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# *The 'Rights' Way to Democratize the Science–Policy Interface in International Environmental Law? A Reply to Anna-Maria Hubert*

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## Abstract

*Science is widely regarded as being necessary for effective international environmental decision-making and risk assessment processes. However, it is equally well recognized that uncertainties or the complexity of phenomena under study mean that science may only offer partial knowledge for environmental problems in many circumstances. 'Democratization' of science is often proposed as a solution to this dilemma. This may involve incorporating a wider spectrum of expert views and public inputs in risk assessments of new technologies, public participation in science through so-called 'citizen science' initiatives or the application of the precautionary principle. This reply reviews these approaches and contrasts them with another tantalizing possibility offered by Anna-Maria Hubert's article; a human rights-based approach drawing on the 'oft-neglected' right to science. It assesses the extent to which a rights-based approach, utilizing the right to science, offers a way to bridge the gap between science and democracy in contested international environmental legal decision-making processes. While it concludes that there are important potential benefits to the application of the right to science in international environmental law, it is far from clear that it provides a panacea given the limitations on the right expressed in the international human rights instruments in which it is found, such as the International Covenant on Economic, Social and Cultural Rights. Instead, the right to science can be seen as placing another thumb on the scales – alongside the precautionary and participatory approaches – in favour of enabling broader, more democratically accountable decision-making in cases of uncertain science and contested environmental risks.*

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# 1 Introduction

As a field, international environmental law is characterized by its close relationship with science.[1] While a number of the problems with which international environmental law deals are physical and tangible, many are not perceptible to the human senses. These 'invisible' risks – such as climate change, ozone depletion or even biodiversity loss – require scientific techniques for their detection and understanding.[2] Consequently, scientific discussions and expert bodies are a common feature of international environmental treaties,[3] providing key inputs into decision-making processes, such as the listing of potentially harmful substances.[4] Although science is often a necessary input for effective international environmental decision-making and risk assessment processes,[5] this does not mean that science supplies a comprehensive answer to all questions of environmental regulation. This is especially the case where value judgments are needed, for instance, about what is an acceptable level of risk associated with the deployment of an otherwise beneficial technology.[6] In addition, as a result of uncertainties or the complexity of phenomena under study, science may only offer partial knowledge about a particular environmental problem.[7] In these circumstances, decision-making enters a realm that social scientists studying the limitations of scientific knowledge have called 'post-normal science'.[8] When in this 'wild' area, all (experts and lay people) are 'amateurs' because the questions at stake are essentially 'trans-scientific' – that is, they can be asked of, but not answered by, science.[9]

How environmental law should respond when operating in the wild domain of post-normal science is an issue that has been a central preoccupation of science and technology scholars studying domestic risk assessment processes. Many advocate a 'democratization' of science-based decision-making to overcome the limitations of science in these circumstances.[10] Scholars have suggested a range of ways that this

1 P. Sands and J. Peel, *Principles of International Environmental Law* (4th edn, 2018), at 6.

2 U. Beck, *Risk Society: Towards a New Modernity*, translated by M. Ritter (1992), at 72–74.

3 S. Andresen *et al.*, *Science and Politics in International Environmental Regimes: Between Integrity and Involvement* (2000), at 182–183; see also Andresen, 'The Role of Scientific Expertise in MEAs: Influence and Effectiveness', in M. Ambrus *et al.* (eds), *The Role of 'Experts' in International and European Decision-Making Processes* (2014) 105.

4 This is the role, for example, of the Persistent Organic Pollutants Review Committee under the Stockholm Convention on Persistent Organic Pollutants 2001, 40 ILM (2001) 532, Art. 8.

5 See Haas, 'Science Policy for Multilateral Environmental Governance', in N. Kanie and Peter M. Haas (eds), *Emerging Forces in Environmental Governance* (2004) 115 (discussing the notion of 'useable' science).

6 Fischhoff, 'Acceptable Risk: A Conceptual Proposal', 5 *Risk* (1994) 1, at 24.

7 Wynne, 'Uncertainty and Environmental Learning: Reconceiving Science and Policy in the Preventative Paradigm', 2(2) *Global Environmental Change* (1992) 111, at 114–115, discussing different types of environmental uncertainties.

