September 7, 2016

The International Human Right to Science and its Application to Geoengineering Research and Development

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International Agreements Commented On: Article 27 of the 1948 United Nations Universal Declaration of Human Rights, and Article 15 of the 1966 United Nations International Covenant on Economic, Social and Cultural Rights

> "*Scientific and technical advances bring unquestioned benefits, but they also generate new uncertainties and failures, with the result that doubt continually undermines knowledge, and unforeseen consequences confound faith in progress."*
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> — Sheila Jasanoff, "Technologies of Humility: Citizen Participation in Governing Science" (2003) 41 *Minerva* 223, 224

There is a growing body of social science literature emphasising a need for science and technological innovation to be more accountable to society and to take into account the full spectrum of uncertainties surrounding these processes. These calls are often manifested as calls for greater reflexivity, transparency and public participation in R&D. Environmental law – with its focus on the prevention of environmental harm and precaution – provides an important site for regulation and governance for many advances in science and technology. There is an obvious logic to this choice, given the countless examples of technologies that have contributed to environmental damage at various phases of their lifecycles. However, there are conceptual limits to the application of environmental law for governing upstream R&D, as environmental obligations primarily aim at preventing or minimizing actual physical harm to the environment. Precautionary risk assessment and management are examples of governance tools for asserting greater control over research and innovation processes. However, although environmental law is increasingly informed by a broader framework of sustainable development that draws upon a range of legal subject areas, an environmental framing does not directly target the social and ethical concerns that dominate the early stages of science and the development of emerging technologies.

The specific concerns raised by small-scale geoengineering research illustrate this point nicely. Geoengineering is commonly defined as "deliberate large-scale interventions in the Earth's natural systems to counteract climate change" (Oxford Geoengineering Programme). Larger-scale climate response tests or deployment of geoengineering at material scales are likely to cause a risk of significant harm to the environment or human safety. By contrast, the environmental impacts of initial research projects may be negligible in comparison to other everyday commercial activities. Social scientists point out, however, that precautionary governance may be necessary in the face of the social, political and ethical implications of the knowledge acquired from geoengineering research. They identify the 'sociotechnical risks' of geoengineering as including premature entrenchment, path dependency and lock-in (see, e.g., Rob Bellamy, "A Sociotechnical Framework for Governing Climate Engineering" (2016) 41 *Science, Technology & Human Values* 135).

This blog post highlights the contribution of international human rights law – in particular, the frequently overlooked 'right to science' – in providing a supplementary normative underpinning for the governance of sciences and emerging technologies. We begin by outlining legal sources and legal status of this right in international law. We then go on to provide a brief overview of the normative development of this right in the context of ongoing processes established under the auspices of the United Nations Human Rights Council. Finally, we point out some of the implications of the right to science in informing responsible research practices and institutional arrangements for the conduct of geoengineering research.

The Right to Science in International Human Rights Law

Geoengineering will touch on many human rights, but it is the so-called 'right to science' that best functions as a normative framework for informing research governance. The right to "share in scientific advancement and its benefits" was first recognized in Article 27 of the 1948 United Nations Universal Declaration of Human Rights, and later reiterated in Article 15 of the 1966 United Nations International Covenant on Economic, Social and Cultural Rights (ICESCR). The Covenant provides a comprehensive articulation of the right to science, including the general right of everyone to "enjoy the benefits of scientific progress." With 164 States Parties, the ICESCR has near universal participation. Parties are legally bound to respect, protect and fulfill the rights articulated in the Covenant. It requires that States Parties promote "the development and the diffusion of science" (article 15(2)) and "recognize the benefits to be derived from the encouragement and development of international contacts and cooperation in the scientific field" (article 15(3)). In 2013, an Optional Protocol entered into force that sets forth an international complaint and inquiry mechanism which allows the Committee on Economic, Social and Cultural Rights to consider complaints from individuals or groups who claim their rights under the Covenant have been violated and have not received a domestic remedy. The right to science has also been expressed in varying forms in national law with Ecuador, Paraguay and the Republic of Moldova reproducing the scope of the Covenant, and States such as Germany fully protecting freedom of scientific research under its constitution (A/HRC/20/26, para 13).

