs resulted in piecemeal regulatory coverage of mercury internationally. Mercury waste is included in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal ('Basel Convention').[33] Restrictions of trade in pesticides containing mercury appear in the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade ('Rotterdam Convention').[34] Mercury air emissions are included in the 1998 Protocol on Heavy Metals to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals ('Heavy Metals Protocol').[35] Many other substances also appear across a range of these MEAs, including chemicals which are also covered by the Stockholm Convention on Persistent Organic Pollutants ('Stockholm Convention').[36]

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[33] *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, opened for signature 22 March 1989, 1673 UNTS 57 (entered into force 5 May 1992) ('*Basel Convention*').
[34] *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, opened for signature 10 September 1998, 2244 UNTS 337 (entered into force 24 February 2004) ('*Rotterdam Convention*').
[35] *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals*, opened for signature 24 June 1998, 2237 UNTS 4 (entered into force 29 December 2003) ('*Heavy Metals Protocol*').
[36] *Stockholm Convention on Persistent Organic Pollutants*, 22 May 2001, 2256 UNTS 119 (entered into force 17 May 2004) ('*Stockholm Convention*').

This Chapter will question why the Minamata Convention was created amidst this framework. It will explore the extent that mercury is already covered, or could potentially be covered, under these Conventions. This will build on the work of Selin and Selin[37] who questioned where to place the mercury problem seven years prior to the completion of the Minamata Convention. The overlaps and similarities between these Conventions has not gone unnoticed on their parties. In order to address this piecemeal approach and overlaps of the hazardous substance Conventions, the Basel, Rotterdam and Stockholm Convention Secretariats have come together in an initiative known as the "Synergies Process". The nature of this collaboration and the gaps that remain in the hazardous substance framework will be discussed.

The Chapter will conclude by summarising the extent to which the Minamata Convention has filled the gaps in international mercury regulation and has duplicated existing regulation within other Conventions. This research will be undertaken by conducting a doctrinal, comparative analysis of the Minamata Convention with the Heavy Metals Protocol and the Basel, Rotterdam and Stockholm Conventions. This is followed by a discussion of efficiency that questions the precedent of creating a new treaty for each new substance deemed to require regulation.

2.2 International mercury regulation prior to Minamata

Mercury was included in the scope of a number of international treaties prior to the Minamata Convention. As mentioned above, this includes in particular the Basel Convention, the Rotterdam Convention and the Heavy Metals Protocol. In addition, the Stockholm Convention has the potential to include methylmercury, the form most toxic to living organisms, in its scope. This section will review each of the relevant global agreements to explore the extent to which mercury was already regulated, or had the potential to be regulated, prior to the Minamata Convention. It will also provide the legal context that the Minamata Convention has entered into.

The 1989 Basel Convention encourages a reduction in the generation of hazardous wastes, restricts transboundary movement of hazardous waste unless in accordance with environmentally sound management principles, and provides rules for permissible transboundary movement. Wastes that include mercury and mercury compounds are specified as hazardous wastes.[38] Parties are not

[37] Selin and Selin, above n 26.
[38] *Basel Convention* annex I.

permitted to transport hazardous wastes to parties that have banned such imports.[39] Pending entry into force of an amendment, the 'Basel Ban', parties and other States who are members of the OECD, EC and Lichtenstein will not be permitted to transport hazardous wastes to States that are not also one of these listed States.[40]

Another instrument that places restrictions on transboundary movement of mercury is the 1998 Rotterdam Convention. The Rotterdam Convention promotes shared responsibility and cooperation in international trade of pesticides and hazardous chemicals through the application of the Prior Informed Consent procedure. This procedure is a mechanism for obtaining and recording the decisions of Parties about which listed chemicals they will allow to be imported into their borders. Pesticides that contain mercury compounds are included.[41] More than 100 countries have used this procedure to notify the rest of the international community that they do not consent to import pesticides containing mercury compounds.[42]

The 1979 Convention on Long-range Transboundary Air Pollution ('CLRTAP')[43] was the first binding international agreement on air emissions. It contains eight protocols that address different concerns. The 1998 Heavy Metals Protocol includes mercury, alongside lead and cadmium, as the metals of concern. The Heavy Metals Protocol requires Parties to reduce heavy metal emissions to below their 1990 levels, focusing on combustion processes, industrial sources, waste incineration and certain products. Prior to the Minamata Convention, this was the most comprehensive international treaty on mercury.[44] The Convention was initially limited to European and North American States but has become increasingly broad in its coverage and impact. The Heavy Metals Protocol was amended in 2012 (yet to enter into force) to "introduce flexibilities to facilitate accession of new Parties, notably countries in Eastern Europe, South-Eastern Europe, the Caucasus and Central Asia."[45] It is for this reason that the originally regional CLRTAP and Heavy Metals Protocol are considered alongside the other global

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[39] *Basel Convention* arts 4(1), (6).
[40] Annex VII is an integral part of the Amendment adopted by the third meeting of the Conference of the Parties in 1995 in its Decision III/1.
[41] *Rotterdam Convention* annex III.
[42] Secretariat of the Rotterdam Convention, *Mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds*, Rotterdam Convention <http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals>.
[43] *Convention on Long-range Transboundary Air Pollution*, opened for signature 13 November 1979, 1302 UNTS 217 (entered into force 16 March 1983).
[44] Selin and Selin, above n 27, 262.
[45] United Nations Economic Commission for Europe, *Protocol on Heavy Metals*, <http://www.unece.org/env/lrtap/hm_h1.html>.

agreements in this Chapter. The CLRTAP also added a protocol on persistent organic pollutants ('POPs') in 1998.

The 2001 Stockholm Convention differs from the above agreements by taking a more lifecycle approach to certain hazardous substances and trying to regulate them from creation through to disposal. The Convention targets certain POPs listed under Annex A and requires Parties to prohibit and/or eliminate their production, import and export.[46] Some POPs are exempt and reduction is sought instead under Annex B, and unintentional releases of industrial by-products are listed for minimisation and, where possible, elimination under Annex C. Parties should also reduce and eliminate releases from stockpiles and wastes.[47] Mercury in its elemental form would technically not be appropriate for inclusion in Annex A as, while it is persistent, it is not an organic pollutant. Methylmercury, however, broadly fits the criteria and was raised as a possibility both in the Stockholm Convention negotiations and by the UNEP Global Mercury Assessment Working Group.[48]

2.3 The hazardous substance framework

It is quite common for multilateral environmental agreements to link to others. In a 2013 study, Kim examined cross references in 747 multilateral environmental agreements from 1857 to 2012 and found that 80% of them had at least one cross reference to another environmental agreement.[49] This is particularly apparent among the hazardous substance treaties. The Minamata Convention recognises the roles of the Basel and Rotterdam Conventions in its preamble. During the Minamata negotiations many commentators called for taking advantage of the work already done and synergies between the other hazardous substance treaties.[50]

Of particular relevance is the "Synergies Process", a 2008 decision to increase collaboration and coordination between the Conference of the Parties to the Basel, Rotterdam and Stockholm Conventions.[51] Together these three Conventions broadly cover the lifecycle management of a number

[46] *Stockholm Convention* art 3(1).
[47] *Stockholm Convention* art 6.
[48] Selin and Selin, above n 27, 266.
[49] Rakhyun E Kim, 'The emergent network structure of the multilateral environmental agreement system' (2013) 23 *Global Environmental Change* 980, 984.
[50] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury*, 1st Sess, UN Doc UNEP(DTIE)/Hg/INC.1/21 (15 July 2010) para 64 ('*INC 1st Session*').
[51] Adopted by the Conference of the Parties to the Basel Convention as decision BC.Ex-2/1, by the Conference of the Parties to the Rotterdam Convention as decision RC.Ex-2/1 and by the Conference of the Parties to the Stockholm Convention as decision SC.Ex-2/1.

of hazardous chemicals. They are also strengthened by the voluntary 2006 Strategic Approach to International Chemical Management (SAICM), an international policy framework to promote chemical safety that includes high-level declaration, policy strategy and action plan. Areas of collaboration between the Conventions include joint activities, managerial functions and services; synchronising budget cycles and an integrated approach to financing; review arrangements, audits, transparency and accountability; and information exchange and public awareness issues.[52] A 2013 omnibus decision on enhancing cooperation and coordination between the Conventions "expresse[d] its interest and signals its readiness to cooperate and coordinate with the Minamata Convention on Mercury" and invited the Minamata conference of plenipotentiaries to consider the same.[53] The coordination efforts between Basel, Rotterdam and Stockholm are also relevant to mercury management due to the reliance and borrowing of the Minamata Convention on these agreements, as discussed below.

However, there are limits to how far the collection of hazardous substance treaties can act as a net for all hazardous substance issues. One major problem is the difference in membership of the different Conventions, preventing a straight-forward reliance on other agreements to fill gaps.[54] The membership gap was a difficulty in negotiating the POPs Protocol to the CLRTAP, as not all Parties (e.g. the United States) had ratified the Basel Convention on which it relied.[55] It was also highlighted as one of the barriers to using the Stockholm Convention as an alternative to a mercury convention, as it would exclude parties that had not ratified the Stockholm Convention such as the United States.[56]

Another problem in the framework of agreements is that there are still regulatory gaps.[57] , The hazardous substances agreements do not cover identical lists of substances which limits the management across life-cycles. As one leading scholar notes, "the only substances addressed by all three are POPs, and the treaties collectively cover only a part of the life cycle of these – namely phase-

[52] For more information on the Synergies Process see: <http://www.brsmeas.org/Decisionmaking/Overview/SynergiesProcess>.
[53] *Omnibus decision on enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions*: *Adopted by the Conference of the Parties to the Basel Convention as decision BC.Ex-2/1, by the Conference of the Parties to the Rotterdam Convention as decision RC.Ex-2/1 and by the Conference of the Parties to the Stockholm Convention as decision SC.Ex-2/1*; see <http://www.brsmeas.org/Decisionmaking/Overview/SynergiesProcess>.
[54] Krueger and Selin, above n 24, 338.
[55] Ibid.
[56] Selin and Selin, above n 27, 266.
[57] Krueger and Selin, above n 24, 338.

out, prior informed consent for export and import, and management of POPs wastes".[58] Even of the POPs regulated, the lists in the CLRTAP POPs protocol and the Stockholm Convention differ so that the areas and manner of regulation vary between regional and global levels.[59]

Another potential gap is accountability, which has been seen in regimes other than the hazardous substance framework. Kim explored the problem of ocean acidification and whether it fit within the framework of relevant international agreements, including the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on the Law of the Sea and other marine agreements, and the Convention on Biological Diversity.[60] It was found that there is an accountability gap "due to diffused responsibilities, legal uncertainties, policy inconsistencies and externalities."[61] The principle of respecting the legal autonomy of treaties was identified as a hurdle, particularly with agreements not wishing to encroach upon the mandate of the UNFCCC - despite it not having assumed this responsibility and being considered legally too narrow to have jurisdiction over ocean acidification anyway. These same issues have not been raised in the context of the hazardous substance MEAs, perhaps because none of these agreements match the size, scope and politicisation of the UNFCCC. There is certainly a deferral of responsibility to other agreements in particular areas, as discussed below in the Minamata Convention text references to the Basel Convention, but this is intentionally done in an increasingly collaborative environment as seen through the Synergies Process.

These gaps between the hazardous substance treaties suggest that a lifecycle approach to hazardous substances is the most effective way of regulating them. This avoids relying on other treaties to address different elements of the problem and risking the gaps outlined above. The Minamata Convention is considered to incorporate a lifecycle approach as it addresses mercury from its mining through to its disposal. It is still important to assess the extent to which the Convention duplicated existing law to explore its actual contribution to existing mercury regulation. If Minamata did not make substantial new contributions to mercury regulation or forge new commitments then perhaps the gaps could have been better filled by non-regulatory measures or amendments to these existing commitments.

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[58] Katharina Kummer Peiry, 'The Chemicals and Waste Regime as a Basis for a Comprehensive International Framework on Sustainable Management of Potentially Hazardous Materials?' (2014) 23(2) *Review of European Community & International Environmental Law* 172, 176.
[59] Krueger and Selin, above n 24, 338.
[60] Rakhyun E Kim, 'Is a New Multilateral Environmental Agreement on Ocean Acidification Necessary?' (2012) 21(3) *Review of European Community & International Environmental Law* 243.
[61] Ibid 255.

2.4 Minamata's coverage of the gaps

2.4.1 Control measures and procedural provisions

The Minamata Convention will now be examined to see which areas of mercury regulation could be considered duplications of existing international law and which provisions provide new regulation. This section consists of a doctrinal analysis on the control measures of the Convention, which are those that specifically address the problem it was created to address. However, it is important to note that the creation of the Minamata Convention, or any new multilateral environmental agreement, establishes more than just measures to reduce environmental harm. It also contains many procedural provisions to guide the implementation of the control measures, such as establishing a Conference of the Parties and a Secretariat; establishing a financial mechanism; capacity-building, technical assistance and technology transfer; a compliance mechanism; information exchange; implementation plans and reporting; cooperation in research, development and monitoring; effectiveness evaluation and dispute settlement. The provisions are present in other hazardous substance agreements in varying degrees and they facilitate the control measures to be discussed below.

It is worth mentioning here that some of these procedural provisions in Minamata have been considered to be significant improvements upon those in the other chemical and waste MEAs. One such area is compliance. The Minamata negotiations reached agreement on the need for a compliance mechanism and this was written into Article 15 of the Convention. Article 15 establishes an Implementation and Compliance Committee which is charged with promoting implementation of, and reviewing compliance with, the Convention including both individual and systemic issues of implementation and compliance. Agreeing on the need to establish a compliance mechanism and embedding structural elements into the Convention "represents a significant departure from the contentious, long-running debates in other multilateral environmental agreements, notably including the Stockholm and Rotterdam Conventions."[62]

The agreement on compliance under Minamata was so successful, partly due to the experienced leadership in the negotiations, that the same co-chairs were used in a contact group for compliance for the Rotterdam and Stockholm Conventions. However, this group did not achieve the same success. The success of the Minamata negotiations has been attributed to the financial provisions of the Convention

[62] Jessica Templeton and Pia Kohler, 'Implementation and Compliance under the *Minamata Convention* on Mercury' (2014) 23(2) *Review of European Community & International Environmental Law* 211, 211.

providing assurances of support for State implementation, and to the fact that the mechanism was "facilitative in nature and contains virtually all 'carrots' and no 'sticks'".[63] The other Conventions have been stalled on issues of funding to meet obligations and the lack of incentives to create such a mechanism.[64] Therefore, separating the mercury problem into a new agreement that was able to surpass the procedural provisions of long-standing Conventions is a success that must be considered alongside the control measures to be discussed.

2.4.2 Supply and stocks

Article 3 of the Minamata Convention concerns mercury supply sources and trade. It prohibits any new mining for mercury, or "primary mercury mining", after the Convention enters into force.[65] Any mercury mining that was underway when the Convention enters into force may continue up to fifteen years after that date, and must only be used for purposes or disposal outlined under the Convention.[66] Parties should also identify mercury stocks that exceed 50 tonnes and sources of mercury exceeding 10 tonnes per year.[67] The supply of mercury is not currently covered by any of the multilateral agreements discussed above.

2.4.3 Trade

Mercury trade is also covered by Article 3 of the Minamata Convention. The provisions are very similar to those under the Basel Convention and the Rotterdam Convention. Parties to the Convention are allowed to export mercury to other Parties only with their written consent and only if it is for the purpose of a use allowed under the Convention or for interim storage, to be discussed below.[68] Additional assurances are required if a Party is exporting to or importing from non-Parties.[69] The procedure in the Minamata Convention is similar to the Prior Informed Consent mechanism in the Rotterdam Convention. The written consent required by Parties under Article 3 can be undertaken as a

[63] Ibid.
[64] Ibid 219.
[65] *Minamata Convention* art 3(3).
[66] *Minamata Convention* art 3(4).
[67] *Minamata Convention* art 3(5)(a).
[68] *Minamata Convention* art 3(6)(a).
[69] If Parties are exporting to non-Parties, it must be with written consent and requires certification demonstrating that the non-Party has measures in place to ensure the protection of human health and the environment, meets the Convention requirements for mercury wastes and storage, and is only for the purposes allowed under the Convention or for interim storage. Parties cannot import mercury from non-Parties without providing written consent and obtaining assurance that the mercury did not come from new primary mercury mining or a decommissioned chlor-alkali plant (as banned supply sources): *Minamata Convention* art 3(6)(b), 3(8).

general notification to the Secretariat which outlines the terms and conditions under which a party will consent to import.[70] The Minamata Convention website then lists the notifications which have been submitted. To date, only the United States has confirmed its consent of mercury imports, provided that such import complies with certain domestic laws.[71]

The departure from the Rotterdam Convention lies in the fact that the Minamata Convention covers mercury more broadly than just pesticides containing mercury compounds. However, it was acknowledged during the Minamata negotiations that the Rotterdam Convention could be extended to cover mercury products and processes if they meet the criteria for inclusion and trigger the process of considering a substance for the Prior Informed Consent procedure.[72] For this process to be triggered Parties from at least two regions must notify the secretariat of regulatory action undertaken to ban or severely restrict the substance. Sweden has already submitted this notification for mercury,[73] so if a Party from another region does the same, mercury may be considered for inclusion in the Rotterdam Prior Informed Consent procedure.

2.4.4 Wastes, storage and contaminated sites

Another area which the Minamata Convention had borrowed from existing Conventions is in the management of mercury wastes. Article 11 of the Minamata Convention requires the environmentally sound management of mercury wastes, taking into account Basel Convention guidelines.[74] Mercury wastes can only be recovered, recycled, reclaimed or directly re-used as allowed under the Minamata Convention itself or for environmentally sound disposal.[75] Mercury wastes may not be transported internationally except for environmentally sound disposal that is in conformity with the Minamata Convention and, for Parties to it, the Basel Convention.[76] The Conference of the Parties is required to

[70] *Minamata Convention* art 3(7).
[71] As of 21 January 2016: UNEP, *Notifications under the Minamata Convention* (2016) *Minamata Convention* on Mercury, <http://www.mercuryconvention.org/Countries/Notifications>.
[72] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Relevant issues being considered in international forums and their possible impact on the mercury negotiation process*, 1st sess, UN Doc UNEP(DTIE)/Hg/INC.1/18 (12 March 2010) para 5.
[73] Notification of final regulatory action may be found here: <http://www.pic.int/Procedures/NotificationsofFinalRegulatoryActions/Database>.
[74] *Minamata Convention* art 11(3)(a).
[75] *Minamata Convention* art 11(3)(b).
[76] *Minamata Convention* art 11(3)(c).

work closely with the bodies under the Basel Convention to review and update the mercury waste guidelines.[77]

Clearly Minamata relies heavily on the Basel Convention regime in managing mercury wastes. The latest revision of the detailed mercury waste guidelines was adopted by the Basel Convention Conference of the Parties at their 4-5 May 2015 meeting.[78] These guidelines include inventorying mercury wastes, monitoring, preventing the generation of mercury wastes, handling, transportation and storage of wastes, environmentally sound disposal and reducing releases of mercury from landfills and thermal treatment plants.[79] The guidelines now also refer back to the Minamata Convention, including the requirements for the reduction and phase-out of mercury in products and industrial processes. The development of the Basel mercury waste guidelines were already underway prior to the commencement of the Minamata negotiations.

