

Researching Topic #12 -- SOCIETAL IMPACTS – THE POTENTIAL FOR CATASTROPHIC IMPACTS
[last revised 3/5/2021]

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 – CATASTROPHIC IMPACTS

Pulling back and looking at a much longer span of time, say on the order of hundreds of thousands of years, it becomes plain to see that the time of greatest human/societal development – from the end of the long period of exclusively living in hunter/gatherer societies and into the period of settlement, agriculture, industrialization, urbanization; so about 10,000 years ago to today – all happened within a time of stable, favorable climactic conditions. Moderate temperatures, adequate but not overwhelming rains, relatively stable over the years.

As the life of contemporary society pushes the planet's climate into a state that has not existed for millions of years (a state humans have not lived in, ever), some scientists have begun to predict not just difficult, not just dire, but possibly catastrophic consequences.

What are the most extreme consequences currently being discussed if emissions are not capped and global atmospheric temperatures increase by 2 degrees Centigrade over pre-industrial levels? More than 2 degrees; 3; 4 or more?

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:

- Catastrophic impacts
- Greater than 2 degrees Centigrade
- 4 degrees Centigrade or higher
- Positive feedback
- Exceeding planetary limits
- Existential crisis

(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>)

And finally, here are some citations to help you get started:

Rockstrom, et al, “A Safe Operating Space for Humanity” – PDF on scholar.google.com
National Academy of Sciences, “Abrupt Impacts of Climate Change: Anticipating Surprises,” PDF available at <http://nap.edu/18373>

Hansen, et al, “Assessing ‘Dangerous Climate Change’: Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature,”
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648>

Steffen, Rockstrom, et al, “Trajectories of the Earth System in the Anthropocene,” PDF on scholar.google.com

Spratt and Dunlop, “What Lies Beneath: The Understatement of Existential Climate Risk,” Download PDF at <https://www.breakthroughonline.org.au/publications>

Xu and Ramanathan, “Well below 2 °C: Mitigation strategies for avoiding dangerous to catastrophic climate changes,” <http://www.pnas.org/content/114/39/10315>

Camilo Mora, et al, “Broad threat to humanity from cumulative climate hazards intensified by greenhouse gas emissions,” Nature Climate Change, Nov 19, 2018.

https://www.thenation.com/article/1-5-to-stay-alive-says-landmark-un-climate-report/?utm_source=Sailthru&utm_medium=email&utm_campaign=weekly%2010122018&utm_term=weekly

https://thebulletin.org/2018/10/climate-report-understates-threat/?utm_source=Bulletin%20Newsletter&utm_medium=iContact%20email&utm_campaign=October12

<https://maps.esri.com/MoraLab/CumulativeChange/index.html>

<http://nymag.com/intelligencer/2017/07/climate-change-earth-too-hot-for-humans.html?gtm=top>m=bottom>

<https://aeon.co/ideas/we-are-heading-for-a-new-cretaceous-not-for-a-new-normal>

More good sources for the possibility of catastrophic impacts, added in March, 2021

- (1) New articles about the continued rise of greenhouse gas emissions, suggesting that we are still on track for levels of global warming that are projected to result in catastrophic-level impacts:

United Nations Environmental Programme (UNEP), “Emissions Gap Report 2019,”
<https://www.unep.org/resources/emissions-gap-report-2019>

United Nations Environmental Programme (UNEP), “Emissions Gap Report 2020,”
<https://www.unep.org/emissions-gap-report-2020>

United Nations Environmental Programme (UNEP), “The Production Gap: The discrepancy between countries’ planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C,”
<https://productiongap.org/2020report/>
https://productiongap.org/wp-content/uploads/2020/12/PGR2020_FullRprt_web.pdf

- (2) Consequences:

Timothy M. Lenton, *et al*, “Climate tipping points — too risky to bet against,” *Nature*, Vol 575, pages 593-596, 28 November 2019

Christopher H. Trisos, Cory Merow and Alex L. Pigot, “The projected timing of abrupt ecological disruption from climate change,” *Nature*, **580**, pages 496–501, 2020.
<https://doi.org/10.1038/s41586-020-2189-9>

Chi Xu (徐驰), *et al*, “Future of the human climate niche,” *Proceedings of the National Academy of Sciences* (PNAS), www.pnas.org/cgi/doi/10.1073/pnas.1910114117