

# **Ethics, policy and geo- engineering: an easy day in the mountains**

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# Geoengineering

- Geoengineering: the deliberate large scale modification of the climate to achieve some end.
- Early history
  - to modify climate from human benefit (N. Rusin and L. Flit *Man versus Climate*, 1960)
  - Cold-war research on intentional climate change for military uses
- In context of climate change – to intentionally moderate the effects of unintentional changes to the climate caused by human activity.

# N. Rusin and L. Flit *Man versus Climate.*

- ‘the Arctic ice is a great disadvantage, as are the permanently frozen soil (permafrost), dust storms, dry winds, water shortages in the deserts, etc’.
- ‘if we want to improve our planet and make it more suitable for life, we must alter its climate’.

# Central issues

- Specific issue: The ethics of geo-engineering and the ethics of research into engineering.
- Generic issue of ethics in environmental governance: How should ethical questions be included in policy making? What, if any, is the role of ethical committees and ethical experts?

# Ethics panel for the Royal Society Working Group on Geoengineering

- Role as ‘ethicist’ (compare ethics committees in other areas of public policy, in particular medicine.)
- Generic questions: Are there ‘ethical experts’? Why the growth ethics panels? What is the relationship between such panels and other forms of governance? What is their relationship to public participation and deliberation? Are ethics panels a way of ‘depoliticising’ value dimensions of policy?

# Ethics panel for the Royal Society Working Group on Geoengineering

- What are your general thoughts on deliberate climate modification?
- Would deliberate geoengineering be unethical? (If so, why, and if not, why not?)
- Would we need a higher standard of proof/confidence about the consequences of deliberate interventions (c.f. just abating accidental intervention)?
- Are there ethical aspects of the ‘whose hand on the thermostat?’ problem? If so, what? Can they conceivably be overcome? If so, how?
- Are some schemes more or less ethically acceptable than others? If so, which, and why?
- What are the main ethical considerations that would have to be taken into account when designing a regulatory framework for geoengineering research or deployment?
- How should future enquiry into the ethics of geoengineering proceed, and how can it contribute to policymaking?
- What are the immediate priorities for geoengineering ethics?

# Structure of talk

- I. Forms of geoengineering
- II. The arguments for geoengineering and geoengineering research – a brief review
- III. Ethics of geoengineering
  1. Consequentialist arguments
  2. What difference does intentional change make?
  3. The language of virtues
- IV. Virtues and institutions – the limits of ethics?

# I. Forms of geoengineering

A. Greenhouse gas removal methods – removal of carbon dioxide from atmosphere.

B. Solar-radiation methods: increase the earth's albedo (ratio of light received to light reflected) or decrease amount of radiation received.