This precedence, and the reliance of the Minamata Convention on the Basel Convention, suggests that Minamata has not added anything new to the area of mercury waste. However, it was raised in the Minamata negotiations that the membership between the Conventions will probably not be identical (a membership gap, as discussed above) and there is imprecision of the definition of mercury wastes under Basel.[80] Therefore Minamata may increase the number of States that are bound to responsibly manage mercury wastes, may have a broader definition of what constitutes mercury waste (thresholds are yet to be settled by the Conference of the Parties[81]) and has provided greater regulation around the generation of mercury waste through its provisions on the supply of mercury, products and manufacturing processes.

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[77] *Minamata Convention* art 11(4).

[78] Basel Convention Conference of the Parties, Decision BC-12/4, *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury*, <http://www.basel.int/TheConvention/ConferenceoftheParties/Meetings/COP12>.

[79] Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds*, UN Doc UNEP/CHW.12/INF/8 (22 April 2015).

[80] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Relationship between the future mercury instrument and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, 3rd sess, UN Doc UNEP(DTIE)/Hg/INC.3/7 (16 August 2011) para 44.

[81] *Minamata Convention* art 11(2). See: Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Compilation of information on the use of mercury waste thresholds*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/19 (9 December 2015).

Other areas with close connection to the Basel Convention are mercury storage and contaminated sites. Article 10 of the Minamata Convention concerns the interim storage of mercury if it falls outside of the scope of the waste provision. Parties must ensure that mercury or mercury compounds that are for an allowed use under the Convention are to be stored in an environmentally sound manner.[82] As with the Minamata waste provision, the Conference of the Parties is required to develop guidelines to inform interim storage of mercury, taking into account any guidance created under the Basel Convention.[83]

Sites contaminated with mercury are covered in Article 12 of the Convention. Parties shall endeavour to develop strategies for contaminated sites and the Conference of the Parties shall develop guidelines on managing such sites.[84] While Article 12 does not reference the Basel Convention, the technical guidelines for the environmentally sound management of mercury waste developed under the Basel Convention have provided such guidance. These technical guidelines reference the need for developing guidelines under Article 12 of the Minamata Convention,[85] and are recognised by the Minamata secretariat as being "directly relevant for guidance on options for managing the risks posed by contaminated sites."[86] It seems likely that as with waste, the contaminated site provisions of Minamata will rely heavily on the Basel guidelines.

2.4.5 Mercury use in products and manufacturing

The Minamata Convention requires under Article 4 that certain products that contain mercury must be phased out. The products, listed in Annex A, include batteries, switches and relays, fluorescent and high pressure mercury vapour lamps, cosmetics, pesticides, biocides and topical antiseptics, and certain non-electronic measuring devices. Parties must cease manufacture, import and export of these products by 2020. There are a number of mercury-added products listed as exemptions.[87] Dental

[82] *Minamata Convention* art 10(2).
[83] *Minamata Convention* art 10(3).
[84] *Minamata Convention* art 12.
[85] Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds*, UN Doc UNEP/CHW.12/INF/8 (22 April 2015) para 25.
[86] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Guidance on managing contaminated sites and the proposed way forward for developing guidance*, 7th sess, UN doc UNEP(DTIE)/Hg/INC.7/20 (5 November 2015), annex para 3.
[87] Exemptions apply to products essential for civil protection and military uses; for research, calibration of instrumentation and for use as reference standard; switches and relays, cold cathode fluorescent lamps and external electrode fluorescent lamps for electronic displays, and measuring devices where no feasible mercury-

amalgam is distinguished as requiring a phase down rather than a phase out.[88] Annex A provides a list of measures to phase down the use of mercury as dental amalgam and Parties should undertake two or more of these, discussed in more detail in Chapter 4. The list of products to be phased out is essentially the same as that in the Heavy Metals Protocol. Parties to the Heavy Metals Protocol are required to reduce mercury use in alkaline manganese batteries,[89] and encouraged to reduce mercury use in the products listed under the Minamata Convention.[90] A key difference is that other than alkaline manganese batteries, which Parties are required to reduce mercury use in, the Parties are merely encouraged to reduce mercury use in these products under the Heavy Metals Protocol.[91]

Article 5 of the Minamata Convention requires mercury or mercury compound use to be phased out or restricted in certain manufacturing processes.[92] The phase out processes are chlor-alkali production (to be phased out by 2025) and acetaldehyde production (phase out by 2018).[93] The processes in which mercury use must be restricted are vinyl chloride monomer production; sodium or potassium methylate or ethylate; and production of polyurethane using mercury containing catalysts.[94] Parties are required to report on these facilities to the Secretariat, which will be made publically available.[95] As with mercury mining, Parties are not allowed to use mercury or mercury compounds for processes in facilities that did not exist prior to the entry into force of the Convention.[96]

The Heavy Metals Protocol focuses on heavy metals from stationary sources as well as products. However, the only manufacturing process in the Minamata Convention that also appears in the Heavy Metals Protocol is chlor-alkali production. The Protocol requires that "[e]xisting chlor-alkali plants using the mercury cell process shall convert to use of mercury free technology or close by 31 December 2020".[97] This is a stricter requirement than the phase out in the Minamata Convention as it requires Parties to comply five years earlier. The other manufacturing processes listed under the Minamata Convention are not otherwise regulated internationally.

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free alternative for replacement; products used in traditional or religious practices; and vaccines containing thiomersal as a preservative: *Minamata Convention* annex A (a)-(e).

[88] *Minamata Convention* annex A, pt II.
[89] *Heavy Metals Protocol* annex VI(5).
[90] *Heavy Metals Protocol* annex VII(3).
[91] *Heavy Metals Protocol* annex VII(3).
[92] *Minamata Convention* art 5(2),(3).
[93] *Minamata Convention* annex B pt I.
[94] *Minamata Convention* annex B pt II.
[95] *Minamata Convention* art 5(5).
[96] *Minamata Convention* art 5(6).
[97] *Heavy Metals Protocol* annex V(17).

2.4.6 Releases to air, land and water

There is more cross-over between the Heavy Metals Protocol and the Minamata Convention on the releases of mercury to the atmosphere from stationary sources. Article 8 of the Minamata Convention concerns mercury emissions to the atmosphere from facilities. As this concerns the mercury released from coal-fired power plants, it was "one of the most contentious areas of negotiations."[98] The total list of "point sources" are coal-fired power plants; coal-fired industrial boilers; smelting and roasting processes used in the production of non-ferrous metals; waste incineration facilities; and cement clinker production facilities.[99] Any of these existing facilities must take measures to control these emissions and new facilities must be built with best available techniques and environmental practices.[100] All of these sources of mercury emissions are also listed in the Heavy Metals Protocol. Therefore, the Minamata Convention has not increased the point sources of concern under the Heavy Metals Protocol but it has greater geographic coverage.

There is, however, a major difference in the level of commitment to reducing emissions under each instrument. Under the Minamata Convention, Parties shall take measures to control emissions from existing sources and shall require best available techniques and best environmental practices for any new sources.[101] Parties may voluntarily submit actions plans to the Conference of the Parties to reduce emissions from point sources with goals, targets and outcomes, and shall implement one or more of a list of measures to control and reduce emissions.[102] There are no specific emission limits required or specified targets; within the measures listed Parties can choose to set their own quantified goal or emission limits. The lack of specific targets was particularly due to objections from China and India,[103] who together contribute 50 percent of the mercury emitted from stationary sources.[104]

The Heavy Metals Protocol, on the other hand, does require specific emission limits and time lines. Annex V imposes specific emission limit values for different stationary sources in the form of the maximum allowable milligrams of dust per cubic metre of gas emissions. These limit values are very detailed and technical, covering different variations of fuels and processes within the stationary sources.

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[98] Selin, above n 23, 11.
[99] *Minamata Convention* annex D.
[100] *Minamata Convention* art 8(3),(4).
[101] *Minamata Convention* art 8(3),(4).
[102] *Minamata Convention* art 8(3),(5).
[103] Selin, above n 23, 11-12.
[104] *Global Mercury Assessment 2013*, above n 13, iii.

The Heavy Metals Protocol also specifies the time lines for achieving these emission limit values in Annex IV.[105] The Heavy Metals Protocol is therefore much firmer than the Minamata Convention in its requirements to reduce atmospheric emissions of mercury and other heavy metals.

Article 9 of the Minamata Convention concerns other types of releases of mercury to the environment, namely to land and water. This provision serves as a catch-all for any releases of mercury to land or water that are not covered by other parts of the Convention. As with the emission requirements, Parties shall take one or more of a list of measures to reduce releases of mercury and may prepare a National Action Plan.[106] Parties must identify their sources of mercury releases and establish an inventory of them.[107] This broad requirement to reduce releases of mercury into the environment is not seen elsewhere in international law.

2.4.7 Artisanal and Small-Scale Gold Mining

A key area of the Minamata Convention that is not regulated by any other multilateral environmental agreement is artisanal and small-scale gold mining (ASGM), covered by Article 7 of the Convention. ASGM is now the largest anthrogenic contributor of mercury emissions into the atmosphere.[108] It is such a significant part of the Minamata Convention that it will be discussed in further detail in Chapters 3 and 4 in terms of miner livelihoods, health and the co-benefits beyond the Convention objective of protecting human health and the environment from mercury.

By way of summary, ASGM involves the addition of mercury to a finely ground ore which amalgamates with gold to separate it from the other materials. The mercury is released into the environment through the mine tailings as well as in the processes of separating the gold through burning, where it evaporates into the atmosphere. The health impacts from the use of mercury in ASGM are significant and affect not only the miners but their communities as a whole, the downstream consumers of fish that are contaminated with mercury, and the international community through the global transport of mercury.[109] The Convention requires that parties that have ASGM within their

[105] New stationary sources must have these emission limit values and best available techniques in place within two years of the Protocol entering into force, and existing stationary sources must do so within two years of entry into force or by 31 December 2020, whichever is the later: *Heavy Metals Protocol* annex IV(1).
[106] *Minamata Convention* arts 9(4),(5).
[107] *Minamata Convention* arts 9(3),(6).
[108] *Global Mercury Assessment 2013*, above n 13, ii.
[109] Ibid.

territories reduce, and where feasible eliminate, the use of mercury in this mining.[110] If the amount of ASGM is "more than insignificant" the Party must notify the Secretariat and develop a National Action Plan.[111] Annex C of the Convention outlines what must be included in these National Action Plans.

2.4.8 Health

The Minamata Convention is the first to include a specific article addressing the health impacts of a hazardous substance. This provision will also be discussed in more detail in Chapters 3 and 4. Article 16 encourages Parties to identify and protect populations at risk by adopting health guidelines for mercury exposure, setting targets for reducing exposure and public education; implement preventative programs for occupation exposure to mercury; promote health-care services for prevention, treatment and care for affected populations; and strengthen institutional and health professional capacities for dealing with mercury. The Conference of the Parties should consult, collaborate and exchange information with the World Health Organisation and the International Labour Organisation.[112] While this provision is not designed to reduce mercury pollution, it is considered a control measure as it is intended to address the problem that prompted the treaty's adoption.

2.4.9 Summary of control measures

Based on the analysis conducted above, the Minamata Convention contains a number of requirements and actions that are featured in other MEAs. These are summarised in Table 1. The key areas that are completely new in the international regulation of mercury include mercury mining, the storage of mercury and stockpiles, a general requirement to reduce mercury releases to land and water, ASGM and addressing the health impacts of mercury. Areas that have expanded existing international commitments include the requirement, rather than mere encouragement, to phase-out products containing mercury; the requirement to phase out mercury use in manufacturing processes beyond chlor-alkali production; the extension of the Prior Informed Consent procedure to mercury, rather than just mercury-containing pesticides; and the global, rather than only regional, regulation of stationary sources of mercury air emissions. A caveat on stationary sources is that it is yet to be seen how global the Heavy Metals Protocol will be now that it has been amended to facilitate greater membership; it may be that global coverage would eventually have occurred without the Minamata Convention. Areas

[110] *Minamata Convention* art 7(2).
[111] *Minamata Convention* art 7(3)(a).
[112] *Minamata Convention* art 16(2).

which the Minamata Convention has not improved upon the existing body of international mercury regulation include: waste, in which the Minamata Convention defers to the Basel Convention; chlor-alkali production, pending expanded membership of the Heavy Metals Protocol; and stationary sources of mercury air emissions, which are subject to less strict requirements than in the Heavy Metals Protocol.

Table 1: Summary of mercury issues covered by the Minamata Convention and other MEAs

Mercury Issue	Inclusion in Minamata	Inclusion in other MEAs	Duplication	Gaps Filled
Supply and stocks	Article 3: prohibits new mercury mining and phase out of existing mining. Parties must identify mercury stocks.	Stockholm Convention Includes a requirement to cease production of POPs.		Mercury mining is now regulated.
Trade	Article 3: written consent is required for exporting mercury and can only be for an allowed purpose under the Convention.	Rotterdam Convention Same consent procedure for pesticides containing mercury compounds		Mercury trade is now included in an informed consent procedure.
Waste and contaminated sites	Article 10: Mercury and mercury compounds must be stored in an environmentally sound manner. Article 11: Mercury wastes can only be recovered, recycled, reclaimed or re-used as allowed under the Convention or for environmentally sound disposal. Parties must take into account Basel Convention guidelines. Article 12: Parties shall develop strategies for managing sites contaminated with mercury.	Basel Convention Wastes that include mercury or mercury compounds can only be moved transboundary if in accordance with environmentally sound management principles. OECD members, EC members and Lichtenstein will soon be disallowed from transporting these wastes to non-members. Guidelines have been developed for managing mercury that include wastes and contaminated sites.	Minamata uses the Basel Convention guidelines for managing mercury waste and contaminated sites.	The storage of mercury and mercury compounds is now regulated.
Mercury use in products and manufacturing	Article 4: Certain product that contain mercury must be phased out, while others are exempt. Article 5: Manufacturing processed that use mercury or mercury compounds must be phased out.	Heavy Metals Protocol Parties are encouraged to reduce mercury use in products, and required to reduce it in alkaline manganese batteries. Mercury use must be phased out of chlor-alkali production.	The same list of products is mentioned in both, and Parties to the Heavy Metals Protocol were already required to cease using mercury in chlor-alkali production.	Minamata requires, rather than encourages, the phase out of mercury in certain products and contains a longer list of manufacturing processes that must phase-out mercury use.

Mercury Issue	Inclusion in Minamata	Inclusion in other MEAs	Duplication	Gaps Filled
Releases to air, land and water	Article 8: Parties with point sources of mercury air emissions must take measures to control these emissions. Article 9: Parties must identify, inventory and take measures to reduce emissions of mercury to land and water.	Heavy Metals Protocol Parties with stationary sources of mercury emissions must meet specified emission limits within specified time lines.	The same sources of air emissions are covered by both agreements, but commitments are stronger in the Heavy Metals Protocol.	Point sources are now covered globally. Released to land and water are now regulated.
Artisanal and Small-Scale Gold Mining (ASGM)	Article 7: Parties with ASGM in their territories must reduce, and where feasible eliminate, mercury use. If the amount of ASGM is more than insignificant Parties must develop National Action Plans.			Minamata is the first MEA to include ASGM activities.

2.5 Non-regulatory international mercury activities

It is clear that the Minamata Convention has filled some of the gaps in the international regulation of mercury. However, just as there were already treaties that managed parts of the global mercury problem there were also voluntary international activities being undertaken prior to the Minamata Convention. UNEP considered these prior to starting negotiations on the Minamata Convention, creating an Open Ended Working Group to consider the options of using voluntary measures, utilising existing legal instruments or creating a new legally-binding agreement for the global control of mercury. The voluntary options identified include the Global Mercury Partnership (GMP), a global mercury declaration and plan of implementation, a mercury code of conduct, a strategic approach towards technology transfer and assistance, and eco-labeling and certification.[113] Advantages to using voluntary options include saving the costs and time required to negotiate a legally-binding agreement and the proliferation of ineffective agreements as outlined in Chapter 1. Governments may also agree to more ambitious commitments when they are not binding.[114] There may also be more flexibility in partnerships and greater involvement with the private sector.

The GMP is one particular voluntary activity that was already addressing mercury prior to the Minamata Convention. Established by UNEP in 2005, the GMP consists of more than 100 partners and has a mandate to deliver immediate actions with the goal of protecting human health and the environment from the release of mercury. The GMP works across eight different areas of reducing mercury in chlor-alkali production, the cement industry, coal combustion, products and artisanal and small-scale gold mining, as well as controlling mercury supply and storage, managing mercury waste, research on mercury transport through the environment, and creating the Global Mercury Assessment and national inventories. Each of these actions are also addressed in the Minamata Convention as demonstrated above. Crucially, the GMP was already active in reducing mercury in ASGM which is one of the key gaps that Minamata filled in the international regulation of mercury. The new contributions of the Minamata Convention therefore shrink once voluntary activities are taken into account.

