

Researching Topic #13 -- SOCIETAL RESPONSES – THE SCIENCE: DISCOVERY;
COMMUNICATION; ACTIVISM [last revised 7/12/2019]

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 –

DISCOVERY OF CLIMATE CHANGE

A small number of great scientific discoveries – finding fossils of extinct dinosaurs; geophysical evidence of ice ages and other evidence that Earth, at earlier times, had vastly different climatic conditions – triggered a scientific revolution. Earlier, “steady state” ideas had to be abandoned. The Earth acquired a geophysical *history*. Later discoveries then forced scientists to conclude that that pace of change wasn’t, as initially thought, slow and gradual. The evidence suggested that sometimes change came fast and was – in terms of geological time scale – abrupt.

That’s the story of paradigm change in the Earth Sciences.

The second facet of the science story is the more specific story of: the scientists who first discovered the connection between CO₂ and atmospheric temperature; the scientists who documented the rise of CO₂, the scientists who found evidence that it was anthropogenic CO₂, not some “natural” cause, that was driving climate change observed today.

The first task is to summarize the key moments in this story.

COMMUNICATION

Scientists communicate their findings to others, certainly first and foremost to their colleagues, but, traditionally, also to the general public. Sometimes their findings are met with awe and/or admiration (black holes!); sometimes with disbelief and disapproval (evolution).

In the case of climate change, communicating the findings has become extraordinarily fraught. Climate scientists feel they *have* to talk, to the public, to policymakers, about climate change because they understand that its impacts could be devastating if nothing (or not enough) is done to address the causes. But it is also true that, given militant climate denial, given the level of polarization surrounding the issue, communicating findings is not just presenting facts, imparting knowledge; it forces scientists into a world of political conflict (a world they are reluctant to enter and for which most of them are ill prepared).

How are climate scientists dealing with this challenge? How are they talking about it? What strategies are they using to get their message heard?

SCIENTISTS and ACTIVISM

Worried that their findings, their warnings, aren't being effective, that the rest of society doesn't seem to understand the urgency of the situation, some scientists have begun to argue that they have to go beyond just communicating ... to actually entering the political arena, become climate activists. That's way out of their comfort zone, but they have felt compelled to discuss making such a move, and some have actually done it.

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: I typically suggest that research start with these kinds of sources, but they may not be all that helpful for working on this topic... Most relevant: these kinds of documents *are* examples of attempts to communicate climate science findings!)

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:

History of climate science

Discovery of climate change

Discovery of global warming

Science communication

“climate scientists” AND activism

activism AND “political activism”

(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 good citations to help you get started:

On DISCOVERY

Spencer Weart's book, [The Discovery of Global Warming](https://history.aip.org/climate/index.htm). Weart's work can also be found at <https://history.aip.org/climate/index.htm>

The first few chapters of Elizabeth Kolbert's excellent book, [The Sixth Extinction](#), also has some relevant history, e.g. the discovery of extinct species, continental drift, paleoclimates, hence the fact that the Earth has not been "the same" forever but has a geological and climatological history that science can uncover and understand.

On COMMUNICATION

Justin Farrell, et al, "Evidence-based strategies to combat scientific misinformation," *Nature Climate Change*, Volume 9, pp 191–195, 2019

John D. Sterman, "Communicating climate change risks in a skeptical world," *Climate Change*, published on line August 18, 2011

Richard C. J. Somerville and Susan Joy Hassol, "Communicating the science of climate change," *Physics Today*, October, 2011, pp. 48-53.

Look up the website of the Yale Program on Climate Change Communication

On SCIENTISTS as ACTIVISTS

Look up the career of James Hansen

Do that Google search for: "climate scientists" AND activism