

## Article

# The Role of the United Nations Environment Assembly in Emerging Issues of International Environmental Law

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**Abstract:** This article takes a closer look at the scientific, policy and catalytic functions of the United Nations Environment Programme (UNEP) and its Assembly (UNEA) and UNEA's role in addressing emerging issues in international environmental policy and law by examining two concrete examples. The first shows how UNEA was able to contribute to the international environmental law on mercury: UNEA played a catalytic policy role by contributing to the development of international soft law, customary law, and treaty law. Further, UNEA played a policy shaping role by influencing the further development of key international environmental law principles in the negotiations of new environmental norms in other fora. The second example describes UNEA's unsuccessful attempt to address geoengineering. Building on the two examples, the article identifies factors that support or impede the fulfilment of UNEA's role in addressing emerging issues of international environmental policy and law.

**Keywords:** international environmental law; international environmental governance; UNEP; UNEA; Minamata Convention on mercury; geoengineering; climate-altering technologies; common but differentiated responsibilities; precaution

## 1. Introduction

Over the last 50 years, the environment has emerged as an important policy area that needs international attention. International environmental law is a relatively young and dynamic area of international law [1]. The 1972 Stockholm United Nations Conference on the Human Environment is generally seen “as the foundational moment of modern international environmental law” [2] (p. 8). Since then, numerous international environmental treaties have been adopted and a complex and multilayered environmental governance structure has materialized in recent decades [3]. However, it seems that with the evolution from the Stockholm Conference on the Human Environment to the 1992 Rio UN Conference on Environment and Development and the 2002 Johannesburg World Summit on Sustainable Development, not only has the word “environment” disappeared from the name of the summits, but the focus has also shifted from environment to development and the attention on environmental concerns has weakened [4,5]. The Rio Declaration is criticized for explicitly subordinating environmental policy obligations to the “dictates of economic development policy” and thus reflecting a “triumph of unrestrained anthropocentricity” [6] (pp. 6 and 12). Further, Rio Principle 2 is seen as “turn[ing] the clock back from Stockholm” because “the right to a wholesome environment embodied in the Stockholm Declaration was abandoned in favor of a right to development” [7] (p. 46). The Rio+20 Summit is similarly perceived as changing the balance of the environment-development equation in favor of economic development and that sustainable development “is turning brownish” [2] (pp. 20–21). This happened despite the fact that in the last decade, it has become increasingly clear that threats to the environment undermine the resource base of human development and well-being.

As UN Secretary-General Kofi Annan stated in 2005, “[w]e fundamentally depend on natural systems and resources for our existence and development. Our efforts to defeat poverty and pursue sustainable development will be in vain if environmental degradation and natural resource depletion continue unabated.” [8] (§ 57). Today, it is evident that an intact environment, a healthy nature and its vital contributions to people are essential for human existence and for achieving the sustainable development goals [9]. Cooperation and action for the environment is needed more than ever, but cooperation and action will happen often only in the context of international regulation.

While the adoption of the Sustainable Development Goals in 2015 can be seen as an important step to integrate environmental concerns into a more traditional development policy, the international community is still dealing with environmental problems using an ad hoc, piecemeal and issue-by-issue approach. This has led to a mushrooming of partial solutions, “a myriad of multilateral agreements” [10] (p. 877) and institutional proliferation on the one hand, while on the other hand important gaps in international environmental policy still remain [11,12]. There are several international fora where environmental issues are discussed, and several of them have the potential of not only creating cooperative frameworks, but also politically and legally binding regimes. The United Nations Environment Programme (UNEP) and its governing body, the United Nations Environment Assembly (UNEA), constitute one of them—if not the most central.

However, UNEP is not always perceived and seems not sufficiently used as an institution that effectively addresses emerging environmental concerns. While there is abundant literature on the strengths and weaknesses of international environmental governance (see, for instance, [3–7,11–15]), this literature generally does not analyze concrete examples. This article will offer a brief analysis of the role of UNEA as a forum for identifying and addressing emerging issues in international environmental policy and law by looking at two concrete examples to examine how successfully UNEP and UNEA have been able to deliver on this function. Section 2 will first describe the reasons for international environmental cooperation and regulation and, therefore, briefly recall important economic concepts that explain why international cooperation and regulation are needed. Section 3 will present the United Nations Environment Programme (UNEP) and its governing body, i.e., the Governing Council, which later became UNEA, as well as its scientific, policy and catalytic functions to address emerging issues of international environmental concern, and how UNEA can contribute to the emergence of new international environmental law. Section 4 will then illustrate UNEA’s potential role and limits in formulating international approaches to emerging issues with two concrete case studies: Section 4.1 will look at UNEP’s successful approach to addressing mercury as an issue of global concern by catalyzing and shaping new policies and law, and Section 4.2 will describe how UNEP has not yet been able to address the challenges posed by novel geoengineering technologies. Section 5 will consider the factors that support or impede the fulfilment of this role, namely the concern of states not to limit their future decision space, the existence or non-existence of a shared understanding of risks that cannot be addressed effectively unilaterally, the existence of a dedicated group of countries pushing for a specific issue, and the presence of an institution providing for a well-informed and well-organized process. This article concludes that UNEP has all the ingredients needed to be such an institution; however, countries have to be ready to make use of it.

## 2. Reasons for International Environmental Cooperation and Regulation

Environmental concerns belong to the most problematic and pressing challenges for the well-being and prosperity of the international community. While there are many examples of environmental improvement in recent decades, especially where problems have been well understood, where regulatory and technical solutions have been readily available, and where societal costs were easily manageable, the overall condition of the global environment has nevertheless continued to deteriorate [16]. The major environmental threats, despite all efforts, remain unresolved and put the future of humanity at risk: greenhouse gas emissions continue to increase; the current biodiversity changes are the fastest in human history; the release of harmful and often also persistent pollutants

such as heavy metals and endocrine disruptors remains a problem for the terrestrial and aquatic ecosystems; deforestation in the tropics continues; and the per capita availability of freshwater is declining [17]. Most of these challenges cannot be solved by individual nations alone, they require cooperation (see, e.g., [9] (at D1), [16], (p. 4) [18] (§ 4.4)). This section will further describe the reasons for international cooperation and regulation.