However, the Open Ended Working Group also identified a number of advantages for making a legally-binding agreement rather than voluntary measures, including a greater impact if states are

[113] Ad hoc Open-ended Working Group on Mercury, Study on options for global control of mercury, 1st mtg, UN Doc UNEP(DTIE)/Hg/OEWG.1/2 (20 August 2007).
[114] Selin and Selin, above n 27, 267.

alleged to be in non-compliance and therefore to be acting unlawfully.[115] In addition, the process of ratification through adopting domestic legislation increases the likelihood of compliance and institutional support is more likely to be created and sustained through a legally binding instrument.[116] In an area such as ASGM, the Minamata Convention will facilitate greater provision of financial resources and technical assistance through the GEF than voluntary measures could. It is also more comprehensive in its coverage so that all countries with more than insignificant ASGM are required to create National Action Plans rather than operating on an ad hoc project basis as in the GMP. In this case the successes of the GMP have emboldened and informed the Minamata Convention but the strength of the Convention's institutional provisions, particular in relation to financial assistance, made a legally-binding agreement significantly more appealing.

2.6 Conclusion

The Minamata Convention has introduced international regulation to some new areas of the global mercury problem. These include mercury mining, releases of mercury to land and water, ASGM and health impacts. However, many areas of the Minamata Convention have merely borrowed, explicitly or by default, from the Basel Convention and its guidelines on the environmentally sound management of mercury wastes. The Minamata Convention also borrowed the consent procedure for international mercury trade from the Rotterdam Convention, even though mercury could have been included under the latter. When compared with the CLRTAP, the Minamata Convention strengthened commitments to phase out mercury products but imposed weaker commitments to reducing mercury air emissions from point sources. Considering that other substances could eventually be deemed to require international regulation, there will be significant repetition in the areas of waste, trade and air emissions if the approach of the Minamata Convention sets a precedent.

Nevertheless, there are benefits to creating an instrument that covers the lifecycle of a substance even if some areas are duplications. This includes avoiding the gaps created between the piecemeal hazardous substance framework. Despite increasing cooperation and coordination through the Synergies Process, there are membership and regulatory gaps between the other agreements that would have prevented the maximum possible abatement of the mercury problem. The Minamata Convention, in following the lifecycle approach of the Stockholm Convention, signals a further move

[115] Ad hoc Open-ended Working Group on Mercury, Study on options for global control of mercury, 1st mtg, UN Doc UNEP(DTIE)/Hg/OEWG.1/2 (20 August 2007).
[116] Ibid.

away from regulating separate elements of environmental problems. It also found easier agreement on some of the procedural provisions than the other agreements, including the Stockholm Convention, and this suggests that limiting the focus to a singular problem allows for greater political effectiveness.

However, Chapter 1 presented the problem of proliferating treaties that are not achieving their goals and the problems when too many agreements cause distractions, resource struggles and diluted political will. Chapter 4 will further discuss the narrow framing of the Minamata Convention and the potential for a heavy metals treaty. The international community must seriously consider the significant cost and time savings in amending and expanding existing treaties rather than negotiating new ones to fill with duplicate provisions. Despite the success of the Minamata Convention in filling gaps in mercury regulation, adding to the duplication that exists throughout the hazardous substance framework raises major questions about this treaty-making approach for long-term efficiency in international environmental law.

CHAPTER 3: What's really at stake? Livelihoods, health and environmental justice under the Minamata Convention on Mercury

3.1 Introduction

Mercury affects the health and livelihoods of many people around the world. The Minamata Convention was created to address the harm to human health and environment from mercury, and its specific article on health impacts is unprecedented in international environmental law. While it does not explicitly reference livelihoods, the Minamata Convention recognises two distinct groups that are disproportionately affected by mercury in their livelihoods as well as their health. The first of these is artisanal and small-scale gold mining (ASGM) communities who use mercury to separate gold from ore. The Minamata Convention defines artisanal and small-scale gold mining (ASGM) as "gold mining conducted by individual miners or small enterprises with limited capital investment and production".[117] These miners are among the most impacted by the harmful effects of mercury as well as the most dependent on mercury for their livelihoods. The task of phasing out mercury in ASGM is complicated as the miners are often uneducated, living in poverty and with few options, if any, of alternative livelihoods.[118]

The second group recognised by the Minamata Convention is Arctic communities who rely on traditional foods. When communities consume animals that accumulate mercury in their bodies, particularly whales, dolphins and other cetaceans, the mercury is passed on to them. Some communities are dependent on these highly contaminated species for their subsistence and traditional way of life. This Chapter will focus on the effect of mercury contamination on the practice of aboriginal subsistence whaling (ASW) as defined under the International Whaling Commission (IWC). While commercial whaling has been banned by moratorium by the IWC since 1982, ASW is permitted on the grounds of cultural, nutritional and subsistence need. Meanwhile, the scientific community is amassing increasing evidence of broad scale contamination of cetaceans by toxins such as mercury and persistent organic pollutants (POPs). Therefore, mercury contamination undermines the ability of these communities to

[117] *Minamata Convention* art 2(a). ASGM has also been described as "small or large operations that use rudimentary techniques to extract [gold] operating in a legal or illegal fashion that are not on the radar of many mining companies, governments, and international environmental agencies": Jacopo Seccatore et al, "An estimation of the artisanal small-scale production of gold in the world" (2014) 496 *Science of the Total Environment* 662, 663.

[118] See for example: S Siegel and M M Veiga, 'The myth of alternative livelihoods: artisanal mining, gold and poverty' (2010) 41(3/4) *International Journal of Environment and Pollution* 272; Clifford, above n 31.

meet their cultural, nutritional and subsistence needs through ASW. This is recognised by the Minamata Convention in the preamble which notes "the particular vulnerabilities of Arctic ecosystems and indigenous communities because of the biomagnification of mercury and contamination of traditional foods".

While both affected populations are acknowledged by the Minamata Convention, their treatment is very different. The recognition of indigenous Arctic communities ends in the preamble, whereas ASGM has a specific article and annex devoted to the problem. The different treatment is illuminating of the weight given to reducing mercury use and adapting to its harm under the Convention and also raises questions of environmental justice. The term environmental justice was coined in the USA by opponents to the consistent locating of hazardous waste, landfill, incinerators and other undesirable sites in communities of colour.[119] The term has evolved to consist of a number of elements, including the disproportionate allocation of environmental burdens and benefits between communities.[120] In this thesis, environmental justice concerns those who use and benefit from mercury and those who bear the health burden of mercury contamination. The issue is complicated as ASGM mining communities fall into both categories.

This Chapter will firstly examine ASGM under the Minamata Convention. It will focus on how Minamata seeks to regulate mercury use in this practice, the challenges involved and the potential for alternative livelihoods. Interdisciplinary literature will be drawn upon as well as reports from the Minamata negotiations. The Chapter will then compare this with the plight of Arctic Indigenous communities who do not contribute to the global mercury problem but are disproportionately affected by it. The differences in the treatment of these activities will be challenged with a discussion of environmental justice under the Convention. The Chapter will then discuss how livelihoods could have had greater consideration in the Minamata Convention as well as how they could be incorporated in its implementation. The Chapter concludes with a discussion of the extent to which such multilateral environmental agreements should consider and prioritise health and livelihoods.

[119] Robert D Bullard, 'Race and Environmental Justice in the United States' (1993) 18 *Yale Journal of International Law* 319, 328.
[120] For a comprehensive overview of the different elements see Robert R Kuehn, 'A Taxonomy of Environmental Justice' (2000) 30 *Environmental Law Reporter* 10681.

3.2 Livelihood 1: ASGM

3.2.1 Health impacts of ASGM

The international community has focused considerable attention on artisanal and small scale gold mining ('ASGM') as it has sought to address the problem of global mercury pollution. This was crucial to reducing mercury pollution as ASGM is the largest contributor to anthropogenic mercury air emissions, accounting for more than 35% of total global emissions.[121] It is practiced by approximately 16 million people across Africa, Central America, South America and Asia and contributes 17-20% of the world's total gold production.[122] ASGM involves the addition of mercury to a finely ground ore which amalgamates with gold to separate it from the other materials. The gold is then detached from the mercury through burning, causing the mercury to evaporate into the atmosphere and transport across the globe.

The health impacts on the ASGM communities from the use of mercury are significant. Gibb and O'Leary (2014)[123] conducted a comprehensive literature review of studies relating to health impacts from mercury in ASGM communities and found more than 60 that measured exposure across 19 different countries. The most common health impacts reported were neurological effects including tremor, ataxia, memory problems, and vision disorder, and there was also evidence of kidney effects and possibly immunotoxic/autoimmune effects.[124] These impacts affect not only the miners but their communities as a whole, and the downstream consumers of fish that are contaminated with mercury.[125] The consequence is that mercury contamination caused by ASGM also affects the health of the global community directly, particularly through the consumption of fish.[126]

3.2.2 ASGM in the Minamata Convention

The health of not only the miners and their communities but also the global community was clearly a priority in the Minamata Convention. However, the livelihoods of the miners was also raised by several attendees in the negotiations. In the first session representatives of several countries with large

[121] Global Mercury Assessment 2013, above n 13, ii.
[122] Seccatore et al, above n 117.
[123] H Gibb and K G O'Leary, 'Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining community: a comprehensive review' (2014) 122(7) *Environmental Health Perspectives* 667.
[124] Ibid 670.
[125] Ibid.
[126] For a comprehensive overview of global mercury cycling see: *Global Mercury Assessment 2013*, above n 13.

ASGM sectors outlined their experiences and highlighted the complexity of the situation, stressing that "social and economic factors were very important, the serious pollution and health hazards notwithstanding."[127] A representative for the group of African countries said "artisanal and small-scale gold mining played a key role in poverty reduction and the instrument should therefore feature mandatory and firm objectives and goals for reducing the use of mercury in the sector and for developing implementation plans to that end."[128] A representative from a non-governmental organisation argued for trade in mercury for the purposes of ASGM to be permitted, stressing that "to prohibit it would jeopardize the livelihoods of many, especially in rural areas, and that illegal trade in mercury would increase considerably."[129]

The Minamata Convention has responded to this complexity through a customised approach. Responsibility for mercury use in ASGM is placed largely into the hands of national governments. Article 7 requires Parties that have ASGM within their territories take steps to reduce, and where feasible eliminate, the use of mercury and mercury emissions and releases to the environment. If the amount of ASGM is "more than insignificant" then Parties must notify the Secretariat and develop National Action Plans which are detailed in Annex C. These National Action Plans are one of the key features of the Convention as these are where the first international, substantive requirements for reducing mercury use in ASGM are found. National Action Plans must include national objectives, reduction targets and baseline estimates of mercury use and practices.[130] They must also include actions to eliminate the most polluting aspects of ASGM: whole ore amalgamation, open burning of amalgam, burning of amalgam in residential areas and cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing the mercury.[131]

National Action Plans allow countries flexibility in meeting their obligations, creating space for adaptation to local conditions and circumstances. The degree of flexibility made Annex C a less controversial aspect of the Convention in the negotiations.[132] Parties themselves are arguably the best

[127] *INC 1st Session*, above n 50, para 95.
[128] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its second session*, 2nd Sess, UN Doc UNEP(DTIE)/Hg/INC.2/20 (28 February 2011) para 26 ('*INC 2nd Session'*).
[129] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its fifth session*, 5th Sess, UN Doc UNEP(DTIE)/Hg/INC.5/7 (14 March 2013) para 99 ('*INC 5th Session'*).
[130] *Minamata Convention* annex C, arts 1(a),(d).
[131] *Minamata Convention*, annex C, art 1(b).
[132] Spiegel et al, above n 28, 6.

placed to lead implementation as "each item in Annex C requires in-depth understanding of the complexity of ASGM and the underlying reasons—social, economic and political—that underpin mercury use."[133] Some of these local requirements include steps to facilitate formalisation or regulation of the industry, strategies for promoting the reduction of emissions and exposure to mercury, for managing trade and preventing diversion of mercury into ASGM, and for involving stakeholders.[134] Interestingly, there is nothing explicit in Annex C about the miners' livelihoods. The Minamata Convention has not imposed any obligation on national governments to consider these or to facilitate a transition to alternative income sources. There are, however, health obligations added to Parties with ASGM in addition to Article 16. Parties are required to prevent the exposure of vulnerable populations to mercury, to provide information to miners and affected communities and to create a public health strategy.[135] The following sections will outline how the implementation and enforcement of these National Actions Plans may impact the health and livelihoods of ASGM communities.

3.2.3 Alternatives to mercury

Any requirement to eliminate the use of a substance without a viable alternative raises questions about both its effectiveness and its fairness, particularly if it transfers the responsibility to find replacements to communities without the technological or financial resources to do so. Success in reducing mercury use and eliminating open burning of amalgam will depend on the availability of alternatives to separating the gold from the ore and, where mercury is still used, alternatives to separating mercury from the gold. As mentioned in Chapter 1, much of the literature on ASGM is field-based and written by people who have been actively involved in trying to reduce mercury in these communities. They find that mercury is used for a number of reasons in ASGM including low cost, fast processing, simplicity and the ability for one person to undertake the whole process.[136] A lack of education on the risks is a common problem as "most miners across the globe are largely unaware, misinformed or unconvinced about the dangers of mercury."[137] However, as one scholar has noted, it is important to recognise that the use of mercury by miners is "a 'rational' decision that nearly all would

[133] Ibid.
[134] *Minamata Convention* annex C, arts 1(c),(e)-(g).
[135] *Minamata Convention* annex C, arts 1(h)-(j).
[136] Davies, above n 31, 114.
[137] Ibid 111.

make in the same circumstances, given the lack of alternatives, even with awareness of the risks (which does not apply to most miners)."[138]

This paper will not provide a detailed description of all possible alternatives to using mercury, but rather focus on the relevant issues for policy makers.[139] Current manual alternatives to mercury are often discounted due to problems like high expense, needing skilled labour, slow processing or requiring a plentiful water supply.[140] One of the main chemical alternatives is the use of cyanide to separate the gold from the ore.[141] This can be a highly effective process, but the health effects from using cyanide are more immediate and dangerous than using mercury. It is indicative of the limited options of miners and the hazardous nature of their work that cyanide, a notoriously dangerous product in the developed world mindset, is proposed as the safer option. However, it has also been said that "[t]he public thinking about cyanide is the main hurdle to accept gold cyanidation as a technique cleaner than amalgamation".[142]

Where mercury is still considered the only viable option, there are tools such as retorts which capture and condense the mercury in the burning process so that it may be reused rather than allowing it to evaporate into the atmosphere. There has also been controversy over the value of retorts, and previous failed attempts at promoting their use in Zimbabwe and Tanzania indicate:

> [P]roblems emerge when foreigners introduce retort designs without taking into account the local retort costs or without carefully thinking through who manages the retorts in the mining community and the various reasons why miners and mineral processors might not trust the technology…. illustrat[ing] that policymakers must recognize that theoretical ideas about mercury capture may simply not play out well in the local reality of artisanal miners' field circumstances—and instead must prioritize involvement of the local community in processes of technology adaptation.[143]

In contrast, the involvement of the local community was key to successfully reducing mercury through "The Columbia Mercury Project" in Antioquia, Columbia - a collaboration between the United Nations Industrial Development Organization, the Government of Antioquia, the National University of

[138] Clifford, above n 31, 109.
[139] For discussion of alternatives, see for example: Davies, above n 31 and Veiga, Angeloci-Santos and Meech, above n 31.
[140] Davies, above n 31.
[141] Ibid.
[142] Veiga, Angeloci-Santos and Meech, above n 31, 354.
[143] Spiegel et al, above n 28, 9.

Colombia and the University of British Columbia.[144] This project focused on educating miners and owners of the amalgam processing centres to reduce the amount of mercury added for amalgamation, and also included awareness campaigns in the towns, increased enforcement by the federal government and demonstrations and distributions of equipment.[145] The results were a 43% reduction in the mercury used in the processing, and a 63% reduction in mercury losses from 2010-2013, as a result of "systematic strategies that addressed the policy, participation, and personality dimensions of interventions, as well as ensuring optimal presence of project personnel and the patient persistence required to maintain efforts until significant changes were observed."[146]

Reducing and eliminating mercury use therefore seems to require a holistic, inclusive and long term approach that takes all reasons for mercury use into account, rather than seeking a technological "silver bullet". This is difficult for policy makers where underlying factors, such as poverty and a lack of education, are more entrenched and wider problems than mercury use itself. Whether the Convention is hoping to put an end to the mercury pollution that affects the global community, or is trying to improve the situations of the ASGM miners, may be reflected in how much effort is directed to the long term, sustainable transition of miners to low and no mercury practices, and how much is directed to criminalising mercury's use and enforcing its prohibition. This will indicate how health and livelihoods are balanced in the Convention and whose rights are prioritised.

3.2.4 Formalisation, criminalisation and enforcement

A related issue for miner livelihoods in the implementation of the Minamata Convention is the requirement that the National Action Plans include steps to formalise or regulate the sector.[147] Formalisation will be discussed in more detail in Chapter 4 on co-benefits. There is concern that efforts to reduce mercury, whether through banning its use or requiring miners to formalise, could lead to the criminalisation of miners and their activities. There is consensus in the literature that ASGM should be legalised before efforts begin to address ASGM problems.[148] The issue of criminality also brings into question enforcement capabilities which has been found to be lacking for many countries with ASGM.

[144] Oseas García et al, 'Artisanal gold mining in Antioquia, Colombia: a successful case of mercury reduction' (2015) 90 *Journal of Cleaner Production* 244.
[145] Ibid 247.
[146] Ibid 251.
[147] *Minamata Convention* annex C, art 1(c).
[148] Adrián Saldarriaga-Isaz, Clara Villegas-Palacio and Santiago Arango, 'The public good dilemma of a non-renewable common resource: A look at the facts of artisanal gold mining' (2013) 38 *Resources Policy* 224, 225.