8 Funtowicz and Ravetz, 'Three Types of Risk Assessment and the Emergence of Post-Normal Science', in S. Krimsky and D. Golding (eds), *Social Theories of Risk* (1992) 251.

9 *Ibid.*, at 253–254. On the distinction between science and 'trans-science', see the seminal article by Wienburg, 'Science and Trans-Science', 10(2) *Minerva* (1972) 209, at 209.

10 See, e.g., Functowicz and Ravetz, *supra* note 8; Fischer, 'Citizen Participation and the Democratization of Policy Expertise: From Theoretical Inquiry to Practical Cases', 26(3) *Policy Sciences* (1993) 165; A. Giddens, *The Third Way: The Renewal of Social Democracy* (1998), at 59; Stirling, Hayes and Delborne, 'Towards Inclusive Social Appraisal: Risk, Participation and Democracy in Governance of Synthetic Biology', 12(S8) *BMC Proceedings* (2018) 15.

democratization might occur, whether through incorporating a wider spectrum of expert views and public inputs in risk assessments of new technologies, public participation in science through so-called 'citizen science' initiatives or the application of the precautionary principle. To this menu of options, Anna-Maria Hubert's article adds another tantalizing possibility: a human rights-based approach drawing on the 'oft-neglected' right to science.[11] The promise held out by Hubert is that the right to science could augment 'technocratic, expert-driven processes' in international environmental law and 'contribute to more effective, equitable, and democratically legitimate, and accountable processes and outcomes in relation to the application of science and technology in environmental regimes'.[12]

This reply concentrates on that claim. It assesses the extent to which a rights-based approach, utilizing the right to science, offers a way to bridge the gap between science and democracy in contested international environmental legal decision-making processes. Before considering this alternative, it first examines models more commonly put forward as a means for democratizing the science–policy interface.

## 2 Democratizing the Science–Policy Interface: Existing Approaches

The question of how best to resolve difficult post-normal issues of science policy in environmental decision-making has generated a range of potential approaches. These approaches have focused on how to supplement incomplete or uncertain scientific knowledge when assessing environmental risks.

### *A Incorporating Community Knowledge*

One option for overcoming the potential deficiencies of scientific information in environmental decision-making is by supplementing this information with community views. Researchers in the post-normal science tradition have taken this approach, prescribing a 'quality assessment' of scientific materials in post-normal circumstances, which makes use of an 'extended peer community' and 'extended facts', including anecdotal and community knowledge.[13] In effect, these scholars see the problems of post-normal science as requiring a democratization of science itself, not 'out of some generalized wish for the greatest possible extension of democracy in society' but, rather, because 'an extension of peer communities, with the corresponding extension of facts, is necessary for the effectiveness of this new sort of science in meeting the great challenges of our age'.[14]

[11] Hubert, 'The Human Right to Science and its Relationship to International Environmental Law', 31(2) *European Journal of International Law* (2020) 625.

[12] *Ibid.*, at 625.

[13] Functowicz and Ravetz, *supra* note 8, at 254.

[14] *Ibid.*, at 273.

In domestic environmental risk assessment processes, this approach may be implemented by incorporating public participation at different stages in the assessment.[15] This is supported by international environmental principles, such as Principle 10 of the Rio Declaration and associated treaties such as the Aarhus Convention and Escazú Agreement, that call for enhanced public participation in national environmental decision-making.[16] At an international level, however, including public views to supplement those of experts presents a more complex challenge given the lack of a definable global public.[17] In addition, institutional factors, such as the scope of relevant legal rules and the existence of appropriate structures to facilitate broader engagement and participation, play an important part in determining the extent to which such augmented forms of science can be operationalized in global environmental risk governance.[18]

### *B Precautionary Approach*

In the absence of widespread processes of public participation in international environmental decision-making, and given problems in identifying a global public viewpoint,[19] alternative approaches to the democratization of the science–policy interface have drawn on well-established principles of international law, such as the precautionary principle. In international environmental law, the precautionary principle has been widely recognized in a range of treaty instruments and in international judicial decisions, although consensus on whether it has attained customary law status remains elusive.[20] Principle 15 of the Rio Declaration, the most oft-cited formulation of the principle, provides as follows: 'In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific

[15] See generally P.C. Stern and H.V. Fineberg (eds), *Understanding Risk: Informing Decisions in a Democratic Society* (1996).