A functional analysis of state behavior and examples from game theory such as the tragedy of the commons [19] or the prisoner's dilemma [20,21] provide a theoretical explication and illustration for why cooperation and regulation are desirable [22]. The traditional example of the tragedy of the commons involves a pasture open to all [19] (p. 1244), contemporary examples are the overuse of the atmosphere leading to climate change, the destruction of the ozone layer, the overuse of biodiversity, fisheries, water and air pollution. Climate change is again a good concrete example of a prisoners' dilemma situation: no state can prevent climate change alone. While preventive emissions reduction implemented by all would be in the interest of all [23,24], without assurance that the other states will also implement emissions reduction measures, the incentive of individual states would be to prioritize adaptation and not mitigation. The race to the bottom is a form of the prisoner's dilemma involving a regulatory competition between states for more competitive local conditions for their industry, which is leading to a lowering of environmental standards [22,25]. In prescribing lax environmental standards, a state may provide a competitive advantage to its industry. Thereby, states may adopt low standards not only in order to compete for and attract new industry, but also in order to prevent a loss of industry. Even if there is no risk of industry leaving because of high relocation costs, a state may hope that the favorable regulatory environment leads to growth in exportation, tax revenues and wealth of its citizen. Cooperation by agreeing on optimal environmental standards—which can but do not have to be harmonized [25]—could allow states to prevent a race to the bottom and maximize social welfare [26].

These game theory examples advance our understanding of the basic forces that are at work and explain the need for cooperation and regulation [27,28]. However, it is important to acknowledge that a purely economic and rationalist analysis is always limited, as it assumes rational behavior motivated by self-interest and people. However, states do not always make objectively rational choices in line with the maximization of their self-interest [22] (pp. 517–528 with further references). Despite these limits, the examples nevertheless illustrate well that cooperation is desirable to overcome suboptimal—or, as in the case of climate change, even fundamentally threatening—outcomes.

Regulation does not necessarily have to happen at the international level. Thus, it seems that not all issues require international cooperation. In fact, there may be reasons favoring de-centralized approaches and local regulation [29] (pp. 1219 ff.): local approaches may better reflect geographical variations, different preferences and different capacities. There may be a benefit of experimentation with different policies and of competition between systems. At the local level, the political participation may be easier and more direct, leading to enhanced self-determination, ownership and responsibility. Further, local approaches may be faster and they may not need consensus and thus allow for higher ambition and standards. However, there may also be strong reasons for international approaches [29] (pp. 1211 ff.): international externalities, spillovers, and the risks of overusing common natural resources leading to their destruction need international approaches and cooperation as well as the desire to avoid unfair competition at the cost of the environment, which could lead to a race to the bottom and lax environmental standards. Harmonized standards may lead to economies of scale and common rules may facilitate trade. The costs of international approaches may be less visible at the local level and sacrifices may be more palatable if internationally shared. The pooling of competence and expertise may lead to more effective policies. Further, political failure at the local level and the fact that the interests of the socially, economically and politically disadvantaged may sometimes be better and more effectively represented in international fora may speak similarly in favor of international regulation. In today's interdependent world, it is clear that states have to increasingly cooperate in order to deal efficiently with many problems of social policy, economic development, or use of

natural resources. Many of these problems cannot be solved effectively and efficiently by the states independently, making cooperation desirable.

There are different forms, intensities, and stages of cooperation [30] (pp. 259–262). Some entail close collaboration, for example, in the investigation of problems, in the research for means and measures to solve these problems, and in the adoption and enforcement of such measures. Others merely signify that certain activities are coordinated or that decisions are not made independently and unilaterally, but that the interests of others are taken into account. Cooperation implies the rejection of claims to be fully free and independent, and instead involves the taking into account of the interests of the others and a sharing of certain authority, competence, or power [30] (pp. 259–260). Cooperation can happen based on a purely voluntary and ad hoc basis. However, the more complex the issue, the greater the interest in more systematic, more structured, more durable and more predictable cooperation, both with regard to assurance that cooperation will happen and with regard to the form, pattern and content of such cooperation. Systematics, structure, durability and predictability are influenced by the policy and legal framework that is guiding and shaping the decisions and the behavior of states and actors concerned. States have, therefore, established different frameworks promoting such cooperation. Some, e.g., the technical expert meetings established by the United Nations Framework Convention on Climate Change (UNFCCC), simply enable and facilitate voluntary cooperation by creating a forum for exchange. Others motivate and direct cooperation by providing guidance through legally non-binding recommendations and soft law (on the guiding force of soft law, see generally [31]). The strongest form of requiring and regulating cooperation is binding international law, which include international treaty law, international customs, and general principles of law [32,33]. While international law has the greatest binding force, soft law has gained increasing influence [34] and the “orthodox categories of custom and treaty” are no longer adequately capturing the subtlety of the processes by which contemporary international law can be created and can influence state behavior [35] (pp. 901–913). Soft legalization has a number of significant advantages, including that it is easier to achieve, provides strategies for dealing with uncertainty, infringes less on sovereignty, and facilitates compromise among differentiated actors [36]. Moreover, soft law has a range of political and legal effects and it interacts or overlaps with or is a precursor to one or more of the traditional sources of law [37]. Like the traditional “hard” law, it is an expression of cooperation and a tool to guide behavior. At the core of these hard and soft legal norms and frameworks facilitating, requiring and guiding cooperation lies an understanding of sovereignty not as a simplistic concept of freedom, independence and autonomy, but as a notion of authority, responsibility and duty to participate as a member of the international community and to cooperate to address and solve the pressing challenges of a complex and interdependent world [30] (pp. 331–343).

### **3. The United Nations Environment Assembly and its Function to Contribute to the Emergence of New International Environmental Law**

This section will now look at the United Nations Environment Programme (UNEP) and its assembly, the United Nations Environment Assembly (UNEA), as such a framework facilitating, requiring and guiding cooperation to address international environmental challenges.