Veiga et al argue, on the basis of extensive field experience, that without training and enforcement, miners will not change their techniques.[149] National legislation prohibiting or strictly regulating mercury use in mining already exists in nearly all countries with significant ASGM, "[y]et, mercury is freely available and is extensively, often liberally, used by small-scale prospectors: clear signs that such policies cannot be enforced."[150] Criminal activities such as drug abuse, money laundering and prostitution can also run rampant in ASGM communities due to a lack of enforcement.[151]

However, there are also examples where mercury regulation has been abusive or disproportionate. This has not only destroyed livelihoods but also has human rights implications, all in the name of environmental protection. Two specific examples have occurred in Zimbabwe and Peru. In Zimbabwe crackdowns on illegal ASGM in the name of protecting the environment by the state authorities resulted in more than 30,000 miners and traders being arrested between 2006 and 2009.[152] During this crackdown, "[s]tories of human rights abuses ran rampant, and various media outlets emphasized horrors of ruthless police invasion."[153] There were also negative impacts such as weakened trust between the regulators and communities and an increase in hazardous practices such as working at night.[154]

In Peru enforcement over artisanal gold mining regulations has led to political unrest with fatal consequences. In 2010 the government shut down seven gold mines lead to protesters blockading streets and police opening fire on a crowd of six thousand, killing six people and wounding thirty.[155] Since that event a number of other protests over gold mining have resulted in injury and death for miners.[156] This has caused the Peruvian government to fear that miners might start to fund armed groups to defend their interests, with the Environment Minister Manuel Pulgar-Vidal quoted as saying "[t]he risk that we are running is that, to protect themselves, illegal mining begins to finance armed groups, as in Colombia."[157] It is worth mentioning here that the involvement of armed groups in gold

[149] Veiga, Angeloci-Santos and Meech, above n 31, 354.
[150] Clifford, above n 31, 108.
[151] Marcello M Veiga and Jennifer J Hinton, 'Abandoned Artisanal Gold Mines in the Brazilian Amazon: A Legacy of Mercury Pollution' (2002) 26 *Natural Resources Forum* 13, 18.
[152] Spiegel et al, above n 28, 8.
[153] Samuel J Spiegel, 'Resource policies and small-scale gold mining in Zimbabwe' (2009) 34 *Resources Policy* 39, 42.
[154] Spiegel et al, above n 28, 8.
[155] Jessica Benko, 'Mother of God, Child of Zeus' (2010) 86(4) *Virginia Quarterly Review* 94, 120.
[156] Buccella, above n 29, 185.
[157] Andean Air Mail and Peruvian Times, 'Peru's Illegal Mining on Verge of Funding Armed Groups: Minister' Peruvian Times (14 May 2013) <http://www.peruviantimes.com/14/perus-illegal-miningon-verge-of-funding-armed-groups-minister/19119/>.

mining causes significant human rights violations in certain parts of the world, particularly in African states such as the Democratic Republic of Congo.[158] Further discussion of these violations is beyond the scope of this Chapter.

There is clearly an impact on the ability of miners to maintain their livelihoods if they are criminalised and find themselves in situations of conflict with their national governments. The health of the miners, as well as the global community through weakened implementation, is likely to also be affected. Criminalising miners excludes them from discussions and actions to reduce mercury, potentially rendering efforts less effective. Spiegel et al argue that "there is a risk that some policymakers might seize upon ambitious mercury reduction targets as a rationale for harshly policing [ASGM] communities rather than investing in long-term strategies to work with such communities."[159] Miners need to stop being labelled as illegal if they are to be included in mercury reduction programs, public health programs and international assistance programs.[160] In order to achieve the Minamata Convention objectives it is imperative that miners are involved for the sake of their own health and the global community impacted by their emissions.

3.2.5 Alternative livelihoods

Despite the changes the Minamata Convention requires of ASGM, it has been criticised for its lack of attention to the livelihoods of the miners in the text. There is no requirement to consider miner livelihoods in the National Action Plans, and the funding mechanism for developing countries "does not offer relief to the miners whose livelihoods are jeopardized by the convention's terms."[161] The Convention does not mention the need to create alternative economic development strategies, and in a country like Peru "the population that relies on illegal mining is far from guaranteed an economic safety net in the interim should the illegal gold mining industry be successfully curtailed."[162] Surely it would be an undesirable and unsustainable consequence of the Minamata Convention if mercury emissions were reduced by sending the millions of people dependent on ASGM into even further poverty. One author has questioned whether the countries imposing a ban on trade in mercury are "prepared to deal with

[158] For a detailed report see: Human Rights Watch, *The Curse of Gold: Democratic Republic of Congo* (Human Rights Watch, 2005).
[159] Spiegel et al, above n 28, 8.
[160] Samuel J Spiegel, 'Occupational Health, Mercury Exposure, and Environmental Justice: Learning From Experiences in Tanzania' (2009) 99(S3) *American Journal of Public Health*, S550.
[161] Buccella, above n 29, 183.
[162] Ibid.

the consequent poverty repercussions of debilitating such a fragile but central source of livelihoods".[163] The lack of funding relief to miners' livelihoods in the Convention suggests that this has not been made a priority.

Unintended consequences to local communities have been seen in other MEAs as they attempt to address global problems. The livelihoods of those practicing ASGM are also threatened by the Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative of the United Nations Framework Convention on Climate Change. REDD+ seeks to mitigate climate change through payments from wealthy nations to impoverished local communities for forest protection. This frequently occurs in regions with ASGM, such as sub-Saharan Africa, and both activities occur in rural areas with limited alternative livelihoods.[164] Deforestation is one of the key environmental impacts of ASGM, especially as large mining companies prohibit ASGM on their concessions and the displaced communities encroach on forest land.[165] ASGM communities and poverty alleviation may be negatively affected if these activities are not managed with the livelihoods of all stakeholders in mind: "if REDD restricts access to mineral reserves that are covered by forests, then it may prevent access to a valuable source of income and employment, therefore undermining the delivery of a development dividend."[166] Further marginalisation of the miners would likely undermine attempts to reduce deforestation anyway.[167] It is apparent that for international environmental efforts to be successful it is crucial for them to consider local livelihoods and the options of the local communities. To do otherwise is to risk undermining their environmental and development aims and to further disadvantage local communities.

3.3 Livelihood 2: Aboriginal subsistence whaling

3.3.1 What is ASW and how is it affected by mercury?

A completely different activity is also affected by mercury and the Minamata Convention. Whaling is a practice that has been undertaken by a number of indigenous peoples for millennia. While commercial whaling has been banned by moratorium by the International Whaling Commission ('IWC') since 1982, Aboriginal subsistence whaling ('ASW') is permitted on the grounds of cultural, nutritional

[163] Martin J Clifford, 'Potential repercussions of a mining ban on the artisanal and small-scale gold-mining sector: a viewpoint' (2010) 41(3/4) *International Journal of Environment and Pollution*, 229 at 235.
[164] Mark Hirons, 'Locking-In Carbon, Locking-Out Livelihoods? Artisanal Mining And REDD In Sub-Saharan Africa' (2011) 23 *Journal of International Development* 1140, 1141.
[165] Ibid 1142, 1144.
[166] Ibid 1143.
[167] Ibid 1146.

and subsistence need. ASW is a term which is undefined in the International Convention for the Regulation of Whaling.[168] In 1981 an ad hoc Technical Committee Working Group put forward the following definitions:

> *Aboriginal subsistence whaling* means whaling, for purposes of local aboriginal consumption carried out by or on behalf of aboriginal, indigenous or native peoples who share strong community, familial, social and cultural ties related to a continuing traditional dependence on whaling and on the use of whales.
>
> *Local aboriginal consumption* means the traditional uses of whale products by local aboriginal, indigenous or native communities in meeting their nutritional, subsistence and cultural requirements.[169]

Currently, ASW permits are provided to communities in the USA (for indigenous people in Alaska and the Makah tribe in Washington State), Russia (for the peoples of the Chukotka Peninsula), Greenland and St Vincent and the Grenadines.[170] There is evidence of a shifting trend across most of the Arctic from traditional to store bought foods, with younger generations consuming less traditional food than older generations.[171] However, the extent of human consumption of marine mammals is still widespread. An assessment of marine mammal consumption published in 2011 found that "since 1990, people in at least 114 countries have consumed one or more of at least 87 marine mammal species".[172]

Meanwhile, the scientific community is amassing increasing evidence of broad scale contamination of cetaceans by mercury along with persistent organic pollutants (POPs). The UNEP Global Mercury Assessment found that "[i]n some species of Arctic marine animals, mercury content has increased by 12 times on average since the pre-industrial period."[173] This leads to contamination of the communities that consume these animals. The Arctic Monitoring and Assessment Programme has confirmed that "people who eat large quantities of marine mammals have higher POPs and mercury levels than those who do not."[174] For example, a review of human health in the Arctic had findings that

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[168] *International Convention for the Regulation of Whaling*, opened for signature 2 December 1946, 161 UNTS 72 (entered into force 10 November 1948).
[169] G P Donovan, 'The Ad Hoc Committee Working Group on Development of Management Principles and Guidelines for Subsistence Catches of Whales by Indigenous (Aboriginal) Peoples' (1981) Special Issue 4 *International Whaling Commission And Aboriginal Subsistence Whaling* 83.
[170] For current Aboriginal Subsistence Whaling Catch Limits see: International Whaling Commission, *Catch Limits & Catches taken* (2015) <https://iwc.int/catches>.
[171] SG Donaldson et al, 'Environmental contaminants and human health in the Canadian Arctic' (2010) 408 *Science of the Total Environment* 5165, 5223.
[172] Martin D Robards and Randall R Reeves, 'The global extent and character of marine mammal consumption by humans: 1970–2009' (2011) 144 *Biological Conservation* 2770.
[173] *Global Mercury Assessment 2013*, above n 13, iii.
[174] Ibid xiii-xiv.

Inuit women had significantly higher levels of mercury in maternal blood than other ethnic groups, and levels of a number of POPs have been found around 6-12 times higher for Inuit mothers.[175]

Mercury contamination has also been identified as a problem outside of the Arctic. A suite of studies have been conducted in the last fifteen years to analyse the level of contamination of cetacean products marketed for human consumption in Japan. Japan is significant in this consideration as it has "the only substantial commercial market for whale meat in the world."[176] Studies lead by Tetsuya Endo have consistently found levels of mercury and POPs that exceeded Japanese health guidelines,[177] and even found that mercury concentrations in samples of boiled liver were "high enough to cause acute intoxication… from a single ingestion".[178] The resulting level of contamination in the Japanese populations that consume whale meat has also been assessed and found to be increased as a result of their consumption. The levels of mercury in hair samples of the residents of the whaling town of Taiji, Japan, have been found to be markedly higher than the overall population that does not consume whale meat.[179]

Another relevant case study demonstrating the extent the contamination problem is the Faroe Islands, where communities have hunted pilot whales for at least 400 years by herding pods into shallow water to kill them.[180] In 2008 the Chief Physician and the Chief Medical Officer of the Faroe Islands made a recommendation to the government that, as a result of mercury and POP contamination, pilot whales

[175] J Van Oostdam, 'Human health implications of environmental contaminants in Arctic Canada: A review' (2005) 351-352 *Science of the Total Environment* 165, 232.
[176] Brian Trevor Hodges, 'The Cracking Facade of the International Whaling Commission as an Institution of International Law: Norwegian Small-Type Whaling and the Aboriginal Subsistence Exemption' (2000) 15 *Journal of Environmental Law and Litigation* 295.
[177] For example: Tetsuya Endo et al, 'Total Mercury, Methyl Mercury, and Selenium Levels in the Red Meat of Small Cetaceans Sold for Human Consumption in Japan' (2005) 39(15) *Environmental Science and Technology* 5703; T Endo et al, 'Contamination by mercury and cadmium in the cetacean products from Japanese market' (2004) 54 *Chemosphere* 1653; T Endo et al, 'Mercury Contamination in the Red Meat of Whales and Dolphins Marketed for Human Consumption in Japan' (2003) 37 *Environmental Science and Technology* 2681; T Endo et al, 'Distribution and toxicity of mercury in rats after oral administration of mercury-contaminated whale red meat marketed for human consumption' (2005) 61 *Chemosphere* 1069. See also: M P Simmonds et al, 'Human Health Significance of Organochlorine and Mercury Contaminants in Japanese Whale Meat' (2002) 65 *Journal of Toxicology and Environmental Health* 1211.
[178] T Endo et al, 'Contamination by mercury and cadmium in the cetacean products from Japanese market' (2004) 54 *Chemosphere* 1653, 1653.
[179] Masaaki Nakamura et al, 'Methylmercury exposure and neurological outcomes in Taiji residents accustomed to consuming whale meat' (2014) 68 *Environment International* 25; Tetsuya Endo and Koichi Haraguchi, 'High mercury levels in hair samples from residents of Taiji, a Japanese whaling town' (2010) 60 *Marine Pollution Bulletin* 743.
[180] Russell Fielding, 'A Comparison of Pilot Whale Drives in Newfoundland and the Faroe Islands' (2007) 123(3) *Scottish Geographical Journal* 160, 162.

should no longer be used for human consumption.[181] Mercury contamination in the Faroe Islands was recognised as early as 1977 as being high in the meat and 100 fold higher in the kidneys and livers.[182] Dietary advice about eating pilot whales was gradually tightened until the 2008 recommendation concluded "that pilot whales today contain contaminants to a degree that neither meat nor blubber would comply with current limits for acceptable concentrations for toxic contamination."[183] No government action was taken to stop the whale hunt and instead dietary advice continued to be provided to the community. In 2012 the recommendation was issued again, warning that evidence of health effects on birth cohorts in the community included adverse effects on foetal development of the nervous system, higher blood pressure, adverse immune system effects, and an increased risk of developing Parkinson's disease, hypertension and arteriosclerosis.[184] While this Chapter is focused on ASW, it is clear that eating cetaceans is a strong cultural practice in certain parts of the world as well as a part of many subsistence livelihoods.

3.3.2 Long term effects of mercury contamination

The Minamata Convention preamble notes "the particular vulnerabilities of Arctic ecosystems and indigenous communities because of the biomagnification of mercury and contamination of traditional foods." It attempts to reduce and eliminate mercury in the environment through its control measures, outlined in Chapter 2. Unfortunately, the nature of mercury means that it will have a legacy long after it has stopped being used. According to the UNEP Global Mercury Assessment "there will likely be a time-lag of years or decades… before emissions reductions begin to have a demonstrable effect on mercury levels throughout the environment and in the fish and marine mammals which are part of the human food-chain."[185] One study investigating whether restrictions on persistent organic pollutants and mercury have led to concentration declines in Beluga whales found that either there is a

[181] Pál Weihe and Høgni Debes Joensen, Submission to the Prime Minister, the Minister of Health, and the Minister of Trade and Industry, *Recommendations to the government of the Faroe Islands concerning the pilot whale*, 7 August 2008 (English translation).
[182] Ibid.
[183] Ibid.
[184] Pál Weihe and Høgni Debes Joensen, "Dietary recommendations regarding pilot whale meat and blubber in the Faroe Islands" online: (2012) 71 *International Journal of Circumpolar Health* 3.
[185] *Global Mercury Assessment 2013*, above n 13, iii.

lagging response in the Arctic to source reductions or else concentrations are being maintained by unregulated sources.[186]

Looking forward, projections of the trajectories of mercury emissions under the Minamata Convention have found that, while there may be significant local benefits in regulating mercury waste and its use in ASGM, reductions in the global cycling of mercury will be small to 2050.[187] While there is benefit in avoiding an increase in emissions, this still leaves the problem of the current levels of mercury that will persist in the environment and food chain. It has been argued that if the Minamata Convention is to be successful it requires three critical adaptive elements: policy makers must view this as a long term priority to account for legacy effects and the overall persistence of mercury in the environment; a global framework will be needed for cost effective, long term monitoring programs; and harmonized regulatory tools must be developed to detect improvements (or lack thereof) of ecosystem and human health at all scales.[188]

Most mercury policies prior to the Minamata Convention did not focus on adaptation, which would involve minimizing human or environmental exposure to and impacts from mercury prior to a long term, successful reduction in contamination.[189] This might include public health advice for safe fish consumption choices in the short term as "full ecosystem recovery is only possible in the very distant future".[190] Article 16 on Health Aspects in the Minamata Convention includes elements to both reduce exposure to mercury and address the exposure that already exists. It encourages parties to identify and protect populations at risk, reduce exposure to mercury, implement educational and preventative programs on occupational exposure, promote appropriate health care and increase institutional and health professional capacities. The World Health Organisation is currently developing technical guidelines to inform the creation of public health strategies in ASGM.[191] This specific provision on health seeks to reduce further negative impacts while also recognising that people are currently experiencing

[186] Jennifer Hoguet et al, 'Spatial and temporal trends of persistent organic pollutants and mercury in beluga whales (Delphinapterus leucas) from Alaska' (2013) 449 *Science of the Total Environment* 285.
[187] Selin, above n 26.
[188] Editorial, 'United Nations Environment Programme's Global Mercury Partnership: Science for Successful Implementation of the *Minamata Convention*' (2014) 33(6) *Environmental Toxicology and Chemistry* 1199, 1200.
[189] Selin, above n 25, 2398.
[190] Elsie M Sunderland and Noelle E Selin, 'Future trends in environmental mercury concentrations: implications for prevention strategies' online: (2013) 12(2) *Environmental Health* <http://www.ehjournal.net/content/12/1/2>.
[191] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Overview of progress in the development of public health strategies on artisanal and small-scale gold mining, including in the context of the Minamata Convention on Mercury*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/INF/7 (2 February 2016).

health effects. It also creates a response to the legacy effects of mercury as it seeks to establish ongoing healthcare.

The Minamata Convention also requires research and monitoring under Article 19. Of particular relevance, parties shall develop and improve modelling and monitoring of mercury levels in vulnerable populations and assessments of the impacts of mercury not only on human health and the environment, but also the social, economic and cultural impacts.[192] This suggests that the Minamata Convention has taken a longer term approach to the mercury problem and seeks adaptive actions beyond preventing pollution in the first place. However, parties are not required to act on these impacts, unlike the requirement to act on reducing mercury emissions, so there is still a much stronger focus on reducing mercury contamination rather than addressing its impacts.

3.4 Health and livelihoods as priorities under Minamata

3.4.1 Environmental justice

The treatment of ASGM communities and Arctic indigenous communities are very different under the Minamata Convention. The recognition of Arctic indigenous communities ends in the preamble, whereas ASGM has a specific Article and Annex devoted to the problem. The number of people directly affected is drastically different between the two. ASGM is practiced by approximately 16 million people across Africa, Central America, South America and Asia[193] and it is estimated that between 80 and 100 million people are dependent on ASGM activities for their livelihoods.[194] In contrast, there are approximately 400,000 Arctic indigenous people in total[195] and adding in the numbers of non-Arctic communities practicing ASW only marginally increases that amount.[196] ASGM is now the largest contributor to anthropogenic mercury air emissions to the environment, accounting for more than 35% of total emissions.[197] Therefore much of the mercury that is affecting human health and

[192] *Minamata Convention* arts 19 (1)(b),(c).
[193] Seccatore et al, above n 117, 662-667.
[194] Spiegel et al, above n 28, 3.
[195] Arctic Council, *Arctic Peoples* (15 October 2015) <http://www.arctic-council.org/index.php/en/our-work/arctic-peoples>.
[196] There are currently only two non-Arctic catch limits in force under the IWC: St Vincent and the Grenadines and the Makah indigenous people in Washington State in the USA. Their catches are minimal, for example in 2014 (the last complete year of data) there were only two whales caught in St Vincent and the Grenadines and none by the Makah people. See: International Whaling Commission, Catches Taken: ASW (2016) <https://iwc.int/table_aboriginal>.
[197] *Global Mercury Assessment 2013*, above n 13, ii.

the environment globally is currently being produced by ASGM. While ASGM communities are bearing a high burden of mercury pollution, they are also now the largest contributor to mercury air emissions. On the other hand, Arctic indigenous communities do not contribute significantly, if at all, to the global mercury problem.