Normative Development Right to Science and its Implications for the Governance and Regulation of Geoengineering Research

Although the right to science is articulated in binding international treaties, its normative content is vague and underdeveloped. In recognition of this, UN Special Rapporteur Farida Shaheed in the field of cultural rights for the UN Human Rights Council set out a normative framework for the right to science in her 2012 report on "The right to enjoy the benefits of scientific progress and its applications" (A/HRC/20/26). The Special Rapporteur's report defines the term 'science' broadly as encompassing all "knowledge that is testable and refutable, in all fields of inquiry, including social sciences, and encompassing all research" (A/HRC/20/26, para 24). Although this definition provides practical guidance, it is important to bear in mind that the problem of defining the scope and content of the meaning of scientific research is a growing issue in international law. It has cropped up, for example, on several occasions in the context of defining the scope of research exemptions (see, e.g., *Whaling in the Antarctic Case* (*Australia v Japan; New Zealand Intervening*) [2014] ICJ; LC-LP.2(2010) on the Assessment Framework for Scientific Research involving Ocean Fertilization).
The UN report further asserts that the normative content of the right to science has four dimensions: (1) access for everyone to the benefits of science, (2) opportunities for everyone to contribute to the scientific process and the freedom indispensible for scientific research, (3)

participation for individuals and communities in scientific decision-making, and (4) an enabling environment fostering the conservation, development and diffusion of science and technology (A/HRC/20/26, para 25). All of these elements have implications for the governance and regulation of geoengineering research, and much more can be said on these points, in particular, regarding the third aspect about providing a greater role for citizen participation in the management of technology. However, in the interest of space, the first two elements are examined in further detail below.

Access to the Benefits of Science

Underpinning the right to science is the guarantee of access to the benefits of science. States must guarantee their citizens universal access without discrimination. This means, *inter alia*, that everyone has the right to access the benefits of science regardless of gender, race, religion or any other defining characteristic (A/HRC/20/26, para 29). The UN report conveys that the 'benefits' of science "encompass not only scientific results and outcomes but also the scientific process, its methodologies and tools" (A/HRC/20/26, para 24).

Experts have identified access to scientific information as a key element for the good governance of science and innovation processes. For example, the Third Oxford Principle for geoengineering governance encourages "disclosure of geoengineering research and open publication of results." Though recognizing that disclosure does carry risks relating to the misuse of scientific data, the authors of the Oxford Principles nonetheless argue for full disclosure to the extent that the "burden of proof should fall on the advocates of any restriction" (Steve Rayner and others, "The Oxford Principles" (2013) 121 Climatic Change 499, 507). Transparency is an end in itself, but also serves a governance function by enhancing legitimacy and the effective and fair distribution of power in decision-making (see further Craik and Moore). Within the environmental law context, open disclosure of scientific information is thought to support implementation and compliance with governance and regulatory regimes, promote public awareness and engagement, and foster trust in institutions and processes (Anne Peters, 'Towards Transparency as a Global Norm" in Andrea Bianchi and Anne Peters (eds) Transparency in International Law (Cambridge University Press 2013) 599–600).

The guarantee of access to information for researchers is also essential for the freedom of scientific research, described below. It encompasses access to the applications of science, to scientific knowledge and information, scientific literature, data, materials, samples and subjects (A/HRC/26/19, para 15). However, Craik and Moore point out overly onerous disclosure requirements could also hamper scientific progress. Against this backdrop, "a key source of tension in the design of disclosure mechanisms will be balancing the demands for high levels of participation and deliberation against the burdens that these demands place on researchers." A human rights approach could support procedural fairness and inform the balancing of competing rights in establishing and administering rules for research projects. In particular, legal and ethical disclosure requirements should be subject to the principle of proportionality according to which "non-physical, informational risks" should be treated less onerously than direct physical interventions with the potential to harm the environment or threaten safety (BM Knoppers and others, "A human rights approach to an international code of conduct or genomic and clinical data sharing" (2014) 133 *Human Genetics* 895).

