

## 63. The ethics of geoengineering

by  
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*This is a brief literature review of the ethics of geoengineering – the intentional manipulation of the climate system to counteract greenhouse gas emissions. The social sciences have a role to play in clarifying the moral hazards associated with geoengineering, given that future generations may have no other choice but to implement such projects.*

Over the past two decades, climate change has emerged as a major challenge to the planet. The Intergovernmental Panel on Climate Change (IPCC)'s *Second Assessment Report* (AR2) showed compelling evidence that much recorded climate change is anthropogenic in origin (IPCC, 1996). The Stern review concluded that the benefits of taking strong early action to reduce greenhouse gas emissions outweigh the costs of climate change effects considerably (Stern et al., 2006). However, most technical solutions to mitigate climate change have environmental, social and economic effects, and raise additional issues regarding ethics, justice and moral hazard.<sup>1</sup> Geoengineering is one example.

According to Scott (2012), geoengineering is the intentional manipulation of the climate system to mitigate global climate change, which is itself the effect of anthropogenic greenhouse gas emissions. Geoengineering methods and technologies seek either to reduce the amount of absorbed solar energy in the climate system or to increase carbon removal from the atmosphere, at a scale sufficiently large to alter the climate.

The first group of such technologies are referred to as solar radiation management. This includes pumping sulphates into the stratosphere to simulate volcanic eruptions and so brightening clouds to reflect more sunlight back into space. Fertilising the ocean with iron to remove carbon dioxide from the air is an example of the second approach.

Given the increasing scientific interest in geoengineering, the IPCC's *Fifth Assessment Report* (AR5) will evaluate its ethics, feasibility, effectiveness, side effects, efficiency, legal and social acceptability, regulation, monitoring and verification (IPCC, 2012).

A report launched in 2009 by the Royal Society and entitled *Geo-engineering the Climate: Science, Governance and Uncertainty*, identified three main ethical positions regarding these techniques: consequentialist (value of the results), deontological (the issue of duty and "right behaviour") and virtue based (dilemmas of pride and arrogance) (Royal Society,

2009). These ethical positions have shared concerns regarding the governance of research and its possible deployment, the unbalanced sharing of risks, the distributions of harms and benefits, the possibility of one-sided deployment and possible effects on the environment.

According to Scott (2012), the philosophers Dale Jamieson and Stephen Gardiner have provided the two most extensive treatments of the ethical issues to date. Jamieson proposed a list of difficult-to-meet ethical preconditions to allow the implementation of geoengineering projects (cited in Scott, 2012). Gardiner argues that it would be sensible to develop these technologies, as future generations might have no choice but to implement them in order to avoid the catastrophic consequences of climate change (cited in Scott, 2012). The Royal Society (2009) considers that in terms of justice and moral hazard, the mitigation of greenhouse gas emissions is preferable to geoengineering, but advises that research should continue.

Rayner et al. (2009) maintain that governance structures should be in place to guide research in this area and to ensure that any decisions ultimately made regarding deployment occur within an appropriate governance framework. They believe that such a framework should support transparent decision-making, public participation and the open publication of research results. Furthermore, it should take the views of scientists, policymakers, the public and civil society groups into account. The “Oxford Principles” (Oxford Geoengineering Programme, 2013) regarding the governance of geoengineering were drawn from the work of Rayner et al. (2009) and submitted to the British government in 2009:

- geoengineering to be regulated as a public good
- public participation in geoengineering decision-making
- disclosure of geoengineering research and open publication of results
- independent assessment of impacts
- governance before deployment.

The Royal Society (2009) also emphasises that the possible use of geoengineering will depend upon the public’s perception of the risks, their level of trust in researchers and practitioners, the transparency and purposes of geoengineering actions, and the vested interests involved. It argues that many of the ethical issues associated with geoengineering are likely to be specific and technology dependent. If research shows that moral hazard is unlikely in some types of projects, the public’s objection to the implementation of these projects might disappear. Therefore one of the objectives of the social science research agenda should be to clarify the existence or extent of any moral hazard associated with geoengineering projects. Scott (2012) argues that as a pragmatic approach it might be sensible to research other options generated by geoengineering while political efforts are still inadequate.

### Note

1. *Ethics*: how humans should act; *justice*: the concept of moral rightness based on ethics, rationality, law, natural law, religion, equity or fairness; *moral hazard*: a situation in which a party has a tendency to take risks because the costs that could incur will not be felt by the party taking the risk.

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