[16] Rio Declaration on Environment and Development, Doc. A/CONF.151/26, vol. 1 (1992), Principle 10; Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters 1998, 2161 UNTS 447; Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean 2018, Doc. C.N.196.2018.TREATIES-XXVII.18 (2018) (not yet in force).

[17] Weiler, 'The Geology of International Law: Governance, Democracy and Legitimacy', 64 *Zeitschrift fur auslandisches offentliches Recht und Volkerrecht* (2004) 547, at 560.

[18] Peel, 'International Law and the Legitimate Determination of Risk: Is Democratising Expertise the Answer?', 38(2) *Victoria University of Wellington Law Review* (2007) 363.

[19] Though see the discussion of a 'democracy-striving' approach in global governance: De Búrca, 'Developing Democracy beyond the State', 46 *Columbia Journal of Transnational Law* (2008) 221, at 252.

[20] See, e.g., Bodansky, 'Law: Scientific Uncertainty and the Precautionary Principle', 33(7) *Environment* (1991) 4; McIntyre and Mosedale, 'The Precautionary Principle as a Norm of Customary International Law', 9(2) *Journal of Environmental Law* (1997) 221; Trouwborst, 'The Precautionary Principle in General International Law: Combating the Babylonian Confusion', 16(2) *Review of European, Comparative and International Environmental Law* (*RECIEL*) (2007) 185. For a summary of the different positions reached by international courts on this question, see Aguila and Viñuales, 'A Global Pact for the Environment: Conceptual Foundations', 28(1) *RECIEL* (2019) 3, at 6.

certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.[21]

The foundation for the application of the precautionary principle in environmental decision-making is thus the coupling of circumstances of scientific uncertainty with threatened harm of a serious or irreversible nature. Where scientific information regarding such threatened harm is uncertain (and, hence, an insufficient or unreliable basis for decisions), this raises questions about what else should guide decision-making.[22] Similarly, to a post-normal science analysis, looking beyond standard scientific sources in a precautionary context might encourage reliance on scientific theories or emerging scientific studies, anecdotal evidence – for example, observations of managers or analogies with similar problems – or available information on public risk perceptions and preferences.[23] There is also an emerging body of evidence from so-called 'citizen science' studies, where non-scientists gather information on environmental phenomena that may contribute to knowledge about threats of harm – for example, changes in the abundance of particular species.[24]

In theory, therefore, the application of the precautionary principle could provide a basis for democratization – or at least a broader assessment of relevant information – when assessing environmental risk in circumstances of scientific uncertainty. However, both in environmental treaties that include the precautionary principle and in international judicial decisions considering the principle, there has been a lack of specification about how the precautionary principle applies.[25] Most often, international courts and tribunals faced with scientific uncertainty offer only vague invocations of the need for 'prudence and caution'.[26] In its advisory opinion on *Responsibilities and Obligations of States with Respect to Activities in the Area*, the Seabed Chamber of the International Tribunal of the Law of the Sea (ITLOS) indicated that the principle applied 'in situations where scientific evidence concerning the scope and potential negative impact of the activity in question is insufficient but where there

[21] Rio Declaration, *supra* note 14, Principle 15.

[22] See Wiersema, 'The Precautionary Principle in Environmental Governance', in D.E. Fisher (ed.), *Research Handbook on Fundamental Concepts of Environmental Law* (2016) 449, at 461, noting that a consequent fear that the principle allows unfettered, anti-scientific decision-making has often led to the principle being tied to scientific processes that appear to be rational and objective, such as risk assessment and environmental impact assessment, an approach that has the potential to undermine the very basis for the principle's existence.

[23] See the discussion of case study examples in J. Peel, *The Precautionary Principle in Practice: Environmental Decision-Making and Scientific Uncertainty* (2005).

