

Geoengineering's Governance Vacuum: Unilateralism and the Future of the Planet

Prepared by ETC Group for the U.S. National Academies Workshop:

Geoengineering Options to Respond to Climate Change: Steps to Establish a Research Agenda, Washington, D.C., June 15-16, 2009

Summary:

It is unwise to advance a research agenda and real-world experimentation of geoengineering technologies in the absence of a global governance regime. It is unrealistic to think that once governments, corporations or scientists possess the technological means to modify the earth's climate system that they will share that knowledge and act in the best interests of all states. Furthermore, the prospect of a geoengineering "solution" to the climate crisis will forestall vital actions that are needed NOW to reduce emissions and to put adaptation measures in place for those who are already being affected by climate change. Geoengineering wastes precious time and resources on false solutions. There should be a moratorium on further geoengineering *in situ* experiments, at least until universal, democratic governance is established that is guided by the precautionary principle.

Few exercises of power are more formidable than laying claim to the technological means to restructure the planet. If such means appear even mildly feasible, governments will pay dearly for them, and wars will be waged to control the relevant technologies and research agendas. Many commentators have emphasized the imbalance between the global reach to which geo-engineers aspire and the potential for individual actors, single states or a "coalition of the willing" to unilaterally deploy these technologies (Victor, 2008; Barrett, 2007).

If any of the geoengineering technologies currently in the research stage were to be deployed at full scale, the direct impact on people and ecosystems would be far-reaching. This is true by definition: Geoengineering aims to purposefully alter planetary-scale phenomena such as the carbon cycle and atmospheric dynamics. Most geoengineering proposals are inherently transboundary – sulphate aerosols will spread across the globe on high winds; plankton blooms created via ocean fertilization will shift with the tides; whitened clouds will move and contribute to changes in the weather. As with climate change, the action may be unilateral but the consequences are transnational.

In the few cases where a geoengineering proposal appears "local" or "regional," the issue of scale will quickly elevate it to the global level. Some biochars, for example, may well prove harmless in small-scale applications. However, as soon as they are scaled-up in order to sequester significant quantities of atmospheric CO₂, biochar production processes will inevitably require unsustainable amounts of biomass (Ernsting and Rughani, 2008). This poses a global threat since ecological studies have documented that human appropriation of the biosphere has already exceeded the safe limits for the proper functioning of ecosystems (Loh *et al.*, 2008). Air-capture devices for sequestering CO₂ might appear static and local in impact. However, if large quantities of CO₂ are subsequently sequestered in geological formations, there is a risk of undoing mitigation efforts should those gases ever escape (Rochon, 2008). Seen this way, carbon capture and storage schemes present as great a risk as radioactive waste disposal and require a legitimate means of global agreement and oversight before they are implemented. New

norms governing these issues are necessarily the product of international negotiations – by all nations – not simply decided by those with geoengineering research and development capacity.

There is great danger in deepening geoengineering discussions amongst a small group of governments, a select scientific community and/or influential think tanks in the absence of a serious public, international discussion about the governance of the field as a whole. We have seen in the early political battles over ocean fertilization that even one geoengineering technique can challenge the mandates of several different international bodies, which can be played against each other as protagonists claim primacy for the forum that best suits their interests. Rather than allow geoengineering governance to fragment into many ill-fitting pieces, we need a single accessible and responsible international forum that can meet the challenge head on.

In one controversy after another, it has become clear that governance processes that privilege techno-scientific knowledge and perspectives above all other forms of knowledge deliver inequitable, unsafe and poorly informed judgments (Kearns *et al*, 2006). Types of knowledge and perspectives typically excluded by such expert-driven processes (but highly relevant to geo-engineering) include indigenous knowledge of land and wildlife, the knowledge of weather, soils and vegetation held by farmers, the knowledge of oceans and weather developed by fisher-folk and so forth. The historical failure to solicit and incorporate these forms of knowledge has led to conflict and poor decisions on nuclear waste, synthetic chemicals, hybrid seeds, genetically modified organisms, trawler fishing, biofuels and more. When proper assessment and oversight is not established at the outset, future generations pay a high price.