UNEP was established by the UN General Assembly following the recommendation of the 1972 Stockholm Conference as an institutional arrangement for international environmental cooperation [38–41]. The UN General Assembly also established UNEP’s Governing Council (GC) as a body with 58 states as its members [38] (para 1). UNEP’s GC, which later became UNEA, had the main functions and responsibilities to (a) “promote international co-operation in the field of the environment and to recommend policies to this end”; (b) “provide general policy guidance for the direction and co-ordination of environmental programmes within the United Nations system”; (c) review their implementation; (d) “keep under review the world environmental situation in order to ensure that emerging environmental problems of wide international significance receive appropriate and adequate consideration by Governments”; (e) “promote the contribution of the relevant international scientific

and other professional communities to ... environmental knowledge and information”; and (f) “to maintain under continuing review the impact of national and international environmental policies and measures” [38] (§§ 2 (a)–(f)). Thus, the core functions of UNEP and its governing body can be clustered into three functions: first, a *scientific function* to keep the world environment under review and identify emerging environmental problems with international significance. Second, a *policy function* to promote international cooperation, provide general policy guidance, and coordinate the environmental activities within the UN. Third, a *catalytic function* to stimulate environmental cooperation, action and policy implementation. These three functions form a cycle: science, policy, and the catalysis or promotion of action should be followed again by reviewing the environmental situation and determining whether additional policies are needed.

These three functions reflect the theoretical concepts explaining the desirability of cooperation outlined in Section 2, namely the benefit of cooperation through pooling of competence and expertise. This pooling leads not only to a more authoritative scientific assessment and hopefully better decision making, but it also allows circumventing political failures at the local level and taking into better consideration the interests of the more socially, economically and politically disadvantaged. Further, by using an already existing international machinery and sharing the incremental costs, it makes costs less visible. By keeping the environment under the review, the *scientific function* serves to assess the need for international cooperation and regulation such as the existence of international externalities, spillovers, or the risk of overusing common natural resources that may, in the absence of international cooperation and regulation, lead to a tragedy of the commons, a prisoners’ dilemma situation or a race to the bottom. The *policy function* then serves to establish an institutional and regulatory framework for cooperation through voluntary or legally binding approaches to address problems that have been identified through the scientific function. The development of coordinated policy approaches may also help to avoid unfair competition and a race to the bottom, the formulation of harmonized standards may lead to economies of scale, and common rules may facilitate trade. Further, the *catalytic function* finally aims to facilitate and promote the implementation of the policies and of concrete action and cooperation, namely by stimulating and coordinating environmental activities and capacity building within the UN system.

Over time, UNEP’s structure and functions have been reinforced and further clarified [42]. In 2002, its GC adopted a package of measures at its 7th special session aimed at strengthening the international environmental regime and UNEP [43] including requiring that the UNEP GC should be utilized more effectively in promoting international environmental cooperation, in providing broad policy advice and guidance, in identifying global environmental priorities, and in making policy recommendations [44] (§11). Moreover, in order to ensure that all states are able to fully engage in the political work and guidance undertaken by the UNEP, it was decided that universal participation in the work of the UNEP GC should be ensured and universal membership should be considered [44] (para 11(a)). The World Summit on Sustainable Development [45] (§ 140(d)) and the UN General Assembly [46] (§ 2) endorsed these decisions later in the year. This confirmation was central because it broadened the relevance of the decision taken by the Special Session of UNEP’s GC and made it a part of the overarching global commitment to sustainable development [47] (pp. 12–13).

Ten years later, the Rio+20 Conference in 2012 adopted another set of measures to strengthen UNEP’s scientific, policy and catalytic functions [48] (§§ 87–90), which was endorsed by the UN General Assembly the same year [49] (§ 2.). The decision underlined the importance of a strong science–policy interface for bringing together information to support informed decision making, of the dissemination and sharing of evidence-based environmental information and raising public awareness on critical and emerging environmental issues, and of a regular review of the state of the earth’s changing environment [48] (§§ 88(d), 88(e) and 90). It decided to enhance UNEP’s ability to fulfil its coordinating mandate within the UN system [48] (§ 88(c)), and to strengthen its role as the “leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations

system and serves as an authoritative advocate for the global environment” [48] (§ 88). In this context, it also recognized the significant contributions of multilateral environmental agreements to sustainable development [48] (§ 89). Moreover, it established universal membership in the GC of the United Nations Environment Programme [48] (§ 88(a)).

Introducing universal membership to UNEP’s governing body, thus making it the only subsidiary organ in the United Nations with universal membership, was “a logical, feasible and potentially effective legal measure to upgrade UNEP’s current institutional structure” [42] (p. 224). While UNEP legally had the authority to provide political guidance, this authority was politically weakened by the fact that not all states directly engaged in UNEP’s decision making and that, e.g., the Conference of Parties of multilateral agreements had much broader membership than the UNEP GC. Introducing universal membership thus strengthened the legitimacy of UNEP’s GC as an authoritative voice that sets the global agenda [14] (p. 4). Subsequently, the UNEP GC further clarified its mandate to set the global environmental agenda, to provide overarching policy guidance, to define policy responses to address emerging environmental challenges, to undertake policy review, dialogue and exchange of experiences, and to promote a strong science–policy interface by reviewing the state of the environment [50] (§§ 5(a)–(c) and 8). Consequently, the UN General Assembly decided to change the designation of the “Governing Council of the United Nations Environment Programme” to the “United Nations Environment Assembly of the United Nations Environment Programme” one year later [51] (§ 2).

UNEP’s scientific, policy and catalytic functions and its role to promote and coordinate international policies and efforts to protect the environment, to “provide the center of gravity for environmental affairs within the UN system” [39] (pp. 345–347), and to be the United Nation’s “leading global environmental authority” [48] (§ 88) and “anchor institution” [13] (pp. 15–30) have been clarified, re-confirmed and strengthened several times since UNEP’s creation in 1972. Thereby, its governing body, the United Nations Environment Assembly, has the critical role to convene and engage all the UN members and to provide the forum for concrete decision making on environmental coordination, cooperation and policy. In doing so, it has the potential of directly contributing not only to the identification and better understanding of critical emerging international environmental concerns that require international cooperation but also to the emergence of international environmental law. It does so by identifying available standards and best practices, by formulating policy advice and recommendations, by adopting, confirming and clarifying political and legal principles, and by deciding to develop new international environmental treaties. UNEA thus contributes to the growing body of soft law, to the emergence of general principles of law, to the crystallization and affirmation of customary international law, and to the codification and formulation of new international law through treaty law.