[24] See, e.g., Kelly *et al.*, 'Social License through Citizen Science: A Tool for Marine Conservation', 24(1) *Ecology and Society* (2019) 16, characterizing 'citizen science' as 'the active involvement of the public in science to address scientific questions, often of common interest or concern, by collecting and analyzing data, and publishing and communicating science via diverse outlets' (at 16).

[25] See Wiener, 'Precaution', in D. Bodansky, J. Brunnée and E. Hey (eds), *The Oxford Handbook of International Environmental Law* (2008) 597, at 601–602.

[26] ITLOS, *Southern Bluefin Tuna (New Zealand v. Japan; Australia v. Japan)*, Provisional Measures, Order of 27 August 1999, 280, at 296; ITLOS, *MOX Plant (Ireland v. United Kingdom)*, Provisional Measures, Order of 3 December 2001, 95, at 110; ITLOS, *Land Reclamation in and around the Straits of Johor (Malaysia v. Singapore)*, Provisional Measures, Order of 8 October 2003, 10, at 26.

are plausible indications of potential risks'.[27] However, neither ITLOS nor other international adjudicators have provided guidance as to how 'plausible indications of potential risks' might be discerned where scientific evidence is insufficient and the operation of standard scientific processes, such as risk assessment and environmental impact assessment, is likely to be compromised.

## 3 Potential Contribution of the 'Right to Science'

In the absence of other definitive solutions for managing the international science–policy interface in post-normal environmental decision-making situations, might a human rights-based approach offer another way forward? Hubert's proposal is timely, coming as it does at a juncture when the relationship between human rights and international environmental law is receiving renewed attention,[28] not only in efforts to deal with climate change[29] but also in more general international environmental legal reform efforts such as the negotiations on a proposed Global Pact for the Environment.[30] As explained by Hubert, the 'right to science', principally found in Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights (ICESCR), is understood to encompass a right of 'everyone' to both enjoy the benefits of science and technology and also be safeguarded from their adverse effects.[31] It is this 'balancing' that potentially makes the right to science a useful interpretative tool in mediating the science–policy interface in an international environmental context.[32]

Hubert's analysis suggests that there are at least three key ways that the right to science might supplement and expand existing approaches to environmental decision-making in circumstances of scientific uncertainty and contested risks. First, whereas international environmental law has a harm prevention orientation that focuses on actual or potential adverse effects caused by scientific research and technological applications, the right to science might be applicable to 'upstream' situations addressing broader concerns and mediating trade-offs associated with emerging science and technology innovation.[33] If this is the case, it would be a particularly useful contribution. Although the precautionary principle and the notion of anticipatory risk governance that it endorses could be applied potentially to regulate troubling scientific and technology developments before they are widely applied, in practice, states

[27] ITLOS, *Responsibilities and Obligations of States with Respect to Activities in the Area*, Advisory Opinion, 1 February 2011, 10, at 47.

[28] The work of the former and present special rapporteurs for human rights and the environment, John Knox and David Boyd, has played a major role in this renaissance. See particularly Report of the Independent Expert on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, John H. Knox – Mapping Report, Doc. A/HRC/25/53, 30 December 2013.

[29] See, e.g., contributions to *Climate Law*, 'Special Issue: Implementing the Paris Agreement: Lessons from the Global Human Rights Regime', edited by A. Savaresi and J. Scott, 9(3) *Climate Law* (2019) 159.

[30] Aguila and Viñuales, *supra* note 20, at 10.

[31] International Covenant on Economic, Social and Cultural Rights (ICESCR) 1966, 993 UNTS 3.

[32] Hubert, *supra* note 11, at 633.