There are four elements to environmental justice: distributive justice, procedural justice, corrective justice and social justice and each have relevance to the Minamata Convention.[198] Distributive justice calls for "the fair allocation of the benefits and burdens of natural resource exploitation among and within nations."[199] As discussed above, those practicing ASW are typically not receiving any benefit from the use of mercury but are disproportionately burdened with pollution. ASGM communities are benefitting from gold production but are also burdened with its harms; however, even the extent of their benefit is limited by external factors such as land title, interactions with government, the price of gold, etc. Procedural justice calls for the comprehensive participation of local communities in environmental decision-making and the Minamata Convention includes elements of this. The National Action Plans shall include "strategies for involving stakeholders in the implementation and continuing development of the national action plan".[200] They are also required to include strategies for communicating information to ASGM communities. In contrast, there is no call for Arctic Indigenous communities or those otherwise affected by mercury through traditional food consumption to be included in decision-making.

Corrective justice concerns punishment for law breakers and the way damages are addressed. There is no inclusion of this in the Convention, nor should there be for ASGM. This Chapter has given an overview of some of the challenges to reducing mercury in ASGM, and considering the limited options in both practice and livelihoods, to punish miners for the damage already done would be unjust. Considering that until recently the largest contributor to mercury air emissions was coal-fired power plants, there may be future research in questioning whether there should be any redress by these emitters to Artic Indigenous communities whose traditional way of life is threatened. However, there has not been any such movement for the harms caused to these communities by POPs, despite the Stockholm Convention being concluded 15 years ago. Social justice is broadly relevant to the Minamata

[198] For an overview of each element see Kuehn, above n 120.
[199] Carmen G Gonzalez, "Environmental Justice and International Environmental Law" in Shawkat Alam, Jahid Hossain Bhuiyan, Tareq M R Chowdhury, Erika Techera, eds, *Routledge Handbook Of International Environmental Law* (Routledge, 2012) 3-4.
[200] *Minamata Convention* annex C (1)(g).

Convention as it concerns the social, racial and economic elements of environmental concerns. Although environmental justice has no explicit reference in the Minamata Convention, there are some elements of it throughout. Once again, these concern ASGM communities far more than Arctic Indigenous communities and ASW.

3.4.2 What would consideration of livelihoods look like?

Health has clearly been given a far more explicit priority than livelihoods in the Minamata Convention in light of Article 16. As mentioned, this is the first such article in a MEA. However, there have been other MEAs that include explicit consideration of livelihoods. The Convention to Combat Desertification (CCD) includes in its preamble an acknowledgement that "arid, semi-arid and dry sub-humid areas … are the habitat and source of livelihood for a large segment of its population". It also includes many requirements of local community participation throughout and suggests that National Action Plans could include establishing "alternative livelihood projects that could provide incomes in drought prone areas".[201] Sectors that foster alternative livelihoods should also be prioritised for technology cooperation[202] and capacity building should include "innovative ways of promoting alternative livelihoods, including training in new skills".[203]

It is difficult to argue that the Minamata Convention should have included explicit consideration of the livelihoods of those engaging in ASW. In a way, the entire Convention works towards protecting these livelihoods by reducing the amount of global contamination that ends up in traditional food. There are reasons why suggesting alternative livelihoods for ASW in the Convention, as seen in the CCD, would have been problematic. Firstly, ASW is founded on cultural practices that may be more important to these communities than the nutritional detriment of consuming the contaminants. Secondly, as discussed above, ASW does not contribute to the global mercury problem the way that ASGM does, or the way that certain livelihoods may contribute to desertification.

Nevertheless, the consideration of livelihoods in the CCD is not founded entirely on preventing desertification, as evidenced by the inclusion of strategies for poverty eradication. There could have been an objective in the Minamata Convention to assist those whose livelihoods are affected by

[201] *United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*, opened for signature 14 October 1994, 1954 UNTS 3 (entered into force 26 December 1996) art 10(3)(d) ('*Convention to Combat Desertification*').
[202] *Convention to Combat Desertification* art 18(1)(d).
[203] *Convention to Combat Desertification* art 19(1)(h).

mercury pollution or the Convention itself to transition to alternative employment. In the first Intergovernmental Negotiating Committee meeting for the Minamata Convention a representative of the International Labour Organisation said "communities that depended on mercury for their livelihoods needed to be provided with viable employment alternatives".[204] A representative speaking on behalf of African countries also argued that the cost of employment alternatives had to be provided for.[205] While the rest of this section will focus on ASGM, a broad consideration of livelihoods could have also helped those involved in primary mercury mining who will soon be out of work when the mines are decommissioned.[206]

Looking at the Minamata Convention as it stands, a straightforward way to increase the consideration of livelihoods depending on ASGM would have been to require their inclusion in the National Action Plans. There could have been a requirement to include strategies for ensuring that livelihoods would be protected or transitioning miners to alternative livelihoods, as was featured throughout the CCD. The focus in the Minamata National Action Plans as they stand in Annex C is to transition miners to low or no mercury mining practices rather than out of the activity altogether. The Global Mercury Partnership has created draft guidance on developing National Action Plans which does include reference to alternative livelihoods. The guidance suggests that encouraging alternative livelihoods might be an additional objective that makes use of the flexibility in the National Action Plans.[207] The draft guidance also suggests that part of the communication strategy with the miners could include information on alternative livelihoods.[208] However, these are clearly optional additions should countries wish to pursue them.

The choice between making mining a more sustainable livelihood or pushing for alternative livelihoods to ASGM is contentious. Siegel and Veiga propose that the very notion of alternatives for these miners is a myth, and that in these poverty stricken areas "[g]old mining itself is the alternative

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[204] *INC 1st Session*, above n 50, para 40.
[205] *INC 2nd Session*, above n 126, para 26.
[206] This was recognised throughout the negotiations, see for example: Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its third session*, 3rd sess, UN Doc UNEP(DTIE)/Hg/INC.3/8 (31 October 2011) para 23 ('*INC 3rd Session*').
[207] UNEP, *Developing a National Action Plan to Reduce, and Where Feasible, Eliminate Mercury Use in Artisanal and Small Scale Gold Mining*, *Working Draft* (17 August 2015) 37, available at: <http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/ASGM/National%20Action%20Plan_draft%20guidance%20v12.pdf>.
[208] Ibid 67.

livelihood."[209] For example, "in both Geita District in Tanzania and Kadoma District in Zimbabwe, socially heterogeneous gold mining communities depend on mercury due to the lack of readily available cleaner technologies, and in both cases, droughts, poor agricultural markets and a critical lack of alternative livelihoods have fuelled the expansion of gold mining since the 1980s."[210] This demonstrates why it was necessary to include great flexibility in the National Action Plans so that parties can respond to their own circumstances. Annex C could still have included a requirement to create strategies for protecting livelihoods or transitioning miners to alternative livelihoods which could have been implemented as appropriate for different regions.

There could be more avenues for protecting or transitioning livelihoods in the funding and technology areas of the Convention. The Global Environment Facility (GEF) has programmed $141 million for mercury activities over its sixth replenishment period (2014-2018). The Minamata Convention Conference of the Parties will be providing the GEF with indicative categories for funding under the Convention and these could include projects that create alternative incomes. During the seventh Intergovernmental Negotiating Committee the GEF reported on funding to 23 projects during July 2014-October 2015 which have "provided assistance to countries to develop initial assessments of their mercury issues, mercury reduction or elimination, and sustainable alternatives."[211] Funding eligibility at the moment is proposed to be directed towards the initial assessments, preparation of National Action Plans and activities to implement the provisions of the Convention.[212] This initial funding will be discussed in more detail in Chapter 4 on the potential for co-benefits.

It is not clear yet whether funding will be specifically allocated for protecting or creating alternative livelihoods to ASGM in the future but it seems likely that it would be wrapped into funding for the National Action Plans. This leaves it to the states with ASGM and national actions plans whether they wish to prioritise livelihoods. Providing states flexibility in implementing their obligations does allow them to cater to the specific needs and circumstances of their populations, but this assumption is based on the premise that states will act in the best interests of these impoverished, mostly illegal

[209] Siegel and Veiga, above n 118, 285.
[210] Spiegel et al, above n 28, 6.
[211] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Progress report of the Global Environment Facility*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/INF/3 (25 February 2016) para 11.
[212] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Draft guidance to the Global Environment Facility on overall strategies, policies, programme priorities, eligibility for access to and utilization of financial resources and on an indicative list of categories of activities that could receive support from the Global Environment Facility Trust Fund*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/8 (15 December 2015).

communities. The examples in Zimbabwe and Peru discussed above indicate that this is not always the case. While prioritising alternative livelihoods raises the question of how to create alternative incomes in areas already high in poverty, this challenge competes with the difficulty of being able to transition miners away from mercury use. As discussed above, this has proven to be very difficult for a number of reasons and will be an ongoing challenge in the implementation and enforcement of the Convention. If miners are forced to stop using mercury before alternative extraction practices are established this will nonetheless be damaging to livelihoods as well.

3.5 Conclusion

The objective of the Minamata Convention to protect human health and the environment from anthropogenic emissions of mercury is indisputably a good intention for a global agreement. However, health is only one part of the wellbeing of the people whose lives are affected by environmental damage. The Minamata Convention did not explicitly factor in the livelihoods that are threatened by mercury or those that depend on mercury. In particular, ASGM communities and those who practice ASW and consume other traditional foods are heavily impacted by mercury.

Article 19 includes scope for parties to consider livelihood impacts from mercury, along with social and cultural impacts that will affect both ASGM and ASW. There is no requirement for action in this article so it far from guarantees equitable outcomes for these communities. ASW has no specific protection within the Convention and the outcome for these communities will depend on Parties thoroughly implementing Article 16 and reducing overall mercury contamination in the environment. The Minamata Convention has the potential to be problematic for ASGM if the local and regional operation of the Convention has unintended consequences that leave vulnerable communities in a worse position. If the Convention results in one set of rights violations merely being replaced with others, this is not a desirable or sustainable step forward. Whether the Minamata Convention is able to address the need for miner livelihoods will be largely dependent on the implementation of the National Action Plans and whether funding is eventually provided to address consequences for miners' livelihoods.

There are partner organisations that can help to fill in the gaps made by MEAs. The Minamata Convention requires the Conference of the Parties to consult, collaborate and exchange information with the World Health Organisation and the International Labour Organisation on health issues and

activities.[213] It is efficient to call upon existing institutions so that duplication is avoided. However, it is not yet clear exactly how this cooperation with play out and the allocation of responsibilities. More work has been done on the side of ASGM communities than Arctic indigenous communities for reasons laid out in this chapter. Whether the health and livelihoods of the communities depending on traditional foods for cultural, nutritional and subsistence needs will be given greater attention by these partner organisations is yet to be seen.

The scale that global agreements are now being asked to operate on is vast, from protecting the global environment down to individuals' health, social and economic wellbeing. This challenge may require the aims of such agreements to be placed in a hierarchy so that the implementation is not side-tracked by secondary objectives. The Minamata Convention seems to have done just that. The sole specified objective of the Minamata Convention is to protect human health and the environment from mercury. At this point in time any aim of securing livelihoods for those affected is coming in well behind that primary objective. Without explicit reference to environmental justice in the Minamata Convention, it must be implemented with the justice elements in mind. This will ensure the Convention truly serves those it seeks to protect.

[213] *Minamata Convention* art 16.

CHAPTER 4: Narrow but deep: segmentation and cobenefits in the Minamata Convention on Mercury

4.1 Introduction

The Minamata Convention is a unique agreement in many ways. Chapter 2 outlined how it has filled some gaps in the hazardous substance regulatory framework and improved upon others. Chapter 3 detailed how it was the first multilateral environmental agreement to introduce a health article to directly address the current and future health effects of mercury. The Minamata Convention singled out mercury to be regulated in isolation, which makes it markedly different from the other MEAs that seek to eliminate harmful substances such as the Stockholm Convention and the Montreal Protocol. Those agreements cover a number of substances with similar properties; the Minamata Convention focuses on just one. The differences distinguish the Minamata Convention as an agreement that is narrow but deep: it only covers one substance but goes further in the regulation of that substance than the previous agreements did for their targets.

Mercury itself is a unique substance. It is the only elemental metal that is liquid at room temperature. However, it is not the only metal with toxic properties that are harmful to human health and the environment. Lead, cadmium, arsenic and chromium are some of the other heavy metals with demonstrated harmful effects. This chapter will first explore the options for a theoretical heavy metals treaty and compare these to the Minamata Convention. The purpose of this is to weigh the efficiency of the Minamata Convention against alternative regulatory options to consider the effects of a narrow treaty framing. It will also explore what the most appropriate options could be for future hazardous substance treaties.

The chapter will then consider, given that a single substance option was chosen, what unique benefits might come from that decision. It will examine the breadth of regulation and potential for co-benefits under the Minamata Convention beyond reducing harm to human health and the environment. Other international environmental laws seem to be moving in a direction that also takes a wider view of environmental issues to incorporate social and economic factors. The recent 2015 Paris Agreement includes many of these in its preamble. The Agreement seeks to take into account “the imperatives of a just transition of the workforce and the creation of decent work and quality jobs” and acknowledges that:

> "Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity".

` The Paris Agreement, even more so than the Minamata Convention, is still too recent to say whether it has achieved co-benefits yet. The potential for co-benefits under the Minamata Convention in this Chapter have been obtained from a wide range of existing interdisciplinary literature that either looks at past results of mercury policies or speculates about the Convention. This discussion will be used to determine whether the sacrifices made in creating a narrow agreement are made up for by the depth of regulation made possible. Finally, the chapter will question if the scope of the Minamata Convention is part of a trend towards broader benefits that creates a precedent for future hazardous substance treaties, and even international environmental law more generally.

4.2 A narrow agreement: just one of the heavy metals

4.2.1 Why consider other heavy metals?

The doctrinal analysis in Chapter 2 indicated that the Minamata Convention has filled some significant gaps in the international regulatory coverage of mercury. It also improved upon the compliance mechanism that has been problematic in other hazardous substance MEAs. However, there are disadvantages to addressing problems one at a time. Chapter 1 introduced the problem of treaty fatigue, the time and costs involved in making agreements, and the limited achievement of treaty goals. As mentioned above, mercury is not the only heavy metal that poses a problem to the health of humans and the environment. It is, however, the only heavy metal that has its own specific treaty. There are other heavy metals such as lead and cadmium that have been discussed in many of the same regulatory fora as mercury. UNEP has been mandated to address lead and cadmium since 2001.[214] The 1998 Heavy Metals Protocol discussed in Chapter 2 covers mercury, cadmium and lead. There are other heavy metals that should arguably be regulated on a precautionary basis, such as manganese.[215]

[214] For a full list of lead and cadmium mandates see: <http://www.unep.org/chemicalsandwaste/LeadandCadmium/Mandates>.
[215] Lorenzo Alessio, Marcello Campagna and Roberto Lucchini, 'From Lead to Manganese Through Mercury: Mythology, Science, and Lessons for Prevention' (2007) 50 *American Journal of Industrial Medicine* 779.

At the national level, states do not generally regulate these hazardous substances individually. Those in charge of implementing the Minamata Convention domestically, such as national environmental regulatory agencies, will likely be managing many hazardous substances at once along with other environmental problems. This may be complicated when financial and technical assistance is provided through the Minamata Convention, as this assistance could be used more effectively if multiple substances were dealt with at once.[216] This section will consider the challenges and possible structure of including other heavy metals into a broader agreement to question whether the Minamata Convention should have filled a bigger space in the hazardous substance framework.

4.2.2 The challenges of a heavy metals agreement

There are a number of issues with creating a heavy metals agreement, some of which were raised during the negotiations for the Minamata Convention. The first, and some would argue the biggest, was the lack of political will to do so. The USA, Canada and Australia initially resisted starting negotiations on a mercury treaty due to concern that such an agreement could lead into a heavy metals treaty.[217] There is also a risk that negotiations could get stuck on the more politically difficult metals at the expense of those which are mostly agreed upon. This was identified as a problem for including mercury in the Stockholm Convention: "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."[218] Separating mercury out allowed Minamata to move beyond the stalling that had occurred in other Conventions. There are also differences in the nature of the heavy metals, their sources, uses, transport routes, toxicity, human exposure pathways, etc. These factors may make it difficult to apply the same control measures to heavy metals generally.

4.2.3 A potential structure for a heavy metals agreement

The different options for the structure of a treaty provide insight into how a heavy metals agreement could manoeuvre these political and technical challenges. The structure of an agreement can determine whether all the control measures must be adopted together as a package or if States have the option of adopting them as separate, legally distinct instruments. The first intergovernmental

[216] I L Fuller and Clare Stankwitz, 'The Necessity of International Agreement' in Sharon L Zuber and Michael C Newman (eds), *Mercury Pollution: A Transdisciplinary Treatment* (CRC Press, 2016) 211, 221.
[217] Selin and Selin, above n 27, 265-266.
[218] Ibid 266.

negotiating committee for the Minamata Convention was presented with three different options for structure, featured in Figure 1. They include:[219]

a) Control measures plus annexes: the convention contains control measures which are supplemented or elaborated upon by one or more annexes. The annexes form an integral part of the convention and may be amended or additional annexes adopted later (e.g. the Minamata Convention);
b) Convention plus protocols: some or all of the control measures appear in separate protocols which are legally distinct and may be adopted separately (e.g. the CLRTAP, the UNFCCC);
c) Umbrella agreement: the convention is succinct and does not contain control measures, which are included in detailed annexes. The entire agreement, including the umbrella agreement and annexes, is adopted as a package (e.g. Marrakesh Agreement Establishing the World Trade Organization).