In this process of creating hard and soft law, UNEA would typically have to follow three steps: first, it must identify an issue of critical international environmental concern. This step is inherently linked to its scientific function, as reflected in UNEP’s and UNEA’s mandate to “keep under review the world environmental situation in order to ensure that emerging environmental problems with international significance receive appropriate and adequate consideration by Governments” [44] (para 2(d)), to “disseminate and share evidence-based environmental information” [48] (§ 88(e)) and to “promote a strong science-policy interface by reviewing the state of the environment” [48] (§ 88(d)) [50] (§ 8). In order to trigger further measures, this scientific information has to show that an environmental issue is not only of local relevance but of global concern, requiring action at the international level. Second, after identification of an issue that warrants international action, UNEA will try to address this concern through soft measures such as raising awareness, creating a voluntary framework for cooperation, identifying best practices and models, and providing non-binding guidance. If the UNEA concludes that these voluntary approaches are not sufficient to effectively address the identified issue of environmental concern, it may move to the third step of more binding approaches and launch negotiations of a legally binding instrument. The second and third steps of developing voluntary or legally binding instruments to address global environmental concerns are linked to UNEA’s policy

and catalytic functions, as reflected in its mandate to “recommend policies”, “provide general policy guidance” and “promote international co-operation in the field of the environment” [38] (§ 2(a)), and to define “policy responses to address emerging environmental challenges” [50] (§ 5(b)). It is important to note that the evolution from the second step of voluntary measures to the third step of creating “hard” and binding law is fluid. Thus, the creation of voluntary frameworks, the identification of best practices, the formulation of recommendations and the confirmation of international environmental principles could contribute to the emergence to international environmental law through the crystallization of customary law and recognition of binding general principles of law.

#### 4. UNEA’s Contribution to the Emergence of New International Environmental Law: Two Examples

After having presented UNEA’s mandate and functions and its potential role in the process of international environmental law making, this section will turn to two concrete examples. These case studies illustrate the cumbersome process of following the three steps from identifying an issue of critical international environmental concern, to developing voluntary tools and frameworks of cooperation, and finally to agreeing on legally binding approaches.

##### 4.1. Minamata Convention on Mercury

The first reports of methyl mercury poisoning existed already in 1865 [52]. However, the severe risk to human health and the environment of methyl mercury was only recognized a century later. “The most notable event was the catastrophic pollution in Minamata, Japan, where industrial releases of methyl mercury caused the epidemic known as the Minamata disease in the 1950s and onwards” [53] (p.195) [54]. Over time, an understanding of the risks of methyl mercury, of its capability to be transported over long-range distances, and of the increase in anthropogenic releases of mercury into the environment was growing, and in the 1990s, national and regional initiatives were undertaken to reduce or eliminate mercury releases [53]. In 2000, concerned about the global dimension of mercury pollution, regional fora such as the Arctic Council and the Executive Body for the Convention on Long-range Transboundary Air Pollution called upon the United Nations Environment Programme to initiate work on mercury [55,56], and in 2001, UNEP’s GC requested UNEP to undertake a global assessment of mercury and its compounds [57] (§ 2). By doing so, it made use of UNEP’s scientific function to keep the environment under review as described in the previous section. Norway, Iceland, the Netherlands and the Czech Republic proposed that the assessment should also cover other heavy metals of concern. However, this proposal did not gain sufficient support [58] (p. 9). UNEP was nevertheless requested to consider whether there is a need for assessments of other heavy metals of concern as well [57] (§ 2). UNEP’s chemicals division in Geneva produced UNEP’s first Global Mercury Assessment report in 2002, which concluded that mercury levels in the environment have increased considerably since the onset of the industrial age, that mercury is persistent and travels in cycles, that mercury exposure has serious effects, and that local or regional action is not sufficient due to long-range transport [59]. It also concluded that significant trade in mercury and mercury containing products is ongoing, and that coal-fire power and heat generation, cement production and mining, including small-scale gold and silver mining, and chlor-alkali production are some of the more important anthropogenic emission sources [59]. The global mercury assessment has thus identified typical reasons for international cooperation outlined in the previous sections, namely the existence of international externalities and spillovers. The report did not specifically address other heavy metals of concern.

When the Global Mercury Assessment was presented in 2003, the UNEP GC accepted the assessment’s finding and concluded “that there is sufficient global adverse impacts from mercury and its compounds to warrant further international action to reduce the risks to human health and the environment” [60] (Section V, § 1). Norway and Switzerland proposed to begin negotiations of a legally binding instrument, arguing “that in light of the global dimension of the problem, including transboundary externalities and trade implications, voluntary actions alone would be

insufficient to reduce use and emissions of mercury, and that a legally binding instrument would be the most robust and most effective framework for concrete action, including international cooperation and support” [53] (p.196). While the EU, the African Group and some Latin American countries supported this proposal, several countries, including the US, Canada, Australia and New Zealand opposed a legally binding approach and advocated focusing on voluntary approaches. They argued that negotiating a legally binding instrument would require a lot of time and resources and that direct voluntary action would be more effective and less costly. Moreover, China and India argued that a legally binding approach could limit their right to economic development, for which mercury emissions were unavoidable [61] (pp.431–434). A number of countries also called for global assessments of other heavy metals, in particular lead and cadmium [62] (§ 70) [63] (p. 2). However, no agreement could be achieved on the proposal to expand the focus on heavy metals. After tense negotiations, a compromise was found to request the UNEP Executive Director to establish a “Programme for international action on mercury” [60] (Section V, operative paragraph 4 and annex) and to invite submissions from Governments on their views on further measures for addressing mercury, and to present and synthesize these views, “including, for example, on the possibility of developing a legally binding instrument, a non-legally binding instrument or other measures or actions for consideration by the Governing Council at its twenty-third session” [60] (Section V, operative paragraph 9).

Over the next four years, the debate on whether a legally binding instrument on mercury and possibly other heavy metals is needed or not continued [53] (pp.197–198). In 2007, Norway and Switzerland, together with Gambia, Iceland and Senegal, tabled a proposal for initiating negotiations for a legally binding instrument on mercury which is ‘open for the possibility to include other chemicals of global concern should this be warranted’. The African Group, the EU, Brazil, Japan, Russia, and Uruguay supported the call for a legally binding instrument, while the US and Canada opposed it, introducing alternative draft decisions highlighting the need for further voluntary action through an enhanced UNEP mercury programme [64]. The US and Canada, supported by Australia, China and India, argued that partnerships are more effective than legally binding mandates, and that there is no sufficient information suggesting a need for additional work on lead and cadmium. After intense negotiations, the UNEP GC concluded that further long-term international action was required and agreed on a two-track approach: on the one hand, it decided to continue and strengthen the voluntary actions under UNEP’s mercury programme [65] (§ 25–27); on the other hand, it agreed to establish an ad hoc Open-Ended Working Group (OEWG) to review and assess options for enhanced voluntary measures and new or existing international legal instruments [65] (§ 28–33). Moreover, it requested UNEP to collect additional specific information on mercury such as the best available data on mercury emissions and trends, results from modelling emissions at a global scale, best practices for reducing mercury emissions, and contaminated sites [65] (§ 24). Finally, with regard to lead and cadmium, the GC requested UNEP to provide available information to address the identified data and information gaps [65] (§ 14).