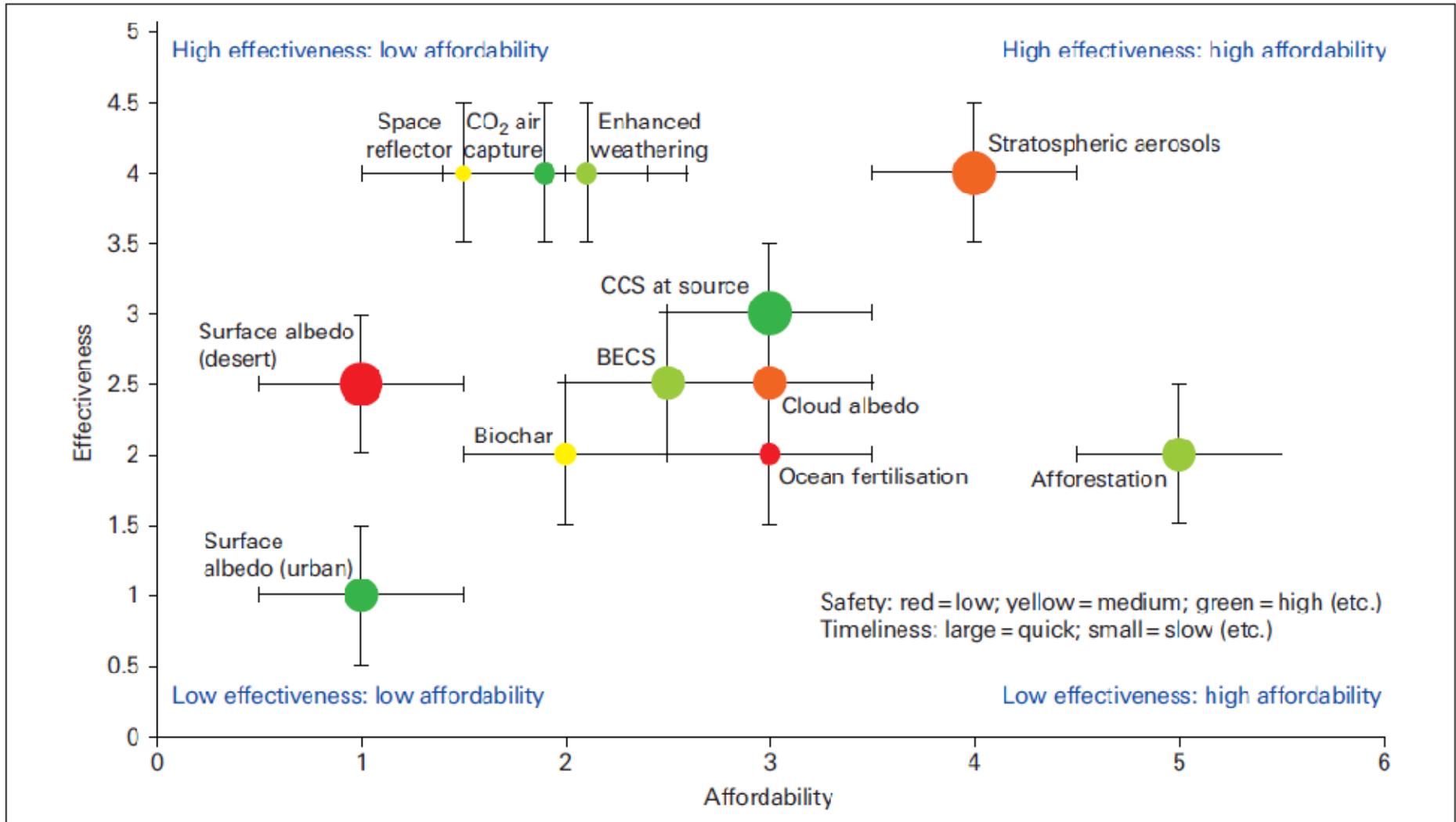
# Removal of carbon dioxide

- Large scale afforestation (land use and food production)
- Large-scale biomass sequestration
- Chemical carbon-scrubbers capturing CO<sub>2</sub> in the ambient air
- Ocean fertilisation

# Solar-radiation methods

- Surface albedo: e.g. white roofs and roads, genetically modified light crops, desert reflectors etc.
- Cloud-albedo enhancement
- Stratospheric aerosols
- Mirrors in space

# Royal Society summary



## II. Arguments for geoengineering

1. Cost-benefit analysis
2. Stop-gap - creates a period in which mitigation policy can be implemented successfully
3. Back-stop - insurance policy should climate mitigation policies fail

# 1. Cost-Benefit Analysis

- ‘Budyko’s Blanket [which puts sulphur dioxide in the upper atmosphere] could effectively reverse global warming at a total cost of \$250 million.’
- Nicholas Stern mitigation proposal - \$1.2 trillion
- We have two methods ‘whose cost-effectiveness are a universe apart.’  
(Steven D. Levitt & Stephen J. Dubner *Superfreakonomics* ch.5)

## 2. Stop-gap

- i. Greenhouse gas emissions are increasing.
- ii. Mitigation policies are failing in developing countries.
- iii. Developing countries will continue to increase their CO<sub>2</sub> emissions and it be unjust not to expect them to do so.
- iv. Hence there is strong likelihood the mitigation policy on its own will stop dangerous levels of climate change.
- v. Hence we should develop research on and plan for the possibility for geoengineering solutions that provide additional measures that support mitigation.

# 3. Back-stop

Last-resort insurance

- i. Greenhouse gas emissions are increasing.
- ii. Mitigation policies are failing in developing countries.
- iii. Developing countries will continue to increase their CO<sub>2</sub> emissions and it be unjust not to expect them to do so.
- iv. Hence there is strong likelihood the mitigation policy on its own will stop dangerous levels of climate change.
- v. Hence we should develop research on and plan for the possibility for geoengineering solutions as a precaution against the catastrophic failure of mitigation-policy.

