

Researching topic #25 -- SOCIETAL RESPONSES TO CLIMATE CHANGE – “PLAN B” – GEOENGINEERING [last revised 3/8/2021]

This prompt offers two kinds of help:

- A brief overview of the kinds of questions you might wish to explore as you study how climate change is likely to affect the food supply;
- A suggested strategy for how to search the literature as you prepare to write your paper.

OVERVIEW – SOCIETAL RESPONSES TO CLIMATE CHANGE – “PLAN B” – IS GEOENGINEERING THE ANSWER?

What if, suddenly, the public and policy makers realize that has been done is too little, too late? That climate change and its various impacts have grown to a scale that can no longer be ignored and promises only to get much worse?

There may come a moment when there is a collective realization that drastic, emergency geoengineering efforts are the only thing left before catastrophe?

Several geoengineering ideas have been explored, ranging from spraying into the atmosphere aerosols that reflect some sunlight back into space to various ways to capture and sequester CO₂. Scholars have described how these methods would work, in theory and have carried out some small, controlled experiments. They and others have worried out loud about *unintended consequences* and about the question of *governance* (i.e., in the absence of an effect world government, action would likely be taken by individual governments, or even by sub-national entities, but such actions would have implications for other nations and for the planet as a whole.)

The research task, here, is to describe

- the variety of geoengineering ideas
- who is advocating the geoengineering response?
- the variety of unintended consequences or side effects that commentators have cited
- the governance question

SUGGESTED STRATEGY FOR SEARCHING THE LITERATURE

I recommend the following sequence for searching the literature:

- 1 Start with a search of the most recent **reports from top scientific bodies and government agencies**;
- 2 Search **academic articles** using Google Scholar (scholar.google.com);
- 3 Do a **more general search** using Google or another search engine;
- 4 Search the **best newspapers** and **reputable climate websites**.
(NOTE that I do not suggest using Wikipedia.)

- 1 Search the most recent **reports from top scientific bodies and government agencies**

(NOTE: There are many excellent reports one can consult. You will find a lot of repetition, so you do not need to consult every source. Here I start with a handful of the most recent reports, followed by a more complete list.)

These publications should, in most cases, supply you with all you need:

IPCC's most recent full set of reports:

<https://www.ipcc.ch/report/ar5/>

EPA: https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-society_.html

U.S. Global Change Research Program:

<https://science2017.globalchange.gov/> (the science)

<https://nca2018.globalchange.gov/> (the impacts)

American Meteorological Society:

www.ametsoc.net/sotc2017/StateoftheClimate2017_lowres.pdf

A more complete list of best scientific and governmental sources:

International

Intergovernmental Panel on Climate Change
United Nations Environmental Programme (UNEP)
World Meteorological Organization

Agencies of the U.S. federal government

Environmental Protection Agency (EPA)
National Oceanographic and Atmospheric Administration (NOAA)
National Aeronautics and Space Administration (NASA)
U.S. Global Change Research Program

Scientific bodies – U.S.

National Academic of Sciences
Climate Change at the National Academies (climatechange@nas.edu)
National Science Foundation

Other professional bodies – American Meteorological Society

2 Search **academic articles** using Google Scholar (scholar.google.com)

(NOTE: Narrow and focus your search by using several phrases in quotes – such as “climate change”. For example, if you are searching for how climate change will increase the frequency of extreme weather events, don’t just enter “climate change,” search, instead for” “climate change” AND “extreme weather events”)

Search terms to use (you may certainly choose others):

“climate change” AND x, where x can be:

Geoengineering

Carbon capture and sequestration

(NOTE: For some citations you find on Google Scholar, you can directly download the PDF. For other citations, you may be able to find and download PDFs if your University library offers on line access to academic journals.)

3 Do a **more general search** using Google or another search engine

Use the same search terms to do a general search on Google or another search engine. This will bring up information more recent than you find on scholar.google.com (it takes several years for research to be published in academic journals).

4 Search the **best newspapers** and **reputable climate websites**

New York Times, Washington Post, The Guardian

On line sources

Climate Central

GRIST

Society of Environmental Journalists

The Daily Climate

Climate Nexus

InsideClimate News

DeSmogBlog

Skepticalscience.com

Yale 350

(NOTE about on line sources: You will run into a lot of denialist disinformation on the internet, on websites, on blogs, on youtube. FYI, skepticalscience.com has a comprehensive list of denialist talking points (and refutations of those talking points). See, for example: <https://www.skepticalscience.com/argument.php>)

Finally, here are some more suggestions to help you get started:

Harvard professor David Keith is the most well known advocate. I would check out his views, then list the worries and warnings raised by other scholars.

NOTE: A word of caution, here: Searches for “geoengineering” are likely to bring up books, articles, websites, youtube videos about something called “chemtrails,” a tin foil hat paranoid conspiracy theory that claims that some mysterious agents, for some evil purposes, are already seeding the atmosphere with poisonous substances. Please ignore all discussions of chemtrails (unless you want to, on your own, do a study of why it has become so easy to spread conspiracy theories in contemporary American society).

And here are some recent news reports:

<http://nymag.com/intelligencer/2018/08/solar-geoengineering-climate-change.html?gtm=bottom>m=top>

<https://www.nap.edu/catalog/25259/negative-emissions-technologies-and-reliable-sequestration-a-research-agenda>

<https://www.nytimes.com/2018/10/24/climate/global-warming-carbon-removal.html>

<https://cosmosmagazine.com/geoscience/polar-geoengineering-may-exacerbate-ocean-warming>

New for 2021:

-- The journal *Environmental Politics* has a full special issue on geoengineering: Volume 28, no 3, 2019

-- An agenda for research, authored by The National Academies of Sciences, Engineering and Medicine:

<https://www.nap.edu/catalog/25259/negative-emissions-technologies-and-reliable-sequestration-a-research-agenda>

-- Scientists' support for geoengineering is growing:

<https://e360.yale.edu/features/geoengineer-the-planet-more-scientists-now-say-it-must-be-an-option>

-- but some are skeptical:

Christopher H. Trisos, *et al*, "Potentially dangerous consequences for biodiversity of solar geoengineering implementation and termination," *Nature Ecology & Evolution*, volume 2, pages 475–482, 2018.

<https://nymag.com/intelligencer/2018/08/solar-geoengineering-climate-change.html>

-- some actual work being done:

British Petroleum: <https://www.nytimes.com/2021/03/08/business/carbon-capture-bp.html>

Harvard Univ: <https://www.nature.com/articles/d41586-019-02331-y>