Several options of legally binding approaches to addressing mercury were discussed, including amending the Stockholm Convention on Persistent Organic Pollutants or establishing a new, freestanding convention on mercury [61] (p. 430) [66] (pp. 264–266). Switzerland, in close cooperation with Norway, therefore initiated and led an informal process to narrow down the legally binding options and to broaden the support for a legally binding instrument. Switzerland invited a small group of countries that all shared an ambitious approach to international chemicals and waste policy. In order to achieve maximum impact on the work of the OEWG, on the regional deliberations and the next UNEP GC, Switzerland invited at least two countries from each of the UN regions that were active and outspoken and that were also not afraid of defending their position in difficult negotiation situations with much tension and pressure. During the informal discussions between these like-minded countries, a common understanding emerged that a new, freestanding legally binding instrument on mercury would be the preferred option—one of the reasons being that a new instrument could also

become a framework for future regulation of other heavy metals of global concern, namely lead and cadmium [53] (p. 198) [67].

At its next session in 2009, the UNEP GC finally agreed to launch negotiations of a legally binding instrument on mercury [68] (§§ 25–31), [69] and [70] (pp. 3 and 7). In order to gain support from those countries that still favored voluntary approaches, the decision explicitly highlighted that the new convention could include both binding and voluntary approaches and that it should consider flexibility in that some provisions could allow countries discretion in the implementation of their commitments [68] (§§ 25 and 28(a)). The negotiation mandate foresaw a comprehensive approach addressing mercury throughout its lifecycle, i.e., supply, trade, demand, emissions and waste [68] (§ 27). While it limited the focus of the new convention to mercury, it recognized explicitly that the mandate of the intergovernmental negotiating committee could be supplemented by further decisions of the GC [68] (§ 30). However, proposals to also address heavy metals of global concern did not gain traction during the negotiations.

The negotiation mandate adopted by the UNEP GC in 2009 held that the negotiations should begin in 2010 and be completed prior to the GC session of the GC in 2013 [68] (§ 26). Although each of the main thematic areas of negotiations involved specific difficulties, the negotiations progressed well, and the intergovernmental negotiating committee was able to agree on 19 January 2013 in Geneva on the text of the Minamata Convention on mercury. Later that same year, the Diplomatic Conference of Plenipotentiaries formally adopted the Convention and opened it for signatures in Kumamoto, Japan, on 10 October 2013 [53] (pp. 200–209).

Interestingly, one of the most contentious issues in the negotiations related to the question whether and how the Convention should differentiate between countries [53] (pp. 200–203). Invoking Principle 7 of the Rio Declaration on Common but Differentiated Responsibilities (CBDR) [71], several developing countries argued that the new instrument should differentiate between developed and developing countries. Others argued that “while differentiation according to responsibilities and capabilities may in some cases be important, such differentiation should be based on the specific circumstances of countries and reflect today’s socio-economic realities where developing countries are the largest source of atmospheric emissions of mercury, and where several developing countries have a higher per capita gross domestic product than some developed countries. A differentiation according to two rigid, historical classes of countries would, therefore, neither be equitable nor effective” [53] (p. 201). During long negotiations, countries were able to agree not to differentiate between developed and developing countries in the Convention’s substantive provisions and obligations nor with regard to the compliance procedure. With regard to support, they agreed that “all parties, within their capabilities, are invited to contribute to the financial mechanism” [72] (Art. 13, para 12); all parties are called to “cooperate to provide, within their respective capabilities, timely and appropriate capacity-building and technical assistance to developing country parties” [72] (Art. 14, para 1); and “[d]eveloped country parties and other parties within their capabilities shall promote and facilitate ... development, transfer and diffusion of, and access to up-to-date environmentally sound alternative technologies to developing countries” [72] (Art. 14, para 3). The negotiations on how to reflect the principle of CBDR in the preamble continued into the last phases of the negotiations and could not be solved within normal negotiations and had to be addressed by a small Friends of the Chair group. These discussions were especially difficult because of the ongoing parallel negotiations of the Paris Agreement, where differentiation and reference to the principle were one of the most divisive issues involving similar overarching political concerns about the engagement or non-engagement of the more advanced developing countries [73] (pp. 219–22), [74,75]. The small group finally found a compromise, which combined the reference to the principle with an acknowledgment of the states’ respective circumstances and capabilities and the need for global action [72] (Preamble, § 4). Linking CBDR to the states’ respective circumstances and capabilities makes clear that the concept should not be understood as dividing the world into fixed categories of developed and developing countries, but that it provides for “targeted differentiation and flexibility” [53] (p. 203). One year later,

the US–China Joint Announcement on Climate Change, which was negotiated by the same US lawyer who was also involved in finding the compromise in the small group in Geneva for the Minamata Convention, similarly qualified CBDR “in the light of different national circumstances” [76], and this solution later became the basis for how the Paris Agreement addressed the issue [77]. Like in the Minamata Convention, this formulation represented a “political signal of flexibility and dynamism”, underlining that given the differences in national circumstances among states, a simple categorization of states as developed or developing might not be appropriate [73] (p. 221). Thus, the negotiations of the Minamata Convention have strongly influenced the Paris Agreement, but at the same time, they have also contributed to the evolution of the understanding of the CBPR principle.