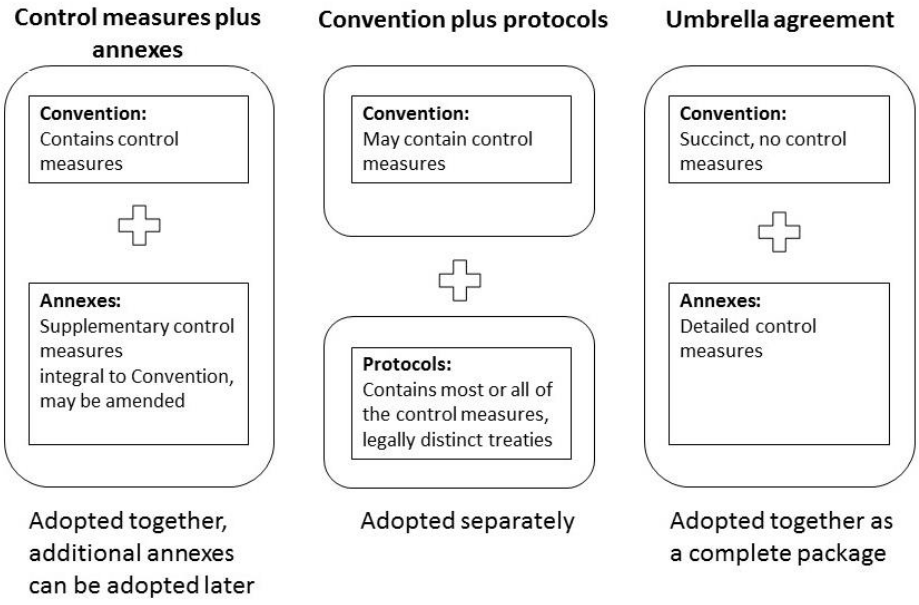

Figure 1: Options for a mercury instrument

Looking towards a heavy metals agreement, the convention plus protocols approach would allow for different heavy metals to be added in separate protocols. This means the convention would contain the preamble and introductory provisions, and provisions related to implementation,

[219] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Options for the structure of the mercury instrument*, 1st Sess, Un Doc UNEP(DTIE)/Hg/INC.1/4 (31 March 2010) para 5.

establishing treaty institutions and further development of the instrument. Each protocol could contain the control measures for different heavy metals. The protocols could address each substance very specifically rather than trying to have a "best-fit" approach between differences in the sources and uses. It could also remove political hurdles by allowing States to opt out of substances rather than diluting the control measures to obtain agreement. Other heavy metals could be added as deemed necessary in light of changing scientific understanding and circumstances. The lack of consideration given to this option during the early stages of negotiating the Minamata Convention seems like a missed opportunity to create a long-term, adaptable and potentially politically-palatable heavy metals agreement.

4.2.4 Future regulation of heavy metals

How likely is it that other heavy metals will be internationally regulated as mercury has been? As mentioned, UNEP is already mandated to address lead and cadmium and the harm of these substances is well known. However, lead and cadmium are transported over local, national and regional distances rather than globally as in the case of mercury.[220] Rather than pursuing a global binding agreement on these substances, UNEP's action on lead and cadmium currently involves creating and supporting voluntary government and industry initiatives on lead paint, lead and cadmium batteries, and the Partnership for Cleaner Fuels and Vehicles.[221] As discussed in Chapter 2, the Heavy Metals Protocol regulates these substances together in a regional agreement that is increasingly global, but the amendment to facilitate wider participation has not yet come into force and been taken up by the broader international community. As with mercury, there are a number of agreements that already cover other heavy metals in different areas. Wastes containing heavy metals such as lead, cadmium and arsenic are covered by the Basel Convention.[222] Leaded fuels are included under the Rotterdam Convention,[223] which has the ability to include other heavy metals if they are found in industrial chemicals or pesticides.

Scientific understanding and the political will to regulate are continually changing. The Stockholm Convention anticipates changing scientific understanding by outlining the procedure for adding new POPs as necessary. There is no such procedure for adding heavy metals to an existing life-cycle regulatory framework. However, as indicated in Chapter 2, efficiency questions are raised if a new

[220] UNEP, *UNEP's Activities on Lead and Cadmium* <http://www.unep.org/chemicalsandwaste/LeadandCadmium/tabid/29372/Default.aspx>.
[221] Ibid.
[222] *Basel Convention* annex VIII.
[223] *Rotterdam Convention* annex III.

treaty is to be created for each new substance. While Minamata has created a strong basis for mercury regulation, it is not realistic that each environmental pollutant that is deemed to require regulation is devoted the same amount of time, effort and resources. If the success of the Minamata Convention is used to initiate international agreements on other heavy metals then "institutional density will increase even further."[224] The solution may be that future agreements should attempt to establish longer term, framework arrangements such as the convention plus protocols approach suggested above for a heavy metals treaty. It is likely that new substances in the future will need international regulation and agreements that rely on protocols such as the Stockholm Convention and the CLRTAP demonstrates how to be responsive to this. If other heavy metals come under consideration for international regulation then they could follow suit to maximise regulatory effectiveness without sacrificing regulatory efficiency.

4.3 A deep agreement: the breadth and co-benefits of Minamata

4.3.1 The potential for co-benefits

While Minamata has been narrowly framed to cover a single substance, the scale of mercury regulation under the convention is vast. It exists as an multilateral agreement signed by 128 countries[225] and contains measures that will affect intergovernmental organisations such as the Global Environment Facility, the national regulation of countries that ratify it, major industries such as mining, coal-combustion energy production, cement and steel production and manufacturing, the medical community and health of the wider public, and individual ASGM miners. The scale spans from extreme macro to extreme micro as it dissects each aspect of the global mercury problem. This section will explore the potential effects of such an expansive response to an environmental problem. It will examine how far the reach of the Minamata Convention may be and what potential for co-benefits exists in this narrow but deep framing of the mercury problem.

4.3.2 Formalisation in ASGM

Chapter 3 reviewed ASGM under the Minamata Convention in terms of its impacts on miner livelihoods and health. There are many other benefits that the Minamata Convention may be able to provide in relation to this previously unregulated activity. The Minamata Convention is the first international instrument to address ASGM and requires that states with more than insignificant ASGM

[224] Selin, above n 23, 17.
[225] As of 31 May 2016.

include steps to formalise or regulate the sector.[226] Illegal mining can be defined as when the activity is conducted without a proper title, authorization, or concession issued by the competent authorities.[227] Informal mining is when there are deficiencies in environmental management, technical assistance and development, access to information and acceptable working conditions.[228] These definitions suggest the range of potential benefits that can be gained for the miners, their governments and the environment if the mining is legalised and formalised, and these benefits extend well beyond reducing harm from mercury.

Governments can benefit from formalising by gaining a better understanding of the numbers and patterns of ASGM miners. Some scholars from the mining discipline are sceptical of the overemphasis on informal or illegal mining, rather than the multitude of other informal employment in developing countries, and suggest that the focus is for the purpose of taxing the activity.[229] For the miners themselves, a lack of formalisation has been identified as a major barrier, among others, to obtaining finance from banks to improve their mining practices.[230] Formalisation may also improve access to technical and financial assistance from government agencies, and access to information and health care. The Annex C National Action Plans require strategies for public health and providing information to ASGM communities and these will be limited in their effectiveness unless miners are formally recognised by their governments.

The Minamata Convention is seen by some as an opportunity to "radically reform national mining policies."[231] The requirement to facilitate the formalisation or regulation of the sector has been described as a "complex but symbolically important measure" that could encourage commitment to "not merely technical approaches for hazard reduction but also to the promotion of equitable opportunities and rights in mining communities."[232] As discussed in Chapter 3, this is dependent on the approach taken by national governments as they are in charge of designing their own National Action Plans. The wording of including "steps to facilitate" is weaker than requiring states to formalise or regulate, and formalisation is not actually defined. In addition, formalisation is not a new endeavour in ASGM. It has been attempted by most of the developing country governments that have problems with

[226] *Minamata Convention* annex C, art 1(c).
[227] Veiga, Angeloci-Santos and Meech, above n 31, 355.
[228] Ibid.
[229] Ibid 355.
[230] Ibid 354-355.
[231] Spiegel et al, above n 28, 17.
[232] Ibid 14.

informal or illegal artisanal mining, but examples of successful formalisation are rare.[233] It remains to be seen whether formalisation as induced by the Minamata Convention will create better overall mining regulation and conditions for ASGM miners. At the very least, the Minamata Convention adds international impetus to the process of formalisation and regulation from which multiple benefits may arise.

4.3.3 Empowerment of women and protection of children

The Convention recognises the particular vulnerabilities of women and children to mercury exposure in both the preamble and in Annex C. The preamble acknowledges "health concerns… especially women, children, and, through them, future generations".[234] Annex C requires national actions plans to include "[s]trategies to prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, especially pregnant women, to mercury used in [ASGM]".[235] These vulnerabilities arise from both a biological basis, as discussed in Chapter 1, and their position in their communities. As this chapter concerns co-benefits, this section will focus not on the potential health benefits for women and children but other areas in which they may benefit.

Women tend to be responsible for the mercury amalgamation in ASGM communities whereas men are responsible for digging.[236] Women experience great difficulties in ASGM due to "cultural and social taboos, discriminatory mining legislation, limited access to credit, a lack of education and technical knowledge, patterns of gendered labor division, and women's domestic work burden."[237] They also experience "more difficulties accessing supportive services, such as training, and they face significant discrimination when trying to obtain land rights, loans, equipment, and hired labour".[238] Clearly the issues for women in ASGM are much bigger than the health risk they face from mercury use.

Because women are usually disadvantaged by the legal and development processes around mining in these countries where ASGM is prevalent, a particular priority for the Convention should be developing specific initiatives for empowering women that include "not only risk awareness-raising

[233] Veiga, Angeloci-Santos and Meech, above n 31, 355.
[234] *Minamata Convention* preamble.
[235] *Minamata Convention* annex C, art(1)(i).
[236] Spiegel et al, above n 28, 11.
[237] M R Bashwira, J Cuvelier, D Hilhorst, G van der Haar, 'Not only a man's world: Women's involvement in artisanal mining in eastern DRC' (2014) 40(1) *Resources Policy* 109, 113.
[238] International Labour Organisation, *Sectoral studies on decent work in global supply chains: Comparative analysis of opportunities and challenges for social and economic upgrading* (International Labour Office, Sectoral Policies Department (SECTOR), 2016) 64.

campaigns targeted to women but also economic empowerment that can enable women to improve livelihoods."[239] Empowering disadvantaged women would be a clear co-benefit to protecting human health and the environment from mercury. Spiegel et al[240] suggest that a practical way this could be done is through community based savings and credit programs that target women in mining communities. In Zimbabwe, for example, "both private sector microfinance institutions and government lending institutions (which offer equipment loans and cash loans) have poorly understood the potential that women offer in Zimbabwe's growing ASGM sector".[241] The benefits beyond mitigating mercury harm could be significant as the social benefits from micro-empowerment initiatives could ''create a multiplier effect to benefit more women across entire societies''.[242] So far there has been no clear indication from the intergovernmental negotiating committee on whether it will direct or encourage specific economic empowerment of women in ASGM communities. Most of the guidance currently provided for implementing the Convention is concerned with women's health instead.[243]

Protecting children is also a difficult challenge for the Minamata Convention. While the Convention seeks to protect the health of children as a particularly vulnerable population to mercury, it does not openly tackle the fact that the International Labour Organisation (ILO) estimates that approximately one million children aged 5 to 17 are engaged in small-scale mining worldwide.[244] Annex C requires strategies preventing exposure of children to mercury used in ASGM but does not suggest that children be removed from ASGM altogether. The ILO suggests that the reason little progress has been made in general to remove children from ASGM is due to the issue paling in relation to the 100 million children reported working in the agricultural sector, the soaring price of gold increasing total number of miners including children, and the informal and remote nature of ASGM, which tends to place it outside of government oversight.[245]

However, since the convention was signed UNEP has released draft guidance for developing national actions plans which does discuss this issue. It suggests that in order to address child labour

[239] Spiegel et al, above n 28, 11.
[240] Ibid.
[241] Ibid 12.
[242] Ibid
[243] See UNEP, above n 207.
[244] International Labour Organisation, 'The burden of gold: Child labour in small-scale mines and quarries' (August 2005) 54 *World of Work Magazine*. Available at: <http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/dwcms_080601.pdf>.
[245] International Labour Organisation, *Sectoral studies on decent work in global supply chains: Comparative analysis of opportunities and challenges for social and economic upgrading* (2016) (International Labour Office, Sectoral Policies Department, 2016) 63.

issues national actions plans could include raising awareness on the risks of children's work with mercury; regulate against the use of mercury by children or even child labour in mining altogether; include child labour as part of routine inspections of ASGM; promote early childhood institutions in ASGM communities; mainstream child labour issues into ASGM programs and share information on child labour with relevant government and UN agencies.[246] The guidance document also suggests that legislation relevant to ASGM should be reviewed and this may include laws of child protection.[247]

While these actions against child labour are still optional and not required by the Minamata Convention, the scope of the Convention in its implementation is clearly stretching beyond its objective of protecting human health and the environment from mercury. It is not a convention about child labour – the 1999 ILO Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour[248] covers this directly and has 180 parties – but it still urges states to consider the issues around ASGM more widely than mercury use. The opportunities to empower women through the implementation of the Convention could also stretch the benefits of Minamata well beyond human health to a more holistic improvement of the lives of women in these communities. As neither issue is directly addressed by the Convention, but both can fall within the wide scope of the National Action Plans, there will need to be more attention and weight given to these issues by the parties to maximise these as co-benefits under the Convention.

4.3.4 Capacity building and financial assistance

The financial mechanism of the Minamata Convention is the Global Environmental Facility (GEF), which is to provide "new, predictable, adequate and timely financial resources to meet costs in support of implementation of [the] Convention as agreed by the Conference of the Parties."[249] The GEF has committed $141 million in funding for the Convention.[250] The intergovernmental negotiating committee has directed the GEF to direct their funding towards enabling activities, particularly initial assessments and National Action Plans, and implementation of the Convention.[251] It may even provide funding to

[246] UNEP, above n 207, 65, 77.
[247] Ibid 40.
[248] *Convention (No. 182) concerning the prohibition and immediate action for the elimination of the worst forms of child labour*, opened for signature 17 June 1999, 2133 UNTS 161 (entered into force 19 November 2000).
[249] *Minamata Convention* art 13(7).
[250] Global Environment Facility, 'The GEF will invest US$141 million in projects under the Minamata Convention' (2016) <https://www.thegef.org/gef/node/10701>.
[251] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its sixth session*, 6th sess, UN Doc UNEP(DTIE)/Hg /INC.6/24 (25 February 2015) annex III(1)(A).

non-signatories for enabling activities if they are taking steps to become a Party.[252] Between July 2014 and October 2015 $24.6 million was programmed for initial assessments, National Action Plans, capacity building, healthcare waste management, and reduction in the production and use of mercury in manufacturing processes.[253] Most of the funding so far has been allocated to initial assessments which include compilation of national mercury inventories; identifying national mercury challenges; and reviewing legal, policy and regulatory frameworks to enable the State to implement future obligations under the Minamata Convention.[254]

While most of the funding under the GEF so far has been towards initial assessments and National Action Plans, a major project has been funded in Colombia with obvious co-benefits beyond reducing harm from mercury. The project introduces best available practices and technologies to reduce both mercury and POPs from the treatment of healthcare waste, the processing of waste electrical and electronic equipment, processing of iron and steel, and biomass burning in the sugarcane sector.[255] This project also aims to "strengthen the institutional, administrative, legal, technical, and regulatory framework for managing these harmful chemicals" and will contribute to national pollutant inventories and to fulfilling obligations under the Stockholm Convention.[256] These aims demonstrate how funding designated under the Minamata Convention may be of wider benefit in enabling States to strengthen institutional capacity and to implement and fulfil obligations under multiple environmental agreements.

Outside the specific Minamata allocation the GEF has funded projects related to mercury with multiple benefits. In the period of July 2014-October 2015 the GEF funded 12 projects relevant for mercury in their small grants program and one of the main focuses was the collection and recycling of e-waste.[257] One of these projects was in St Vincent and the Grenadines which involved training young people on sustainable e-waste management and a public awareness program on e-waste.[258] Other projects with co-benefits include two small grant projects in Belarus that collected, recycled and

[252] Ibid.
[253] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Progress report of the Global Environment Facility*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/INF/3 (25 February 2016) 1.
[254] Projects may be found at <https://www.thegef.org/gef/project_list>.
[255] Global Environment Facility, *Details of GEF Project #6928* (2016) <https://www.thegef.org/gef/project_detail?projID=6928>.
[256] Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Progress report of the Global Environment Facility*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/INF/3 (25 February 2016) 28-29.
[257] Ibid 9.
[258] Ibid.

replaced mercury- containing fluorescent lighting with LED lights to reduce mercury and increase energy efficiency.[259]

4.3.5 Coal combustion

The Minamata Convention is explicit about co-benefits in Article 8 on emissions. This article concerns stationary, "point sources" of mercury emissions such as coal-fired power plants; coal-fired industrial boilers; smelting and roasting processes used in the production of non-ferrous metals; waste incineration facilities; and cement clinker production facilities.[260] Article 8 suggests, on a voluntary basis, that Parties "may prepare a national plan setting out the measures to be taken to control emissions and its expected targets, goals and outcomes."[261] For any new point sources, Parties should require best available technologies (BAT) and best environmental practices (BEP) to control emissions.[262] For their existing point sources of mercury pollution they should include at least one measure from a specified list. These measures include the use of BAT and BEP to control emissions and a "multi-pollutant control strategy that would deliver co-benefits for control of mercury emissions".[263] A BAT for mercury reduction that controls multiple pollutants may, for example, also reduce sulphur dioxide, halogens and trace elements.[264] On the flip side, measures to reduce other pollutants in coal-fired power plants have had the co-benefit of reducing mercury in the EU, USA, China and India.[265]

Co-benefits in greenhouse gas reduction are particularly relevant considering the mercury released from coal-fired power facilities. They are also significant as coal-combustion is the second largest contributor to mercury air emissions after ASGM.[266] Synergies with climate policy were recognised by the ad-hoc open ended working group (OEWG) on mercury prior to the Minamata negotiations. The OEWG, established by UNEP, explored different options to control mercury on a global scale and highlighted the potential for co-benefits with greenhouse gas reduction policies, as less coal

[259] Ibid.
[260] *Minamata Convention* annex D.
[261] *Minamata Convention* art 8(3).
[262] *Minamata Convention* art 8(4).
[263] *Minamata Convention* arts 8(5)(c),(d).
[264] UNEP, *United Nation's Framework Convention on Climate Change and the Minamata Convention on Mercury: A comparison for the Coal Combustion Sector* (UNEP Chemicals Branch, 2015) 18.
[265] Manuela Rallo et al, 'Mercury policy and regulations for coal-fired power plants' (2012) 19 *Environmental Science and Pollution Research* 1084; *Global Mercury Assessment 2013*, above n 13, 16.
[266] *Global Mercury Assessment 2013*, above n 13, 9.

combustion will result in less emissions of mercury.[267] The OEWG identified carbon capture and sequestration as one potential co-beneficial technology.

