

The Royal Society – excerpt on ethics

Ethics, section 4.3 from the Report of the Royal Society

Decisions to deliberately modify the Earth’s climate undoubtedly raise a number of different ethical issues. To explore these, the Royal Society invited a panel of ethicists to consider three questions (Annex 8.3).

1. Would deliberate geoengineering be unethical and are some geoengineering techniques more ethically acceptable than others—if so, which and why? ☐
2. Is a higher standard of proof or confidence needed for geoengineering interventions than for other mitigation actions? ☐
3. What are the main ethical considerations that the design of a regulatory framework for geoengineering research or deployment would need to take into account? ☐

Three main ethical positions were identified in relation to geoengineering, including:

- *consequentialist*, in which the value of outcomes is the predominant consideration; ☐
- *deontological*, where the primary consideration is the issue of duty and ‘right behavior’ (with less interest in outcomes); ☐
- *virtue-based*, concerned primarily in this context with dilemmas of hubris and arrogance. ☐

Common to all positions, though to varying degrees, were concerns of consequence, justice and the effects (of geoengineering) on agents. ☐The moral hazard argument has been important in earlier debates about geoengineering and is plausible.¹ It directly parallels arguments made in earlier years to oppose adaptation policy (Pielke et al. 2007). However there is little empirical evidence to support or refute the moral hazard argument in relation to geoengineering, (although there has been little research in this area), and it is possible that geoengineering actions could galvanize people into demanding more effective mitigation action. Clarifying the existence or extent of any moral hazard associated with ☐geoengineering should be part of the social science research agenda.

For reasons both of justice and the moral hazard argument, mitigation is likely to be preferable to geoengineering. However this does not necessarily rule out geoengineering, especially at the research stage, where a consequentialist case in favor can be made. Scientific momentum and technological and political ‘lock-in’

¹ By “the moral hazard argument,” the Royal Society means “concerns have been expressed that geoengineering proposals could reduce the fragile political and public support for mitigation and divert resources from adaptation” (p. 4). Ben Hale examines several other characterizations of this argument in “Moral Arguments Against Geoengineering,” Chapter 7 in *Engineering the Climate: The Ethics of Solar Radiation Management*, Christopher Preston, ed. (Lexington Books, 2012).

may increase the potential for research on a particular method to make subsequent deployment more likely, and for reversibility in practice to be difficult even when technically possible. These factors need to be taken into account when decisions are being made regarding which methods should be prioritized for research.

Many of the ethical issues associated with geoengineering are likely to be specific and technology-dependent. For example, small-scale, familiar, and reversible methods are likely to be preferable ethically to those that are inherently large-scale, irreversible and unencapsulated. This suggests that the engineered carbon dioxide removal (CDR) methods may be more ethically acceptable than SRM or ecosystem based methods.

It has been suggested that the standard of proof for predictability, reliability, and absence of adverse consequences should be set higher for geoengineering than for other research enterprises (Jamieson 1996). However the rationale for this is not completely clear and it could prove extremely restrictive. An alternative approach would be to **focus research initially on methods for which small-scale, constrained experiments are feasible** so as to help reduce areas of uncertainty and inform the development of risk management guidelines to enable larger scale research programs where these seem ethically defensible.

As geoengineering methods, like climate change, will have global consequences, a flexible framework for international regulation is necessary. As explained in more detail in Section 4.4 and Box 4.2 the current geoengineering regulatory context is fragmented and uncertain. In general however, any future improvements to the regulatory context should be democratic, transparent and flexible enough to take account of the wide range of CDR and SRM methods, and should discourage unilateral action.

Overall it is clear that ethical considerations are central to decision-making in this field. However when evaluating the role different approaches to geoengineering could play, it is not possible to make simple yes or no decisions on the basis of ethical reasoning. For example, if it could be shown empirically that the moral hazard issue was not serious, one of the main ethical objections to geoengineering would be removed.