This history points to the need to tailor the international governance architecture to examine the full social, cultural, economic and environmental impacts of the development of geoengineering within a context that is broader than climate change. In terms of international bodies that have direct interest and specific expertise to offer on the question of geoengineering, one can point to, among others, the United Nations Environment Programme, the Office of the High Commissioner on Human Rights, the Food and Agriculture Organization, the United Nations Industrial Development Organization, the United Nations Development Programme, the International Maritime Organization, the United Nations International Strategy on Disaster Reduction, the United Nations Permanent Forum on Indigenous Issues, the United Nations Commission on Sustainable Development, the International Seabed Authority, the United Nations Office for Outer Space Affairs, the United Nations Office for the Coordination of Humanitarian Affairs, UNESCO, World Health Organization, and the World Meteorological Organization. Although no international legal framework is specifically equipped to deal with the suite of technologies being contemplated, some are of obvious relevance: The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD Treaty), the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change stand out, but there is also the Law of the Sea Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Long-Range Transboundary Air Pollution Convention and others (Virgoe, 2008). We do not need a patchwork of instruments and organizations designed for other purposes but rather a governance framework and a binding international treaty that prohibits unilateral and

potentially dangerous geoengineering actions.

The high profile and interest generated by geoengineering is the result of an appropriate sense of urgency around climate change. However, the climate crisis needs to be addressed in concert with other related emergencies – such as global hunger, species extinction, ecosystem destruction, over-appropriation of biomass and ocean acidification. An exclusive focus on climate change as the one overriding consideration by which a particular scheme succeeds or fails is short-sighted, one-sided and counter-productive. Indeed, governance decisions driven by such a narrow vision have propelled society to this point of desperation where geoengineering seems to many to be a viable option. From here on, we should seek out governance structures and processes that are much more inclusive, open and long-term in their vision. The United Nations, with all its weaknesses, is the only place such a global dialogue can begin.

If the governance process around geo-engineering is to be credible, it will have to challenge head-on the ability of the private sector to profit from unproven schemes through carbon offsets. Thankfully, scientists have spoken out against carbon credits for ocean fertilization (Chisolm *et al.*, 2001), and the Convention on Biological Diversity decision of May 2008 on ocean fertilization explicitly prohibits activities “for generating and selling carbon offsets or any other commercial purposes.” However, scrutinizing speculative carbon trading cannot be done in an *ad hoc* fashion. Rather, institutional mechanisms need to be developed that will ensure that scientific assessments and governance decisions are not skewed in favour of outcomes that maximize profit rather than environmental safety, justice or climate protection. Among other things, there must be a prominent place at the table for those who will be affected.

The goal of the NAS workshop on geoengineering options is to work towards a research agenda – and that is a vitally important task. The question will inevitably be raised: Should real-world geoengineering experiments proceed at this time? We believe that no *in situ* experiments should be allowed in light of the current governance vacuum – where there are no safeguards, no process for approval or prohibition, no agreement on the precautionary principle, no transparency, no clear lines of authority, no process for making decisions and no international sanctioning of the project as a whole. We regard directly interfering with the planet's soils, skies and seas for geoengineering purposes unwise and unnecessary. Seen alongside the full set of possible responses to anthropogenic climate change, we regard geoengineering as an inappropriate and dangerous approach, towards which political will and precious human and financial resources will only be squandered. Our research shows that geoengineering technologies – by virtue of being large-scale, highly centralized and often with latent military uses – are more likely to deliver unjust and undemocratic outcomes than effective mitigation strategies. We further believe that the illusion of a “technofix” just around the corner serves as an all too-convenient excuse for powerful governments to drag their heels and refrain from making the urgent changes (mostly societal changes) required to actually reverse the climate crisis. In a sane and sensible world, the geoengineering option would not be on the table at all, and nobody in their right mind would be agitating for experiments.

Geoengineering cannot be conscientiously deployed without a global governance agreement. The closest parallel to today's geoengineering is to be found in the history of

nuclear weapons. From 1945 until the Limited Test Ban Treaty was signed in 1963, hundreds of atmospheric and underwater nuclear tests – some for supposedly “peaceful purposes” – were carried out without a global treaty in place and despite protest. These tests dispersed isotopes of plutonium, cesium, strontium, iodine-131 and other deadly elements, which killed livestock, sickened civilians (e.g., caused leukemia, cancer, genetic deformities) and heightened Cold War tensions. Estimates of human deaths, illnesses and casualties resulting from American, Soviet, British, French and Chinese nuclear tests run in the hundreds of thousands (Cheney, 1996).

Conclusion: Some geoengineering proposals, such as dispersing nano-particulate matter in the stratosphere and altering the acidity of the world's oceans by adding silicates, will have global impacts and will be very difficult – if not impossible – to reverse should there be unintended consequences. These schemes could be deployed unilaterally, but will have transnational effects. ETC Group recommends a moratorium on real-world geoengineering experiments at any scale, at least until just and effective governance is established.

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