#### 4.2. Geoengineering

While the international community has agreed to keep the global average temperature to well below 2 °C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels [77] (Art. 2.1.a), the current policies, measures and declared nationally determined emission reduction targets are not in line with this objective [78]. This motivates the search for additional solutions such as technical interventions in the climate system, often referred to by collective terms such as “geoengineering”, “climate engineering”, “climate intervention” or “climate-altering technologies and measures” [79]. All these measures, for the purpose of simplicity, referred to in this article as “geoengineering” have in common that they do not reduce anthropogenic greenhouse gas emissions, but aim at reducing global warming by means of large-scale technical measures that directly intervene in the climate system [80]. Geoengineering can be defined as “the deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change” [81] (p. 1). Typically, two categories of geoengineering are distinguished: carbon dioxide removal (CDR) and solar radiation management (SRM) [80], [82] (p. 550) (for an excellent overview for the two categories of geoengineering, see [83]). Examples of CDR include the capturing of CO<sub>2</sub> from the atmosphere or directly at an emission source and its geological storing, the fixation of CO<sub>2</sub> from atmosphere in forests through large-scale afforestation, or the fertilization of oceans to enhance algae growth with associated CO<sub>2</sub> fixation [79] (pp. 2 and 4) (for an overview of potential sequestration capacity and the costs of CDR techniques, see [83] Table 2). On the other hand, SRM tries to reduce warming by artificially increasing the reflection of solar radiation in the atmosphere or at the earth’s surface, e.g., by introducing aerosols into higher atmospheric layers. SRM does not reduce the CO<sub>2</sub> concentration in the atmosphere but can be used to save time until the CO<sub>2</sub> concentration in the atmosphere can be sufficiently reduced [79]. SRM could be attractive, as it would work much faster than emission reductions or CDR and is comparably less expensive (for an overview of SRM potential cooling and costs, see [83] Table 4). However, it does not address the rising greenhouse gas concentration that causes climate change, nor the non-temperature-related consequences of climate change such as ocean acidification [79].

While technical knowledge regarding feasibility, especially in large-scale dimensions, is still lacking for SRM but also for many CDR measures, their application is tested and becomes a real option [79] (p. 3). All the scenarios of the Intergovernmental Panel on Climate Change (IPCC) for meeting the 1.5 °C target include negative emissions, i.e., measures to remove CO<sub>2</sub> from the atmosphere. At the same time, all measures deployed at a large scale can have significant adverse side effects: SRM involves risks, such as changes in precipitation patterns, with sometimes serious regional effects [83] (Table 5). Further, if once started, SRM would have to be continued in a controlled manner until greenhouse gas concentrations have fallen back to the level prior to the use of SRM, as, if stopped abruptly, temperature would immediately increase at a pace to which it would be difficult to adapt [79]. Ocean fertilization could similarly involve risks such as intervention in the highly complex structure of ocean food chains and have adverse effects on the marine environment, and it is argued that the costs of the ecological consequences of ocean fertilization are incalculable [81] (pp. 3–4). Deployed at large scale, CDR measures such as large-scale afforestation could create land-use conflicts, risks for

food security, conflict with the sustainable development goals and with the conservation of natural resources [81] and [83] (Table 3). As outlined in Section 2, these potential risks, such as international externalities and spillovers, would be reasons for international cooperation and some of them, such as ocean fertilization, may even lead to a tragedy of the commons.

In light of these uncertainties and risks, some international fora have started to address geoengineering [84]: the Conference of the Parties to the Convention on Biological Diversity has recommended a broad moratorium on geoengineering in 2010 [85]. The Parties to the London Protocol on Prevention of Marine Pollution adopted an amendment prohibiting ocean fertilization in 2013 [86]. The Federated States of Micronesia, Mali, Morocco and Nigeria submitted a proposal at the meeting of Parties to the Montreal Protocol in November 2018, requesting a report on SRM by the Montreal Protocols Scientific Assessment Panel, but withdrew it due to time constraints [87,88]. Further, because of the uncertainties, knowledge gaps and substantial risks, and the ethical questions that they involve, the IPCC has decided not to include SRM or ocean acidification in its scenarios [82] (pp.12–13).

Despite the uncertainties and complex environmental and ethical questions involved [89], work on different areas of geoengineering has started [79]. Further, despite the global dimensions of the possible impacts of the different geoengineering technologies, an authoritative, internationally coordinated comprehensive assessment of the potential risks and governance needs of geoengineering is so far missing [80] (p. xi). In light of the existing substantial knowledge gaps and the fears of significant environmental and geopolitical risks associated with the utilization of geoengineering, Switzerland submitted a draft resolution for consideration for the 4th UNEA in March 2019, mandating UNEP to prepare an assessment of geoengineering [90]. Burkina Faso, the Federated States of Micronesia, Mali, Mexico, and Niger initially co-sponsored the resolution; Georgia, Liechtenstein, Monaco, Montenegro, New Zealand, and Senegal later joined this group. At the beginning of UNEA 5, Switzerland and 11 countries co-sponsored this submission, representing small and big economies from all UN regions—developed and developing countries, as well as big emitters and most vulnerable countries. They argued that UNEP should be mandated to undertake such an assessment because of its core scientific function to keep the environment under review and to identify emerging environmental problems with international significance and because of its environmental expertise, credibility and its trans-sectorial approach [91]. The proposal asked UNEP’s Executive Director to prepare a report that assesses criteria to determine SRM and CDR technologies, actors and activities with regard to research and deployment, the current state of science surrounding such technologies, including the risks, benefits and uncertainties; the current state and challenges of governance frameworks; and possible future governance frameworks [92]. While the proposal received much support, a group of countries around the European Union and Bolivia were, however, concerned that it would weaken existing international efforts to restrict CDR and SRM under, for example, the Convention on Biological Diversity, and that it could create an enabling framework for geoengineering [90]. Another group including the US and Saudi Arabia criticized the proposal for not sufficiently differentiating between the technologies, suggesting that UNEP is not sufficiently “scientific” and neutral to make such an assessment, and that the proposal would lead to a polarized and ideological debate and limit future decision space [90].

The draft resolution triggered similar reactions by experts and academics. Despite the fact that the proposal explicitly welcomed the considerations by United Nations specialized agencies and programs, multilateral agreements, and other multilateral fora, and specifically by the Convention of Biological Diversity [92] (preambular paragraph 5), some expressed concern that the proposed resolution does not adequately build on decisions taken on geoengineering by other UN bodies such as the Convention on Biological Diversity (CBD) [93]. This concern assumed that the decisions by these other UN bodies are already limiting the use of geoengineering—some even argued that the CBD decision is establishing a moratorium on geoengineering. However, the 2010 CBD recommendation is clearly not legally binding, and key actors like the US are not even a party to the Convention. While some thus perceived the draft as too open towards geoengineering, others perceived it as too negative, not reflecting enough