# Royal Society arguments

- **Stop-gap arguments for CDR:** ‘Carbon Dioxide Removal methods that have been demonstrated to be safe, effective, sustainable and affordable should be deployed alongside conventional mitigation methods as soon as they can be made available’
- **Scepticism about SRM except as backstop for extreme emergency:** ‘Solar Radiation Management methods should not be applied unless there is a need to rapidly limit or reduce global average temperatures.’

# III. Geoengineering and ethics

1. Consequentialist arguments
2. What difference does intentional change make?
3. The language of virtues

# 1. Consequentialist considerations

1. Standard risk-benefit arguments are consequentialist (with rights constraints).
- Consequentialist objections – in particular to SRM:
  - The technology is associated with scientific uncertainty, its effectiveness is unclear – some versions might make the problem worse, there are known risks, uncertainties and a problem of ignorance.
  - These are all worse given the scale of the failure and the fact that it is an attempt to manipulate on global scales the very conditions of human and much non-human life. The risks of failure are severe.
  - It can divert resources and political will to make difficult but necessary changes that are required for mitigation.
  - Even research can create a coalition to pursue the technologies developed.

# Standard responses

- We are already involved in a huge experiment with the global climate which we know will be damaging.
- Stop-gap and back-stop arguments
- Prudence requires that we at least research the geo-engineering options in case they are required. "Prudence demands that we consider what we might do if cuts in carbon dioxide emissions prove too little or too late to avoid unacceptable climate damage." (Ken Caldeira)

## 2. Do intentions matter?

We are already involved in a huge experiment with the global climate which we know will be damaging.

Reply- this is unintentional. Does intentional climate change matter?

- Is there a difference between unintentional and intentional climate change?
- Initial point – we do make a moral distinction between intentional and unintentional actions with the same outcomes – e.g. murder and manslaughter.
- Is the distinction relevant here? Are there potential problems with intentional interventions?

# Intentions

- One answer (Mill and Goodin)
- Human beings require a context for their lives which is not itself humanised. To intentionally manipulate the climate would destroy that context.

# J.S. Mill

- 'It is not good for man to be kept perforce at all times in the presence of his species. A world from which solitude is extirpated, is a very poor ideal. Solitude, in the sense of being often alone, is essential to any depth of meditation or of character; and solitude in the presence of natural beauty and grandeur, is the cradle of thoughts and aspirations which are not only good for the individual, but which society could ill do without. Nor is there much satisfaction in contemplating the world with nothing left to the spontaneous activity of nature; with every rood of land brought into cultivation, which is capable of growing food for human beings; every flowery waste or natural pasture ploughed up, all quadrupeds or birds which are not domesticated for man's use exterminated as his rivals for food, every hedgerow or superfluous tree rooted out, and scarcely a place left where a wild shrub or flower could grow without being eradicated as a weed in the name of improved agriculture.' (Mill, *Principles of Political Economy*, book IV, ch.6 section 2)
- It is not good for humans that the very climate itself is an artifice of humans.

# Goodin

- ‘According to the distinctively [green theory of value] . . . what it is that makes natural resources valuable is their very naturalness. That is to say, what imparts value to them is not any physical attributes or properties that they might display. Rather, it is the history and process of their creation. What is crucial in making things valuable, on the green theory of value, is the fact they were created by natural processes rather than by artificial human ones. By focusing in this way on the history and process of its creation as the special feature of a naturally occurring property that imparts value, the green theory of value shows itself to be an instantiation of yet another pair of more general theories of value - a *process* based theory of value, on the one hand, and a *history* based theory of value, on the other . . .’ (Goodin, *Green Political Theory* pp. 26-27).
- Why should naturalness matter? The natural world provides a larger context in which people’s lives and projects have their setting and in which they make sense. ‘Things that are natural...provide a context of something outside of ourselves – a larger context within which we can set our own life plans and projects’ (Goodin, 1992, pp. 26-27).

# Intentional climate change

- To make something as basic as the worlds' weather system a matter of human artifice would radically undermine that context and rob human life of something of significance.
- If the very colour of sky can be changed, something is radically amiss.

# Reply

- The argument offers a prima facie case against intentional climate changes.
- However:
- Goodin and Mill arguments turn on the disvalue of living in a humanly modified landscape, and not on the disvalue of living in an intentionally humanly modified landscape.
- Their arguments would also apply to unintentional climate change.
- If unintentional climate change threatens the very conditions of basic human needs, the very conditions for our own life plans and projects, then this takes precedence over the context of life.

