Understanding the relation between NSF funding and public opinion on climate change

Maha Mapara

1 Credit Research Project

DS-143: Data Science for Sustainability

1 Introduction

Climate change is defined by the United Nations as the long-term shifts in temperatures and weather patterns due to human activity which have produced greenhouse gasses and may lead to irrevocable damage to our planet.[1] Climate.gov reports that 2021 was the sixth-warmest year on record based on National Oceanic and Atmospheric Administration's (NOAA) temperature data. The earth's temperature has risen by 0.08° Celsius per decade since 1880, and the rate of warming since 1981 is more than twice that at 0.18° C per decade. [2] In the last few years there has been an increased focus on climate change and its impact on the world. An increasing number of Americans believe in climate change and there is increasing desire for legislation that leads to meeting benchmarks set in the Paris Climate Accord and ultimately slowing down climate change.[3]

Research on climate change topics like reducing greenhouse gas emissions, impact of global warming on biodiversity, carbon capturing technologies, improving renewable energy production and adoption are some of the important topics being studied to slow down climate change. This is necessary in order to prevent catastrophic consequences like frequent, high intensity natural disasters, habitat destruction, mass climate migration, and species extinction.[4] An important way to slow down climate change and meet goals in the Paris Climate Accord [5] is through strong public support for action and policy changes.

This project investigates how research funding towards climate research is related to public opinion on it. We focus on research funding from the National Science Foundation (NSF), one of the main organizations funding scientific research and education at higher education institutions in the United States. NSF itself is funded by taxpayer money. Ideally, NSF funding should be awarded to research areas that the public prioritizes. Therefore, if NSF is increasing funding research related to climate change, it is reflective of the public priority and sentiment around the topic. My research question is:

- Is there a positive correlation between national sentiment on climate change in the United States and NSF funding towards climate change related research?

I hypothesize that there is a positive correlation as increase in NSF funding should correlate with increase in positive public opinion on climate change. In order to answer this research question, I am using a linear regression model.

1.1 Data

	year	State	happening	harmUS	timing	personal	futuregen	worried	human	fundrenewables	regulate	CO2limits	Funding
0	2014	AK	62.000	45.000	41.000	29.000	55.000	48.000	45.000	76.000	67.000	48.000	21278921
1	2014	AL	56.000	45.000	40.000	31.000	53.000	46.000	43.000	73.000	69.000	53.000	8717289
2	2014	AR	57.000	46.000	39.000	31.000	55.000	47.000	44.000	73.000	71.000	59.000	4822559
3	2014	AZ	64.000	53.000	44.000	38.000	61.000	54.000	49.000	76.000	74.000	64.000	31581325
4	2014	CA	70.000	59.000	48.000	42.000	70.000	62.000	55.000	79.000	79.000	72.000	163491175
...	...	...	...	...	...	...	...	...	...	...	...	...	...
199	2021	VA	74.246	66.264	61.864	47.914	72.833	67.593	59.283	79.736	73.235	69.422	38258385
200	2021	WA	75.379	68.805	62.891	48.125	76.331	68.291	60.097	78.954	72.999	69.846	52157584
201	2021	WV	56.918	50.727	45.077	32.924	57.075	49.865	42.603	70.574	62.749	47.461	5495792
202	2021	WI	69.452	62.011	55.557	42.428	70.049	61.549	55.104	77.934	72.360	64.875	35490091
203	2021	WY	58.285	51.034	43.809	32.913	57.210	52.421	43.604	72.362	62.288	48.524	4543177

Figure 1: Merged Yale Climate Opinion and NSF Award Funding data

The data source for NSF funding comes from the NSF Awards Search Tool [6]. By utilizing the search tool, I have found the proposals containing the words 'climate change' in the title or abstract of a proposal for a particular year, what amount of funding those proposals received and which states the funding goes to (based on proposal authors location). The funding per year and state is the predictor variable ('Funding' column in figure 1).

The data for public climate change opinion comes from the Yale Climate Opinion Maps data.[7] This data was collected in all 50 states and DC in 2014, 2016, 2018, and 2021. They surveyed people on range of questions regarding their belief, risk perception and policy positions concerning climate change. The question pertinent to my research question is 'Do you think that global warming is happening?'. The percentage of the population that said yes in every state for a particular year is the response variable ('happening' column in figure 1).

References

[1] What is climate change? https://www.un.org/en/climatechange/what-is-climate-change.

[2] Climate change: Global temperature. https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature#:~:text=Earth's%20temperature%20has%20risen%20by,based%20on%20NOAA's%20temperature%20data.

[3] How important is climate change to voters in the 2020 election. https://www.pewresearch.org/fact-tank/2020/10/06/how-important-is-climate-change-to-voters-in-the-2020-election/.

[4] Climate change impacts. https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts.

[5] The paris agreement. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

[6] Nsf award search tool. https://nsf.gov/awardsearch/advancedSearch.jsp.

[7] Yale climate opinions map 2021. https://climatecommunication.yale.edu/visualizations-data/ycom-us/.