its positive potential [94–97]. The draft resolution was also criticized for not differentiating enough between the various techniques for climate engineering [94–97]. Others, however, argued that the draft resolution, by acknowledging the differences between CDR and SRM, but nevertheless using the term ‘geoengineering’ in relation to both, provided states with a common reference point and language to engage with CDR and SRM governance across different international environmental agreements and organizations [98]. The draft decision did indeed remind that geoengineering includes different technologies of SRM and CDR [92] (preamble § 4), and it specified that the requested assessment should particularly look at how SDR and SRM differ with regard to “each geoengineering technology [92] (§ 1). However, the use of the term geoengineering as an umbrella term seems to have triggered important concerns that the different technologies falling under that notion would be treated similarly, despite fundamental differences in their methodologies, opportunities, risks and possible governance needs. Some argued that UNEP and UNEA as a “politically legitimate intergovernmental body that enjoys the universal membership of all 193 UN Member States” are the appropriate forum for this discussion [99,100]. UNEA was also welcomed as the right forum, offering “the possibility of a more inclusive, and hopefully even more respectful debate”, because it “distances the debate from the fraught politics of the UNFCCC and IPCC” and also avoids the CBD, which is perceived by many as anti-geoengineering [101]. Others, however, suggested that the IPCC or UNFCCC with their specific climate expertise might be a more appropriate place to assess geoengineering [102] and the US and Saudi Arabia insisted that UNEP should wait for the assessment by the IPCC. At the same time, “the United States’ focus on the IPCC raised eyebrows. Both the United States and Saudi Arabia angered parties at the U.N. climate talks in Katowice, Poland, . . . by questioning IPCC’s work” [103]. However, the overall reception was positive and the proposal was welcomed as important [104] or an “excellent initiative” [100]. The proposal was described—referring to the Chinese proverb that a journey of a thousand miles begins with a single step—as “an important” [105] and “highly constructive” step [106] at the appropriate time [107]. Further, it was seen as a “helpful way to introduce the topic of ‘geoengineering’ for formal consideration by governments” [102] for “advancing the international community’s understanding of these complex approaches and potential governance frameworks to manage them” [108] and “to start developing a sense of direction on geoengineering governance” [109].

The subsequent negotiations focused on four issues: whether the decision should include a reference to the precautionary principle; whether the mandate to UNEP comes too early and the ongoing work of the IPCC on geoengineering should be awaited; whether, the mandate is too broad; and finally whether UNEP should look at governance issues at all. After long formal and informal negotiations, Switzerland and the 11 co-sponsors presented a revised proposal towards the end of the negotiations that attempted to address the different concerns. It replaced in the operative paragraphs the term ‘geoengineering’ by CDR and SRM, it referred even more explicitly to the other fora where the issue is discussed, it avoided using the term ‘assessment’ and did not anymore request conclusions on potential global governance frameworks for each geoengineering technology, but generally requested UNEP to prepare a report, consisting of a compilation of information provided by relevant UN entities and other intergovernmental bodies [110]. The idea of this very general invitation for a report was to accommodate on the one hand concerns that an assessment by UNEP might be too negative towards specific geoengineering technologies, but to begin on the other hand a process within UNEP on which the next UNEAs could build upon once trust in UNEP and in the process has grown. Finally, in order to address the concerns of those who were afraid that launching the discussion of geoengineering could be seen as a first step towards an enabling framework for geoengineering, the new proposal introduced an explicit reference to precaution in the preamble section [110] (preamble § 3).

While the EU and Bolivia would have supported this compromise, the US refused to accept the text because it felt any reference to precaution would unduly pre-empt the content of the requested report. The concept of precaution emerged in the 1970 in response to the recognition that science is not always able to provide all the information necessary to understand all possible impacts on the environment of certain measures or technologies, and the realization that the consequences of not

taking a preventive measure early enough could be irreversible [111–113]. It provides guidance in the development and in the application of policy making in light of scientific uncertainties [1] (p. 230). Precaution thus builds on the assessment of risks, is relevant to the management of identified but not fully understood risks, and should not be confused with the caution or prudence that scientists apply in their assessments of scientific data during a risk assessment [114] (p. 257). From that perspective, precaution would become only relevant once UNEP has prepared a report of the possible impacts of geoengineering. Reference to the principle in the decision calling for such a report would and should not change its content. Therefore, as reference to precaution was not really needed, it was perceived as creating an overpoliticized framing of the work of UNEP. The reference to precaution in the draft decision became a fundamental difference in the negotiations and finally, due to lack of consensus, Switzerland and its co-sponsors withdrew the proposal in the closing session of the Committee of the Whole [115]. While it seems that the political climate was not yet ready to allow a decision on this issue, the presentation of the resolution on geoengineering at UNEA-4 may have triggered the beginning of the multilateral conversation of the climate altering technologies generally assumed under the term “geoengineering” and on how the world might deal with and govern these technologies [116].

## 5. UNEA's Role in Emerging Issues of International Environmental Law

As shown, UNEP and UNEA have a scientific function to keep the global environment under review and identify environmental issues of global concern. Their policy and catalytic functions suggest that they should develop policy and regulations and catalyze cooperation and action that are needed to address the identified issues of global concern. The two examples discussed in the previous section showed mixed success in fulfilling this task.

The first example discussed in this article has described how UNEA successfully launched work to address the challenges posed by mercury. First, by initiating a global mercury assessment, it generated the common acceptance of the existence of a global risk and that, in line with the theoretical framework described in Section 2, international action is needed to address that risk. Second, it established a Mercury Programme as framework for voluntary action—and by collecting best practices and developing voluntary guidance, the Mercury Programme has arguably contributed to the emergence of international soft law. Third, by launching negotiations of a new legally binding agreement that later became the Minamata Convention on mercury, it triggered the development of new environmental treaty law. Fourth, through the negotiations of the Minamata Convention, it also influenced the content of other multilateral agreements such as the Paris Agreement on Climate Change. Finally, it shaped international environmental principles such as the principle of common but differentiated responsibilities. UNEA has thus played multiple roles in emerging issues of international environmental law: an *informative scientific role* by developing the common understanding of whether and what international action is needed, a *catalytic policy role* by launching the negotiations of new treaty law and by contributing to the emergence of customary international law, and a *policy shaping role* by influencing the further development of key international environmental law principles and the negotiations of new environmental norms in other fora. By doing so, UNEA not only catalyzed voluntary action and cooperation, but it also contributed to the growing body of soft law, to the emergence of general principles of law, to the crystallization and affirmation of customary international law, and to the codification and formulation of new international law through treaty law.