There are a number of parallels between international mercury and climate regulation. UNEP has identified four areas of mutual agreement between the Minamata Convention and the UNFCCC: the reduction of emissions which are detrimental to human health and the environment; the focus on emissions from human activities, including fossil fuel combustion; the promotion of BAT/BEP type approaches to reduce emissions; and the establishment of emission inventories.[268] This will possibly enable cooperation and shared lessons between the regimes. If mutual benefits are to be obtained between Minamata and the UNFCCC, UNEP predicts these will mainly occur through cleaner energy, improved reporting on emissions and technological advancement.[269] There are also wider actions such as public outreach and education, whereby encouraging energy consumers to use less energy may reduce both carbon dioxide emissions and mercury emissions. The UNFCCC is already doing this and the effect can be enhanced if Minamata follows its lead.[270] It may be that these regimes can add political weight to each other by emphasising co-benefits. Funding under either Convention could also consider these mutual benefits for further synergy.

While some technologies may reduce both carbon dioxide emissions and mercury simultaneously, there are also some (e.g. flue gas cleaning systems) that may reduce mercury but also reduce efficiency which could increase carbon dioxide emissions.[271] There is also conflict where carbon-reducing technology contains mercury, such as compact fluorescent light bulbs where "[e]ven though the mercury content of individual light bulbs has decreased, use of this type of light bulb is increasing rapidly."[272] This indicates that Minamata and the UNFCCC should work together so that, where co-benefits are not easily obtained, at least reductions of one harm do not increase other harms.

Similar provisions in Article 9 on releases have potential for co-benefits, albeit with a less obvious partner than coal combustion. Parties should similarly take control measures to reduce releases of mercury to land or water, which may include BAT, BEP and/or "a multi-pollutant control strategy that

[267] Ad hoc Open-ended Working Group on Mercury, *Study on options for global control of mercury*, 1st mtg, UN Doc UNEP(DTIE)/Hg/OEWG.1/2 (20 August 2007) 9.
[268] UNEP, above n 264, 23.
[269] Ibid 40.
[270] Ibid 34.
[271] Ibid 23.
[272] *Global Mercury Assessment 2013*, above n 13, 17.

would deliver co-benefits for control of mercury releases".[273] It is yet to be seen what guidance the Conference of the Parties will adopt in terms of best available techniques and best environmental practices and which point sources this article will target.

4.3.6 Dentistry and public health

The Minamata Convention includes measures to reduce dental amalgam due to the mercury it contains. Dental amalgam exists in its own section of the Convention: under Part II of Annex A, which is referenced in Article 4 on mercury-added products. Part II includes nine measures to phase down the use of dental amalgam and Parties should undertake at least two of them. There is clear potential for co-benefits if Parties undertake the first of these: "[s]etting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration".[274] If Parties aim to improve dental health overall it will protect human health from far more than mercury. Promoting research and development of alternatives, listed as the fourth measure, may also have wider benefits in innovation.

More broadly, the requirements in the Convention to strengthen institutional and health care capacities to respond to mercury risks[275] may also have flow-on benefits for the wider services the heath community can provide. States are also required to develop public health strategies for ASGM communities on their exposure to mercury in their National Action Plans, which should include gathering of health data, training for health-care workers and awareness-raising through health facilities.[276] With appropriate funding, this should increase the overall health care provided to these communities.

4.4 Conclusion

In this Chapter the Minamata Convention has been conceived as narrow in its scope, by regulating only one substance, but deep in its impact in addressing the mercury problem. A heavy metals treaty was proposed to demonstrate how mercury could have otherwise been regulated and to see how future hazardous substance treaties could be framed. Focusing only on mercury was a lost opportunity for the international community to take a longer-term approach to regulating heavy metals.

[273] *Minamata Convention* arts 9(5)(b),(c).
[274] *Minamata Convention* annex A, pt II(i).
[275] *Minamata Convention* art 16(1)(d).
[276] *Minamata Convention* annex C(1)(h).

Nevertheless, the Minamata Convention was created and brought new areas of regulation to the international sphere. The unique health article was discussed in detail in Chapter 3. The first international binding agreement on ASGM may not have been possible, or as detailed, if time and attention had been diverted to cover a range of heavy metals. It might also be the case that the Minamata Convention would have been diluted were it focused on more controversial substances than mercury, which states were largely in agreement about regulating. As a result, the Minamata Convention was created with great detail and focus on the mercury problem while also looking for opportunities to obtain co-benefits in doing so.

A range of potential co-benefits have been identified including the wide benefits to ASGM communities through formalisation, empowering women and protecting children. Funding through the GEF has already been used for projects with broader benefits than just protecting human health and the environment from mercury. Much of this funding has so far gone towards carrying out assessments that will increase institutional capacities beyond mercury regulation and increase knowledge through creating national mercury inventories. There is potential for synergies and co-benefits with the climate regime, which echoes the discussion of the hazardous substance Synergies Process in Chapter 2. Prevention strategies in dentistry will improve general public health, which is also a potential benefit as states develop public health strategies for mercury generally and in ASGM communities.

If the parties to the Minamata Convention are willing to stretch its scope to encompass the wide range of co-benefits available it may be inaccurate to describe it as a narrow agreement. Mercury is used in many industries and activities that are now required to implement BAT and BEP that will reduce overall pollution. The health of a vast number of people should improve if public health strategies are successfully implemented. The international spotlight on ASGM may also benefit communities if it means that national governments are held more accountable for how they recognise and manage the activity. The Minamata Convention, despite only regulating one substance, has huge potential to improve the plight of humans and the environment if the momentum involved in creating this unique agreement is maintained. As with all multilateral environmental agreements, maximising the potential of the Minamata Convention will come down to the willingness of decision-makers to make full use of its provisions.

CHAPTER 5: Conclusion

5.1 Thesis summary

This thesis has challenged the existence, priorities and scope of the Minamata Convention. As the latest hazardous substance treaty, and indeed, the latest major MEA, it is an important indicator of the direction of current international environmental law. The introduction of this thesis explained why we should not be proliferating ineffective international environmental agreements. Not only are these agreements costly and time consuming, both in negotiations and ongoing implementation, but they can also give a false impression of progress. Competing priorities is also an issue, as the public and political focus on climate change in particular will mean that less resources and attention can be given to addressing other environmental problems.

Chapter 2 of this thesis showed that the Minamata Convention has duplicated existing regulation by doubling up on mercury waste with the Basel Convention and borrowing the consent procedure for trade in certain mercury products from the Rotterdam Convention. It duplicated but strengthened commitments to phase out mercury products compared to the CLRTAP but imposed weaker commitments to reducing mercury air emissions from point sources. If mercury regulation had just been left to the existing agreements, however, there would still be significant gaps in its regulation. Despite the Synergies Process increasing cooperation and coordination between the agreements there are membership, regulatory and accountability gaps that would have lessened the effectiveness of addressing the mercury problem. Adding mercury to another lifecycle agreement, the Stockholm Convention, was not deemed practical from a technical or political perspective.

By creating a new lifecycle agreement for mercury the Minamata Convention contributed new standards that will eventually prevent mercury from being mined and address releases of mercury to land and water, and introduced significant ASGM and health provisions. It may be that the Minamata Convention, in following the lifecycle approach of the Stockholm Conventions, signals a further move away from regulating separate elements of environmental problems. It also found easier agreement on some of the procedural provisions than the other agreements, including the Stockholm Convention, and this may suggest that limiting the focus to a singular problem allows for greater political effectiveness. Nevertheless, there are ongoing efficiency questions for international environmental law if each new treaty replicates regulation in areas such as waste and trade.

Chapter 3 recognised that while the objective of the Minamata Convention is to protect human health and the environment from mercury, health is only one part of the wellbeing of the people whose lives are affected by environmental damage. While the Convention has contributed to the broadening scope of international environmental law by being the first to include a specific health article, it did not explicitly factor in the livelihoods that are threatened by mercury or those that depend on mercury. Aboriginal subsistence whalers face an ongoing struggle between maintaining this practice for cultural, nutritional and subsistence needs and trying to limit the contamination they take into their bodies. It remains to be seen whether the health article will provide assistance to these communities or if their recognition will be left in the archive of the Minamata preamble, but it seems unlikely that the Convention will assist them in maintaining their traditional livelihoods.

The livelihoods of ASGM miners is also at stake under the Minamata Convention. The Convention will be problematic if the local and regional operation of the Convention leaves the already vulnerable ASGM communities in a worse position. If the Convention results in health impacts being replaced with human rights violations and economic and social instability, this is not a desirable or sustainable step forward. Whether the Minamata Convention is able to address the need for livelihoods will be largely dependent on the implementation of the National Action Plans and whether funding is eventually provided to address the consequences for miners' livelihoods. Environmental justice should guide the implementation of the Convention to ensure the vulnerable communities it champions are actually served by it. Ultimately, the sole specified objective of the Minamata Convention is to protect human health and the environment from mercury. At this point in time it is clear that any aim of securing livelihoods for those affected, such as aboriginal subsistence whalers or ASGM communities, is coming in well behind that primary objective.

Finally, Chapter 4 posits the Minamata Convention as narrow in its scope, by regulating only one substance, but deep in its impact in addressing the mercury problem. In demonstrating how a heavy metals treaty could be structured this chapter showed that focusing only on mercury was a lost opportunity for the international community to take a longer-term approach to regulating heavy metals. Looking at the positives, it might also be the case that the Minamata Convention would have been diluted were it focused on more controversial substances than mercury, which states were largely in agreement about regulating.

A range of potential co-benefits were identified including the wide benefits to ASGM communities through formalisation and empowering women and protecting children within the ASGM

sector. Institutional capacities are already being strengthened through GEF funding and national mercury inventories are underway. There is potential for synergies and co-benefits with the climate regime, and public health and preventative dentistry should be co-benefited if the Convention is successfully implemented. The Chapter concluded that if the parties to the Minamata Convention are willing to utilise the full breadth of its scope to encompass the range of co-benefits available it may be inaccurate to describe it as a narrow agreement. As with all MEAs, its success will come down to the willingness of decision-makers to maximise its vast potential.

5.2 How does it measure up?

Chapter 1 presented the criteria for MEA success as identified by the GEO assessments. The environmental problems that had improved in the GEO assessment were approached with measurable, defined targets rather than those that were action-oriented. Chapter 2 presented the defined targets in the control measures of the Minamata Convention. These are defined phase out dates for primary mercury mining (fifteen years after entry into force of the Convention), mercury-added products (by 2020) and certain manufacturing processes that use mercury (chlor-alkali production by 2025 and acetaldehyde production by 2018). For these elements of the Convention, according to the GEO assessments, there is an increased likelihood of success.

However, the two activities that contribute the most mercury air emissions to the environment do not have defined targets and are instead action-oriented. For ASGM, Parties are asked to "take steps to reduce, and where feasible eliminate" mercury use and emissions. For point sources of emissions, such as coal-fired power plants, the Convention aims for even less: "controlling and, where feasible, reducing emissions of mercury". Chapter 3 detailed some of the challenges to reducing mercury use in ASGM and made it clear why it would not be reasonable to set defined targets for this activity. In particular, parties need flexibility to implement the Convention according to their own circumstances. It is less easy to explain the lack of targets for point sources of emission in Article 8 beyond political difficulties. Chapter 2 explained that China and India, who together emit 50 percent of the air emission of mercury from stationary sources,[277] objected to specific targets.[278] Article 8 requires that parties use best available technologies and environmental practices for new point sources and take at least one

[277] *Global Mercury Assessment 2013*, above n 13, iii.
[278] Selin, above n 23, 11-12.

from a list of measures to reduce emissions for current sources, but these requirements are weak and the parties could achieve compliance with few tangible results.

Looking to the other factors that increase success, the GEO specified "support from an organised scientific community, scientific consensus on the problem, leadership from international institutions and cost-effective solutions to the problem."[279] As mentioned in Chapter 1, there was strong scientific consensus on the mercury problem. UNEP took strong leadership in this area with the Global Mercury Partnership and in commencing the negotiations, combined with support from institutions such as the World Health Organisation and the International Labour Organisation. Cost-effective solutions to the problem is where the Minamata Convention may struggle. Chapter 3 outlined how difficult it has proven to transition miners away from using mercury and, with ASGM now the biggest anthropogenic contributor to mercury air emissions, this could definitely impact the success of the Convention.

5.3 Future research

There are a number of questions for future research following from this thesis. As the Minamata Convention eventually enters into force and implementation progresses there will be questions about its effectiveness in practice. The implementation of the ASGM National Action Plans should be watched closely as they concern a practice that has typically been under-regulated in countries with poor histories of enforcement. The Convention itself acknowledges that effective implementation will be dependent on the financial assistance provided. Therefore, there will be cause for research into the usefulness of the National Action Plans in practice to achieve mercury reductions and better organisation of the sector, as well as the adequacy of the financial and technical assistance provided through the Convention. The difficulties of reducing mercury in ASGM, as discussed in Chapter 3, will not disappear just because of the conclusion of the Convention.

There will also be questions about the efficacy of the Minamata Convention in reducing mercury from coal combustion, and the potential for synergies with greenhouse gas reduction policies. Considering the lack of defined targets for the coal industry in the Convention, the tangible results from Article 8 on emissions should be scrutinised. Another relatively unspecified area of the Convention, the actual form of the public health strategies under Article 16, should also be examined to see whether and

[279] UNEP, above n 5, 31.

how this creates changes in public health. Finally, the future of hazardous substance regulation remains in question and whether the Minamata Convention has set a precedent for future agreements.

5.4 Final remarks

The Minamata Convention on Mercury has broken new ground for international environmental law. It has addressed the polluting, inequitable but often necessary practice of ASGM and tried to customise the approach taken between countries. It has incorporated an adaptive approach to an environmental problem that also causes significant harm to human health by requiring parties to address the health impacts. The negotiators used lessons learnt from previous MEAs to create a complete lifecycle approach and made use of the extensive work done on waste and trade procedures. The Minamata Convention has also included very particular wording in a number of its provisions so that benefits beyond preventing harm from mercury are possible and even encouraged. There are many ways that the Convention can be wielded to achieve co-benefits, should parties have the inclination to do so, which is already being seen through some of the projects funded by the GEF. As a one-off agreement, looking at its text in isolation, the Minamata Convention is a significant achievement for international environmental law.

However, good results do not always come from good agreements as seen in the failure of many MEAs to achieve their goals, discussed in Chapter 1. The Minamata Convention contains binding obligations for phasing out mercury mining and taking mercury out of certain products and industry. It does not have specified targets for the areas that contribute the most mercury pollution to the environment: ASGM and point sources of emissions such as coal-fired power plants. Even if it had binding targets for ASGM, Chapter 3 demonstrated the difficulties of enforcement for this practice. The regime contemplated by the Minamata Convention has taken more of a facilitative, guiding role in regulating ASGM which will require great ongoing effort to ensure that results are being achieved. The congruence between the Minamata Convention and the UNFCCC were raised in Chapter 4 as a co-benefit, but the lack of binding targets to reduce emissions from coal-fired power plants unfortunately demonstrates another parallel. The difficulty of obtaining binding agreement on reducing coal-combustion is not unique to the Minamata Convention and if the UNFCCC is an indicator, this will be an ongoing battle. These two issues are the greatest threat to reducing mercury emissions worldwide. If these areas of the Convention are not implemented effectively then the success of the Convention in meeting its objective will be limited.

Finally, we cannot look at the Minamata Convention in isolation. It enters a context with much existing regulation and an almost inevitable need for future agreements as more environmental problems arise. The scientific context surrounding this issue is the increasing understanding of substances which cause harm to the environment and human health. The choice of whether to negotiate new treaties or to utilise existing MEAs and institutions will continue to arise as additional substances are deemed to require international regulation. Included in these decisions will be questions of how far existing instruments and non-regulatory actions already go to reducing harm from the substance, which possibly competing aims should take priority, and whether regulating the substance may provide broader benefits across multiple scales.