[33] *Ibid.*, at 635.

usually seek to apply a precautionary approach at the point of the deployment of technologies on the basis of apprehended environmental harms. Bans on genetically modified organisms and genetically modified foods are a case in point.[34] On the other hand, Hubert suggests that the right to science could be used to intervene at an earlier stage when scientific research on contested topics, such as climate geoengineering, is being considered, funded and authorized.[35]

Second, Hubert suggests that the right to science offers advantages over the precautionary principle given the latter's requirement that a particular threshold of potential physical harm must be reached for it to be enlivened.[36] While the idea that the precautionary principle establishes a distinct 'threshold' of harm as a condition precedent for its application in circumstances where scientific evidence is inadequate to establish such a threshold,[37] this view of precaution continues to persist in the minds of many regulatory authorities and courts. There is therefore merit to Hubert's argument that the right to science in these circumstances could provide 'a more comprehensive framework' for regulating science and its applications, rooted in considerations of human dignity.[38] One can imagine, for instance, in the case of contested climate geoengineering technologies like solar radiation management, that rights-based arguments focused on the inequitable distribution of benefits and risks might helpfully supplement a precautionary regulatory approach.

Third, where the right to science is used as a basis for justifying the public's role in science governance, it arguably provides a stronger normative foundation given its status as a legally guaranteed universal human right. By contrast, as Hubert points out, other approaches depend on extra-legal criteria such as the need for ensuring effective decision-making (where this cannot be guaranteed by science) or enhancing the legitimacy of decisions on risk by unelected international bodies.[39] More broadly, the right to science in international environmental law processes 'may open up the possibility to frame and weigh the risks and benefits of scientific and technological developments differently', moving away from the dominant language of expertise to embrace considerations of democratic legitimacy, accountability and equity.[40]

There are thus important potential benefits of the application of the right to science in international environmental law. But it is far from clear that it provides a panacea

[34] This is the case, for example, with genetically modified organisms and genetically modified foods in agriculture or trade under the Biosafety Protocol to the Convention on Biological Diversity 2000, 2226 UNTS 208.

[35] On controversies over climate geoengineering research and governance, see Jinnah, Nicholson and Flegal, 'Toward Legitimate Governance of Solar Geoengineering Research: A Role for Sub-State Actors', 21(3) *Ethics, Policy and Environment* (2018) 362; McDonald *et al.*, 'Governing Geoengineering Research for the Great Barrier Reef', 19(7) *Climate Policy* (2019) 801.

[36] Hubert, *supra* note 11, at 654.

[37] Wiersema, *supra* note 22, at 457–458 discussing decisions such as the European Union's Court of First Instance decision in *Pfizer*; see also van Asselt and Vos, 'The Precautionary Principle and the Uncertainty Paradox', 9(4) *Journal of Risk Research* (2006) 313.

[38] Hubert, *supra* note 11, at 654.

[39] *Ibid.*, at 649.

[40] *Ibid.*, at 655.

in bridging the gap between science and democracy in contested international environmental legal decision-making processes (and, to be fair, Hubert's analysis ultimately does not suggest that this is the case). Instead, it seems that like other approaches to managing the science–policy interface in international environmental decision-making, the promise offered by the right to science is muted by its limitations. These stem primarily from the international human rights instrument in which the right to science is principally found – the ICESCR – and its principle of progressive realization as well as the limitations that state parties may legitimately place on the enjoyment of rights under the ICESCR.[41]

## 4 Conclusion

Post-normal science situations pose a conundrum for decision-making and environmental regulatory processes under treaty regimes. Given the invisible nature of the risks that international environmental law seeks to manage, science and scientific expertise are key inputs into processes for governing these risks. At the same time, science has clear limits as an aid to decision-making where uncertainties and complexities arise. Several models have been developed in international environmental law for promoting effective and legitimate modes of decision-making in response to transscientific questions. These models of public participation in environmental risk assessment and precaution have their own constraints stemming from a lack of clarity about how they should be implemented in an international legal and institutional context. As Hubert's article persuasively argues, in these circumstances, the right to science offers a valuable interpretative aid for construing international environmental obligations and supplementing international environmental decision-making processes through permitting a more upstream focus and injecting considerations of universal rights and human dignity that provide a broader basis for decision-making.

However, the right to science's articulation as a human right in instruments such as the ICESCR is also the source of limitations on its application. This highlights that the right to science does not provide a solution on its own to questions over the democratization of science's role in international environmental law. Rather, it can be seen as placing another thumb on the scales – alongside precautionary and participatory approaches – in favour of enabling broader, more democratically accountable decision-making in cases of uncertain science and contested environmental risks.

[41] ICESCR, *supra* note 31, Arts 2(1), 4.