The Minamata Convention, the first multilateral environmental agreement negotiated in the 21st century, is hailed as a success of multilateralism [117]. The manner in which UNEA and UNEP addressed the problems posed by mercury seems to be a good example of how they can catalyze action and cooperation and contribute to the emergence of new international environmental law. At the same time, it should not be forgotten that several countries had proposed that UNEP's mercury assessment should also cover other heavy metals of international concern; and they called for a broader legally binding framework addressing not only mercury, but also other heavy metals such as lead and

cadmium. The opposition to this proposal was, however, too strong and the scope of the new binding framework had to be limited to mercury.

The second example concerning geoengineering illustrates another case where UNEA seems to have responded less effectively to a new emerging issue. The proposal to mandate UNEP to prepare an assessment of geoengineering, its risks, benefits and potential governance needs was not successful. At first glance, this is surprising, as according to its scientific function, UNEP was established precisely for such tasks. Moreover, in light of its scientific expertise and credibility and its trans-sectorial approach, UNEP seems to be perfectly placed to prepare such an assessment. However, as the example of UNEP's Global Mercury Assessment has shown, such assessments may not only lead to a better understanding of an emerging problem, they can also reveal that this problem, according to the theoretical framework described in Section 2, can only be addressed effectively through international cooperation and thus may also trigger such political action. While such action may involve voluntary cooperation at the beginning, it may well evolve into a legally binding framework regulating and limiting the use of certain geoengineering technologies. It is not surprising that a state with much expertise and capacity in different areas of geoengineering was concerned that such an assessment by UNEP could initiate a process that might limit its future decision space. Further, it is similarly not surprising that a state with a big interest in the promotion of geoengineering as a possible alternative to drastic reduction in emissions from oil consumption was not interested in launching a process that could limit future application of the new technologies. Thus, the political pressure and the political need were not yet big enough to convince these states that a shared and common better understanding of the potential consequences of geoengineering may also be in their interest. The objections to broadening the scope of UNEP's work beyond mercury to also address other heavy metals of international concerns were based on similar concerns. Several countries opposing the proposal had an important mining industry also extracting lead and cadmium, and others felt that regulating the use and emissions of lead and cadmium could limit their economic interests too strongly. At the same time, the risks posed by lead and cadmium were perceived as being more local and not really posing a problem for themselves.

Several factors prevented UNEA and its predecessor, respectively, from playing an active role with regard to heavy metals in the first example and with regard to geoengineering in the second example. These factors included (1) the direct economic and/or political interest of strong actors not to limit the use of a specific substance or the potential of a new technology; (2) the fear that a scientific assessment of problems could trigger a political process leading to the coordination, regulation or limitation of the use of such a substance or a technology; (3) the absence of sufficiently strong public awareness and political pressure focusing on the not yet sufficiently understood risks; and (4) a few states not perceiving that a better common understanding of the risks and benefits of a new technology and international cooperation in this specific area is ultimately also in their interest. On the other hand, key factors that contributed in the first example to UNEA successfully triggering action and contributing to the emergence of new international environmental law included (1) a shared interest in better understanding the global dimension of mercury risks; (2) the acceptance of the existence of a clear global risk as evidenced by a mandated assessment, including the recognition that addressing this risk is in the interest of all; (3) the realization that dealing with this risk unilaterally would be ineffective and cooperation, therefore, desirable; (4) a dedicated group of countries pushing for a legally binding approach; and (5) the existence of an institution that provided for a well-informed and well-organized process to develop a new legally binding instrument [53] (p. 209).

## 6. Conclusions

There are numerous reasons for international environmental cooperation. Today's international environmental challenges are a threat not only for the environment as such, but also for overcoming poverty and achieving sustainable development, as well as improving the prosperity and well-being of all humans. Many of the biggest environmental threats can only be addressed effectively through international cooperation. While the best, most effective and most efficient form, scope and intensity of

cooperation may differ in different areas, binding international norms generally provide the strongest and most predictable structure for such cooperation and action.

UNEP and UNEA were established with a *scientific function* to identify critical environmental issues of global concern, a *policy function* to provide general policy guidance to address these global environmental concerns, and a *catalytic function* to stimulate cooperation and concrete action. By doing so, UNEA can not only generally catalyze voluntary action and cooperation, but it can also contribute to the growing body of soft law, to the emergence of general principles of law, to the crystallization and affirmation of customary international law, and to the codification and formulation of new international law through treaty law. The key function of this new international environmental law is to regulate and provide a structure for action and cooperation.

The response to mercury illustrated how UNEP's governing body was indeed able to contribute to the promotion of international cooperation and the formulation of international environmental law to address an issue of global concern. However, proposals to also include other heavy metals such as lead and cadmium in this effort did not succeed. UNEA was similarly not able to address geoengineering as a new issue of potential international concern. Several factors influence UNEA's ability to foster international cooperation and to contribute to the emergence of international environmental law. These include concern among states to not limit their future decision space, the existence or non-existence of a shared understanding of risks that cannot be addressed effectively unilaterally and that thus limiting future decision space is in the interest of all, the existence of a dedicated group of countries pushing for a specific issue, and the presence of an institution providing a well-informed and well-organized process to develop a new legally binding instrument.

It took several steps for UNEA's predecessor to agree to launch negotiations of a legally binding instrument on mercury. The first step was the initiation of a global mercury assessment. Efforts to also include other heavy metals such as lead and cadmium in that assessment failed. However, in 2019, UNEA-4 requested UNEP to prepare "a report on matters in which emerging evidence indicates a risk to human health and the environment" [118]. The report prepared by UNEP in response to this request concludes that despite decades of efforts by members of the international community, heavy metals such as lead and cadmium are not adequately addressed, that current progress is not enough and that, therefore, increased concerted global action is needed, possibly through legally binding approaches [119]. It will be interesting to see whether this conclusion will trigger additional work by UNEP on heavy metals. Further, similarly, while the first proposal to mandate UNEP to undertake an assessment of the potential, risks and possible governance needs of geoengineering was not adopted by UNEA, several countries indicated at UNEA-4 that they will continue their efforts to develop a better understanding of the implications of geoengineering. It is thus too early to determine whether UNEA will finally be able to contribute to the emergence of new normative frameworks that address lead and cadmium or coordinate international action and cooperation on geoengineering. UNEA has all the ingredients needed to be an institution able to provide for a well-informed and well-organized process to develop such new normative frameworks; however, countries have to be ready to make use of it.

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