Bibliography

A. Treaties

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, opened for signature 22 March 1989, 1673 UNTS 57 (entered into force 5 May 1992)

Convention (No. 182) concerning the prohibition and immediate action for the elimination of the worst forms of child labour, opened for signature 17 June 1999, 2133 UNTS 161 (entered into force 19 November 2000)

Convention on Long-range Transboundary Air Pollution, opened for signature 13 November 1979, 1302 UNTS 217 (entered into force 16 March 1983)

International Convention for the Regulation of Whaling, opened for signature 2 December 1946, 161 UNTS 72 (entered into force 10 November 1948)

Minamata Convention on Mercury, opened for signature 10 October 2013 (not yet in force)

Montreal Protocol on Substances that Deplete the Ozone Layer, opened for signature 16 September 1987, 1522 UNTS 28 (entered into force 1 January 1989)

Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals, opened for signature 24 June 1998, 2237 UNTS 4 (entered into force 29 December 2003)

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, opened for signature 10 September 1998, 2244 UNTS 337 (entered into force 24 February 2004)

Stockholm Convention on Persistent Organic Pollutants, opened for signature 22 May 2001, 2256 UNTS 119 (entered into force 17 May 2004)

United Nations Framework Convention on Climate Change, opened for signature 9 May 1992, 1771 UNTS 107 (entered into force 21 March 1994)

United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, opened for signature 14 October 1994, 1954 UNTS 3 (entered into force 26 December 1996)

Vienna Convention for the Protection of the Ozone Layer, opened for signature 22 March 1985, 1513 UNTS 293 (entered into force 22 September 1988)

B. Article/Books/Reports

Ad hoc Open-ended Working Group on Mercury, Study on options for global control of mercury, 1st mtg, UN Doc UNEP(DTIE)/Hg/OEWG.1/2 (20 August 2007)

Ad hoc Open-ended Working Group on Mercury, *Study on options for global control of mercury*, 1st mtg, UN Doc UNEP(DTIE)/Hg/OEWG.1/2 (20 August 2007)

Alessio, Lorenzo, Marcello Campagna and Roberto Lucchini, 'From Lead to Manganese Through Mercury: Mythology, Science, and Lessons for Prevention' (2007) 50 *American Journal of Industrial Medicine* 779

Andean Air Mail and Peruvian Times, 'Peru's Illegal Mining on Verge of Funding Armed Groups: Minister' Peruvian Times (14 May 2013) <http://www.peruviantimes.com/14/perus-illegal-miningon-verge-of-funding-armed-groups-minister/19119> (accessed 1 July 2016)

Andresen, Steinar, Kristin Rosendal and Jon Birger Skjærseth, 'Why Negotiate a Legally Binding Mercury Convention?' (2013) 3(4) *International Environmental Agreements: Politics, Law and Economics* 425

Basel Convention Conference of the Parties, Decision BC-12/4, *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury*, <http://www.basel.int/TheConvention/ConferenceoftheParties/Meetings/COP12> (accessed 30 June 2016)

Bashwira, M R, J Cuvelier, D Hilhorst, G van der Haar, 'Not only a man's world: Women's involvement in artisanal mining in eastern DRC' (2014) 40(1) *Resources Policy* 109

Benko, Jessica, 'Mother of God, Child of Zeus' (2010) 86(4) *Virginia Quarterly Review* 94

Brachtl, Megan V, 'Capitalizing on the success of the long-range transboundary air pollution (LRTAP) regime to address global transboundary air pollution' (2005) 14 *Papers on international environmental negotiation*

Buccella, Alina, 'Can the Minamata Convention on Mercury Solve Peru's Illegal Artisanal Gold Mining Problem?' (2014) 24(1) *Yearbook of International Environmental Law* 166

Bullard, Robert D, 'Race and Environmental Justice in the United States' (1993) 18 *Yale Journal of International Law* 319

Clifford, Martin J, 'Future strategies for tackling mercury pollution in the artisanal gold mining sector: Making the Minamata Convention work' (2014) 62 *Futures* 106

Clifford, Martin J, 'Potential repercussions of a mining ban on the artisanal and small-scale gold-mining sector: a viewpoint' (2010) 41(3/4) *International Journal of Environment and Pollution* 229

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds*, UN Doc UNEP/CHW.12/INF/8 (22 April 2015)

Davies, George R, 'A toxic free future: Is there a role for alternatives to mercury in small-scale gold mining?' (2014) 62 *Futures* 113

Ditz, Daryl and Baskut Tuncak, 'Bridging the Divide between Toxic Risks and Global Chemicals Governance' (2014) 23(2) *Review of European Community & International Environmental Law* 181

Donaldson, SG et al, 'Environmental contaminants and human health in the Canadian Arctic' (2010) 408 *Science of the Total Environment* 5165

Donovan, G P, 'The Ad Hoc Committee Working Group on Development of Management Principles and Guidelines for Subsistence Catches of Whales by Indigenous (Aboriginal) Peoples' (1981) Special Issue 4 *International Whaling Commission And Aboriginal Subsistence Whaling* 83

Editorial, 'United Nations Environment Programme's Global Mercury Partnership: Science for Successful Implementation of the Minamata Convention' (2014) 33(6) *Environmental Toxicology and Chemistry* 1199

Endo, T et al, 'Mercury Contamination in the Red Meat of Whales and Dolphins Marketed for Human Consumption in Japan' (2003) 37 *Environmental Science and Technology* 2681

Endo, T et al, 'Contamination by mercury and cadmium in the cetacean products from Japanese market' (2004) 54 *Chemosphere* 1653

Endo, Tetsuya et al, 'Total Mercury, Methyl Mercury, and Selenium Levels in the Red Meat of Small Cetaceans Sold for Human Consumption in Japan' (2005) 39(15) *Environmental Science and Technology* 5703

Endo, T et al, 'Distribution and toxicity of mercury in rats after oral administration of mercury-contaminated whale red meat marketed for human consumption' (2005) 61 *Chemosphere* 1069

Endo, Tetsuya and Koichi Haraguchi, 'High mercury levels in hair samples from residents of Taiji, a Japanese whaling town' (2010) 60 *Marine Pollution Bulletin* 743

Eriksen, Henrik Hallgrim and Franz Xaver Perrez, 'The Minamata Convention: A Comprehensive Response to a Global Problem' (2014) 23(2) *Review of European Community & International Environmental Law* 195

Fielding, Russell, 'A Comparison of Pilot Whale Drives in Newfoundland and the Faroe Islands' (2007) 123(3) *Scottish Geographical Journal* 160

Fuller, I L and Clare Stankwitz, 'The Necessity of International Agreement' in Sharon L Zuber and Michael C Newman (eds), *Mercury Pollution: A Transdisciplinary Treatment* (CRC Press, 2016)

Galizzi, Paolo, 'Air, atmosphere and climate change' in Shawkat Alam, Jahid Hossain Bhuiyan, Tareq M R Chowdhury and Erika J Techera (eds), *Routledge Handbook of International Environmental Law* (Taylor and Francis, 2012) 333

García, Oseas et al, 'Artisanal gold mining in Antioquia, Colombia: a successful case of mercury reduction' (2015) 90 *Journal of Cleaner Production* 244

Gibb, H and K G O'Leary, 'Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining community: a comprehensive review' (2014) 122(7) *Environmental Health Perspectives* 667

Hirons, Mark, 'Locking-In Carbon, Locking-Out Livelihoods? Artisanal Mining And REDD In Sub-Saharan Africa' (2011) 23 *Journal of International Development* 1140

Hodges, Brian Trevor, 'The Cracking Facade of the International Whaling Commission as an Institution of International Law: Norwegian Small-Type Whaling and the Aboriginal Subsistence Exemption' (2000) 15 *Journal of Environmental Law and Litigation* 295

Hoguet, Jennifer et al, 'Spatial and temporal trends of persistent organic pollutants and mercury in beluga whales (Delphinapterus leucas) from Alaska' (2013) 449 *Science of the Total Environment* 285

Human Rights Watch, *The Curse of Gold: Democratic Republic of Congo* (Human Rights Watch, 2005)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury*, 1st Sess, UN Doc UNEP(DTIE)/Hg/INC.1/21 (15 July 2010)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Options for the structure of the mercury instrument*, 1st Sess, Un Doc UNEP(DTIE)/Hg/INC.1/4 (31 March 2010)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Relevant issues being considered in international forums and their possible impact on the mercury negotiation process*, 1st sess, UN Doc UNEP(DTIE)/Hg/INC.1/18 (12 March 2010)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Options for the structure of the mercury instrument*, 1st Sess, Un Doc UNEP(DTIE)/Hg/INC.1/4 (31 March 2010)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its second session*, 2nd Sess, UN Doc UNEP(DTIE)/Hg/INC.2/20 (28 February 2011)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Relationship between the future mercury instrument and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, 3rd sess, UN Doc UNEP(DTIE)/Hg/INC.3/7 (16 August 2011)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its third session*, 3rd sess, UN Doc UNEP(DTIE)/Hg/INC.3/8 (31 October 2011)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its fifth session*, 5th Sess, UN Doc UNEP(DTIE)/Hg/INC.5/7 (14 March 2013)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Report of the intergovernmental negotiating committee to prepare a global legally binding instrument on mercury on the work of its sixth session*, 6th sess, UN Doc UNEP(DTIE)/Hg /INC.6/24 (25 February 2015)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Compilation of information on the use of mercury waste thresholds*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/19 (9 December 2015)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Guidance on managing contaminated sites and the proposed way forward for developing guidance*, 7th sess, UN doc UNEP(DTIE)/Hg/INC.7/20 (5 November 2015)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Draft guidance to the Global Environment Facility on overall strategies, policies, programme priorities, eligibility for access to and utilization of financial resources and on an indicative list of categories of activities that could receive support from the Global Environment Facility Trust Fund*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/8 (15 December 2015)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Overview of progress in the development of public health strategies on artisanal and small-scale gold*

mining, including in the context of the Minamata Convention on Mercury, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/INF/7 (2 February 2016)

Intergovernmental negotiating committee to prepare a global legally binding instrument on mercury, *Progress report of the Global Environment Facility*, 7th sess, UN Doc UNEP(DTIE)/Hg/INC.7/INF/3 (25 February 2016)

International Labour Organisation, 'The burden of gold: Child labour in small-scale mines and quarries' (August 2005) 54 *World of Work Magazine* <http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/dwcms_080601.pdf> (accessed 23 June 2016)

International Labour Organisation, *Sectoral studies on decent work in global supply chains: Comparative analysis of opportunities and challenges for social and economic upgrading* (2016) (International Labour Office, Sectoral Policies Department, 2016)

Kim, Rakhyun E, 'Is a New Multilateral Environmental Agreement on Ocean Acidification Necessary?' (2012) 21(3) *Review of European Community & International Environmental Law* 243

Kim, Rakhyun E, 'The emergent network structure of the multilateral environmental agreement system' (2013) 23 *Global Environmental Change* 980

Krueger, Jonathan and Henrik Selin, 'Governance for Sound Chemicals Management: The Need for a More Comprehensive Global Strategy' (2002) 8 *Global Governance* 323

Kuehn, Robert R, 'A Taxonomy of Environmental Justice' (2000) 30 *Environmental Law Reporter* 10681

Lambert, Kathleen F et al, 'Integrating mercury science and policy in the marine context: Challenges and opportunities' (2012) 119 *Environmental Research* 132

Lehmann, Janna, 'A Comparative Analysis of the Long-Range Transboundary Air Pollution, Ozone Layer Protection and Climate Change Regimes' in Michael Bothe and Eckard Rehbinder, eds, *Climate Change Policy* (Eleven International Publishing, 2005) 73

Molenaar, Erik J and Alex G Oude Elferink, 'Marine Protected Areas in Areas beyond National Jurisdiction - The Pioneering Efforts under the OSPAR Convention' (2009) 5(1) *Utrecht Law Review* 5

Mukherjee, Arun B et al, 'Mercury in waste in the European Union: sources, disposal methods and risks' (2004) 42(2) *Resources, Conservation and Recycling* 155

Nakamura, Masaaki et al, 'Methylmercury exposure and neurological outcomes in Taiji residents accustomed to consuming whale meat' (2014) 68 *Environment International* 25

Oostdam, J Van, 'Human health implications of environmental contaminants in Arctic Canada: A review' (2005) 351-352 *Science of the Total Environment* 165

Peiry, Katharina Kummer, 'The Chemicals and Waste Regime as a Basis for a Comprehensive International Framework on Sustainable Management of Potentially Hazardous Materials?' (2014) 23(2) *Review of European Community & International Environmental Law* 172

Rallo, Manuela et al, 'Mercury policy and regulations for coal-fired power plants' (2012) 19 *Environmental Science and Pollution Research* 1084

Robards, Martin D and Randall R Reeves, 'The global extent and character of marine mammal consumption by humans: 1970–2009' (2011) 144 *Biological Conservation* 2770

Saldarriaga-Isaz, Adrián, Clara Villegas-Palacio and Santiago Arango, 'The public good dilemma of a non-renewable common resource: A look at the facts of artisanal gold mining' (2013) 38 *Resources Policy* 224

Schmidt, Charles W, 'Quicksilver & Gold: Mercury Pollution from Artisanal and Small-Scale Gold Mining' (2012) 120(11) *Environmental Health Perspectives* 424

Seccatore, Jacopo et al, "An estimation of the artisanal small-scale production of gold in the world" (2014) 496 *Science of the Total Environment* 662

Selin, Henrik, 'Global Environmental Law and Treaty-Making on Hazardous Substances: The Minamata Convention and Mercury Abatement' (2014) 14(1) *Global Environmental Politics* 1

Selin, Noelle E, 'Science and strategies to reduce mercury risks: a critical review' (2011) 13 *Journal of Environmental Monitoring* 2389

Selin, Noelle E, 'Global change and mercury cycling: Challenges for implementing a global mercury treaty' (2014) 33(6) *Environmental Toxicology and Chemistry* 1202

Selin, Noelle Eckley and Henrik Selin, 'Global Politics of Mercury Pollution: The Need for Multi-Scale Governance' (2006) 15(3) *Review of European Community & International Environmental Law* 258

Shibata, Akiho, 'The Basel Compliance Mechanism' (2003) 12(2) *Review of European Community & International Environmental Law* 183

Siegel, S and M M Veiga, 'The myth of alternative livelihoods: artisanal mining, gold and poverty' (2010) 41(3/4) *International Journal of Environment and Pollution* 272

Simmonds, M P et al, 'Human Health Significance of Organochlorine and Mercury Contaminants in Japanese Whale Meat' (2002) 65 *Journal of Toxicology and Environmental Health* 1211

Söderholm, Patrik, 'The political economy of a global ban on mercury-added products: positive versus negative list approaches' (2013) 53 *Journal of Cleaner Production* 287

Spiegel, Samuel et al, 'Implications of the Minamata Convention on Mercury for informal gold mining in Sub-Saharan Africa: from global policy debates to grassroots implementation?' (2015) 17(4) *Environment, Development and Sustainability* 765

Spiegel, Samuel J, 'Occupational Health, Mercury Exposure, and Environmental Justice: Learning From Experiences in Tanzania' (2009) 99(S3) *American Journal of Public Health* S550

Spiegel, Samuel J, 'Resource policies and small-scale gold mining in Zimbabwe' (2009) 34 *Resources Policy* 39

Sunderland, Elsie M and Noelle E Selin, 'Future trends in environmental mercury concentrations: implications for prevention strategies' online: (2013) 12(2) *Environmental Health* <http://www.ehjournal.net/content/12/1/2> (accessed 1 July 2016)

Susskind, Lawrence E and Saleem H Ali, *Environmental Diplomacy: Negotiating More Effective Global Agreements* (Oxford University Press, 2nd ed, 2015)

Templeton, Jessica and Pia Kohler, 'Implementation and Compliance under the *Minamata Convention* on Mercury' (2014) 23(2) *Review of European Community & International Environmental Law* 211

UNEP, *Global Environmental Outlook 5: Environment for the future we want* (UNEP, 2012)

UNEP, *Measuring Progress: Environmental Goals & Gaps* (UNEP, 2012)

UNEP, *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport* (UNEP Chemicals Branch, 2013)

UNEP, *Developing a National Action Plan to Reduce, and Where Feasible, Eliminate Mercury Use in Artisanal and Small Scale Gold Mining*, *Working Draft* (UNEP, 17 August 2015) <http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/ASGM/National%20Action%20Plan_draft%20guidance%20v12.pdf> (accessed 30 June 2016)

UNEP, *United Nation's Framework Convention on Climate Change and the Minamata Convention on Mercury: A comparison for the Coal Combustion Sector* (UNEP Chemicals Branch, 2015)

Veiga, Marcello M and Jennifer J Hinton, 'Abandoned Artisanal Gold Mines in the Brazilian Amazon: A Legacy of Mercury Pollution' (2002) 26 *Natural Resources Forum* 13

Veiga, Marcello M, Gustavo Angeloci-Santos and John A Meech, 'Review of barriers to reduce mercury use in artisanal gold mining' (2014) 1 *The Extractive Industries and Society* 351

Weihe, Pál and Høgni Debes Joensen, Submission to the Prime Minister, the Minister of Health, and the Minister of Trade and Industry, *Recommendations to the government of the Faroe Islands concerning the pilot whale*, 7 August 2008 (English translation)

Weihe, Pál and Høgni Debes Joensen, "Dietary recommendations regarding pilot whale meat and blubber in the Faroe Islands" online: (2012) 71 *International Journal of Circumpolar Health* 3 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3417701> (accessed 1 July 2016)

C. Other

Arctic Council, *Arctic Peoples* (15 October 2015) <http://www.arctic-council.org/index.php/en/our-work/arctic-peoples> (accessed 22 March 2016)

Global Environment Facility, 'The GEF will invest US$141 million in projects under the Minamata Convention' (2016) <https://www.thegef.org/gef/node/10701> (accessed 22 June 2016)

Global Environment Facility, *Details of GEF Project #6928* (2016) <https://www.thegef.org/gef/project_detail?projID=6928> (accessed 23 June 2016)

Global Environment Facility, *GEF Projects* (2016) <https://www.thegef.org/gef/project_list> (accessed 23 June 2016)

International Whaling Commission, *Catch Limits & Catches taken* (2015) <https://iwc.int/catches> (accessed 1 July 2016)

Mitchell, Ronald B, *International Environmental Agreements Database Project (Version 2014.3)* (2016) <http://iea.uoregon.edu> (accessed 26 November 2015)

Secretariat of the Basel, Rotterdam and Stockholm Conventions, *History of the Synergies Process* (2012) Synergies among the Basel, Rotterdam and Stockholm Conventions <http://www.brsmeas.org/Decisionmaking/Overview/SynergiesProcess> (accessed 30 June 2016)

Secretariat of the Rotterdam Convention, *Database of Notifications of Final Regulatory Action* (2010) Rotterdam Convention <http://www.pic.int/Procedures/NotificationsofFinalRegulatoryActions/Database> (accessed 5 February 2016)

Secretariat of the Rotterdam Convention, *Mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds* (2010) Rotterdam Convention <http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals> (accessed 21 January 2016)

UNEP, *Mandates* <http://www.unep.org/chemicalsandwaste/LeadandCadmium/Mandates> (accessed 30 June 2016)

UNEP, *Notifications under the Minamata Convention* (2016) *Minamata Convention* on Mercury, <http://www.mercuryconvention.org/Countries/Notifications> (accessed 21 January 2016)

UNEP, *UNEP's Activities on Lead and Cadmium* <http://www.unep.org/chemicalsandwaste/LeadandCadmium/tabid/29372/Default.aspx> (accessed 21 June 2016)

United Nations Economic Commission for Europe, *Protocol on Heavy Metals*, <http://www.unece.org/env/lrtap/hm_h1.html> (accessed 14 Jan 2016)

World Health Organisation, *Mercury and Health: Fact Sheet N°316* (January 2016) <http://www.who.int/mediacentre/factsheets/fs361/en> (accessed 29 June 2016)