# 3. Virtue based arguments:

Much of the standard argument around geo-engineering is conducted in terms of virtues and vices.

- Virtues: prudence and preparedness
- Vices: Hubris, arrogance, recklessness, failure of humility.
- Central charge often heard in this context – and granted by some proponents – is that it is hubristic to assume that we could control the climate on the scale and with the foreseeable outcomes proposed – particular problems where this involves engineering of the global conditions for life support.

# Three failures of humility

- a. Epistemic humility – recognition of limits capacity to know and forecast.
  - Expert over-confidence
  - Optimism bias
  - Necessary limits on the evidential base of geo-engineering
- b. Humility about the capacities to control– in particular where one is referring to large scale interventions over a long time period.
- c. Humility about moral capacities – tendency to self-deception and weakness of will; tendency to adjust moral responses to what is desirable.

# Expert overconfidence

- Dangers of :

‘From cognitive psychologists we have learned that people tend to be overconfident about their judgments (Kahneman et al., 1982). There is even reason to believe that in some cases greater expertise leads to even greater levels of overconfidence.... This result should give experts about geoengineering some humility about the reliability of their predictions. Their guesses about what will occur may be no better than those of novices (Adelson, 1984).’ (Jamieson, p327)

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# Optimism bias

Optimism bias about the costs and benefits, particularly those associated with mega-projects.

- Over a remarkably long period of time, over a wide range of countries and on a variety of different kinds of project, cost benefit analyses of public projects systematically and substantially underestimate the costs of projects and tend also to overestimate their benefits. Throughout that history there is no evidence of institutional learning. The same errors are repeated. (Flyvbjerg et. al (2003))

# Limits of evidence basis

- What kind of experiments are possible to test large-scale long-term geoengineering plans? (Bunzl)

# Prudence: preparing for the worst

The argument from prudence and preparing for the worst:

- Response: Central difficulty is that the likelihood of the worst is not independent of the actions of undertaken now.
- ‘There seems to be an important moral difference between (on the one hand) preparing for an emergency, and (on the other hand) preparing for an emergency that is *to be brought about by one’s own moral failure.*’ (Stephen Gardiner)
- Is it morally permissible to prepare for the worst social unrest – a breakdown of law and order - by arming myself against others?

# Does preparation increase the likelihood of the worst?

- Geoengineering plans may substantively increase the probability that the worst case happens— removes the incentives for mitigation (moral hazard argument)
- Undermines the push for mitigation
  - i. the human capacity to adjust ends to what is desirable – it corrupts the sentiments.
  - ii. capture by powerful interests who are opposed to mitigation
  - iii. creates a coalition to pursue the technologies developed. Once technologies are developed they tend to create advocacy groups whose career trajectories and interests are tied to the development of that technology.
  - iv. Path-dependency and technological lock-in.

# Royal society response:

- Mitigation policy may improve through consideration of geoengineering
- Focus group research: respondents were more concerned about mitigation after hearing about geo-engineering than they were before.
- Research on geoengineering should take place.

# An easy day in the moral mountains

- ‘It has frequently been noticed that all mountains appear doomed to pass through the three stages: An inaccessible peak - The most difficult ascent in the Alps - An easy day for a lady.’ (Albert Frederick Mummery, *My Climbs in the Alps and Caucasus*)
- A similar claim could be made about the development of moral attitudes: morally unthinkable; morally permissible in exceptional circumstances; the moral norm; morally required.
- It is true both of moral change in a positive direction (homosexuality) and in a negative (killing in time of war).

# Moral responses to technological change

- The landscape of the ethics of technological change follows the contours that Mummery describes.
- It is particularly true in the area of technological change –
  - IVF
  - Bodily enhancement technologies
  - Genetic enhancement (shift from unthinkable to required for ethicists).

# The limits of focus groups

- Concern with go-engineering is being marked at a particular moment:
  - Morally unthinkable – stage of focus groups and rightly so – if it has really come to this we are in a mess;
  - Morally permissible in exceptional circumstances as a stop-gap or backstop for mitigation policy .
  - Morally normal – a world without blue sky where the very environment is under human control (*Superfreakonomics*).

# Adaptation and Habituation

Two sources of the easy day in the moral mountains:

- Adaptation
- Habituation
- The cumulative results of minor decisions.

Need an independent answer to the question of whether this is moral corruption, moral progress, or morally neutral.