The Human Rights Council report on the right to science defines 'scientific progress' as attributing "positive impact" of science and innovation on human wellbeing. In this vein, it is noted that technology affecting human rights is to be given particular attention (A/HRC/26/19, para 29). Some geoengineering proposals, and, in particular, stratospheric aerosol injection, raise

serious human rights concerns. These are related to the preservation of the "international democratic order" both at the domestic level in terms of public participation and consultation on geoengineering and at the international level concerning interference in the affairs of sovereign states in accordance with Article 2(7) of the United Nations Charter (de Zayas, International Law Association (ILA) Panel on Geoengineering (New York, 24 October 2014); see also Werrell and Femia, "CIA Director on the Geopolitical Risks of Climate Geoengineering" The Center for Climate and Security (25 July 2016)).

The Opportunity for Everyone to Contribute to the Scientific Process

The second normative aspect of the right to science is the opportunity for everyone to contribute to the scientific process and have the necessary freedom to do so. This freedom intersects with a variety of other human rights, including the right to mobility, freedom of expression and thought. Most significantly, however, it encapsulates the traditional guarantee of the so-called 'freedom of scientific research', which provides for research to be undertaken without political or other interference. This freedom is broad in scope, protecting the freedom of association, inquiry, opinion and expression and extends to all persons, not just professional scientists (A/HRC/26/19, para 15**)**.

The freedom of scientific research is often cited as an argument against stringent governance of geoengineering research (see, e.g., European Commission, European Transdisciplinary Assessment of Climate Engineering (EuTRACE); Edward A Parson and David W Keith, "End the Deadlock on Governance of Geoengineering Research" (2013) 339 *Science* 1278, 1278). However, the right of free scientific enquiry is not absolute. This point is underscored in several soft-law instruments including in the 1999 UNESCO Declaration on Science and the Use of Scientific Knowledge, according to which "[a]ll scientists should commit themselves to high ethical standards, and a code of ethics based on relevant norms enshrined in international human rights instruments should be established for scientific professions" (para 41). Principles for the responsible conduct of scientific research increasingly extend beyond research involving human and animal subjects to cover ecological research conducted in the open environment (see, e.g., Hubert, "Marine Scientific Research" in Markus and Salomon (eds) *Handbook on Marine Environmental Protection: Science, Impacts and Sustainable Management* (Springer, in press)).

Clearly, there is a balance to be struck by which "the scientific enterprise remains free of political and other interference, while guaranteeing the highest standards of ethical safeguards by scientific professions" (A/HRC/26/19, para 39**)**. This determination regarding limitations on the freedom of scientific research, will be heavily dependent upon the relevant factual circumstances and should be subject to a precautionary approach in the face of large uncertainties (see Hubert and Reichwein, "An exploration of a code of conduct for responsible scientific research involving geoengineering" (2015) IASS Working Paper, InSIS Occasional Paper No 1. Potsdam & Oxford., Draft Article 8).

Conclusion and Next Steps

A human rights framework can help to bolster the role of environmental law in the establishment of principles, policies and procedures for governing science and emerging technologies. While many general human rights articulated in international law are of consequence for

geoengineering research and development, the normative framework of the right to science has particular relevance. This right has the potential to enhance accountability, transparency and participation, particularly in addressing the sociotechnical risks associated with early research and innovation processes. One advantage of this approach is that the human right to science applies regardless of the scale, duration or environmental impact of the research project. Its normative content is vague and not fully elucidated. However, in light of its universal scope and legally enforceable mechanisms, it provides an important legal basis for the development of responsible research practices grounded in the fundamental principle that that scientific advancement and its benefits should extend to everyone.

Research for this blog post was made possible by a generous grant from the V. Kann Rasmussen Foundation in support of the Geoengineering Research Governance Project (GRGP). The GRGP is an interdisciplinary study on potential arrangements for the governance and regulation of geoengineering research. It is a joint initiative led by Professor Anna-Maria Hubert at the Faculty of Law at the University of Calgary in collaboration with the University of Oxford and Institute of Advanced Sustainability Studies, Potsdam (IASS). You can learn more about the project here: http://www.ucalgary.ca/grgproject/

This comment was originally posted on The Forum for Climate Engineering Assessment, http://dcgeoconsortium.org/2016/08/09/international-human-right-to-science-and-its-application-to-geoengineering-research-and-innovation/