## IV. Virtues and institutions: the limits of ethics?

- Who or what is the object of the attribution of hubris, recklessness or an absence of humility by critics?
- Standard answer in virtue ethics – individuals.
- Problem – insufficient attention to institutions and institutional contexts.

# The virtues and vices of institutions

Character of institutions:

- Vice terms applied to institutions: reckless, sloppy, untrustworthy, uncaring, disorganised, exploitative.

Sheen report on *Herald of Free Enterprise*:

‘From top to bottom the body corporate was infected with the disease of sloppiness.’

# *Herald of Free Enterprise*

‘At first sight, the faults which led to this disaster were the aforesaid errors of omission on the part of the Master, the Chief Officer and the assistant Bosun, and also the failure by Captain Kirk to issue and enforce clear orders. But.....the underlying or cardinal faults lay higher up in the Company. The Board of Directors did not appreciate their responsibility for the safe management of their ships. They did not apply their minds to the question: What orders should be given for the safety of our ships? The directors did not have any proper comprehension of what their duties were. There appears to have been a lack of thought about the way in which the Herald ought to have been organised for the Dover/Zeebrugge run... ... From top to bottom the body corporate was infected with the disease of sloppiness.’ (Sheen Report)

# Two interpretations of character of institutions

1. The structure of responsibilities is not taken on board by actors.
  - The bosun who did notice that the doors were open did nothing since shutting the doors did not form part of his duties.
  - Why? Possible answers. There is an absence of a culture of solidarity – members take a narrow legalistic perspective on what their duties were. There was an ethos of not covering – of sloppy habit.

# Two interpretations of character of institutions

2. The structure of responsibilities and duties itself is vague:

- ‘The Board of Directors did not appreciate their responsibility for the safe management of their ships. They did not apply their minds to the question: What orders should be given for the safety of our ships? The directors did not have any proper comprehension of what their duties were. There appears to have been a lack of thought about the way in which the Herald ought to have been organised for the Dover/Zeebrugge run...’
- ‘No one told the captain the doors were open - and indeed there were no procedures for telling the captain that this was the case.’

# Two interpretations of character of institutions

- Sense 1: the character of the institutions defined in terms of the character dispositions of agents within the institution.
- Sense 2: the character of the institutions defined in terms the nature of the institution itself.

# Institutional vices

The vice of sloppiness is not primarily a vice of specific individuals but of the institution. The carelessness exhibited in the immediate events that led to the disaster are manifestation a wider pattern of procedures and routines.

# Institutional vices

- Corporate crime – preventable ‘accidents at work’ etc. - are not normally the result of the particular intentional acts of particular individuals, but rather of ‘an organisation's structure, its culture, its unquestioned assumptions, its very *modus operandi*...’ (Slapper and Tombs, *Corporate Crime*, p.17).

# Recklessness again

- How far is the concern for hubris and recklessness a concern about the habits and dispositions of individuals?
  - Expert overconfidence
  - Optimism bias
- How far is the concern for hubris and recklessness a concern about the habits and dispositions of individuals?
  - The organisational procedures, routines and *modus operandi* are structured as if there are not epistemic and moral limits.
- The need for a more institutional dimension.

# Dewey: some parallels

- Habit and choice  
‘Choice is made as soon as some habit, or some combination of elements of habits and impulse, finds a way fully open.’ (Dewey, 1922, p.192)
- Deliberation is not a matter of utilitarian calculation, but is a matter of uncovering conflicts in the kind of people we are and aim to become, and the kind of social worlds we inhabit and are making.

# Dewey: some parallels

- The nature of decision making: ‘Our minor decisions differ in acuteness and range, but not in principle. Crucial decisions can hardly be more than a disclosure of the cumulative force of trivial choices.’
- Improving deliberation is not a matter simply of a matter of improving capacities of calculation or some faculty of reason, but rather of improving larger virtuous habits of sensitivity and sympathy.
- Those improvements in deliberation have an institutional dimension. Because institutions are in part ‘embodied habits’, institutional change is not simply a matter of formal rules and norms, but also informal habitual dispositions.

# Ethical experts?

- The danger of experts plus rights-constrained consequentialism dominating the field without proper consideration of the arguments?
- Are philosophers ethical experts? Are there any 'ethical experts'?
- Why the growth ethics panels? What is the relationship between such panels and other forms of governance? What is their relationship to public participation and deliberation? Are ethics panels a way of 'depoliticising' value dimensions of policy? Does it focus attention away from the institutional and economic dimensions of choice?