

# Global Warming, Always a Hot Topic

Plant Friends: droussev, ssriram3, zhu38, hwu62

## Hypothesis

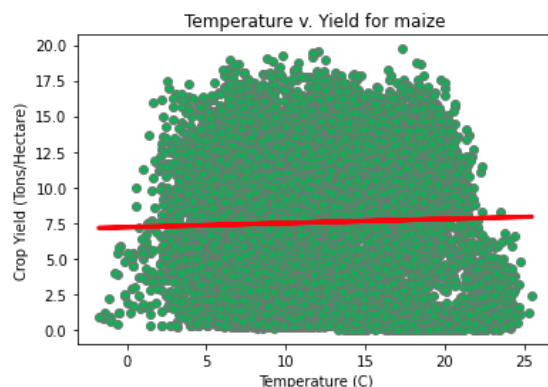
Given the unnatural rise of temperatures due to global warming, the climates of regions across the world are changing over time. We wanted to analyze the effect of temperature on crop yield to expand on the message of climate change. Our hypothesis is that crop yield will be inversely correlated with this positive temperature change, because plants will not be able to flourish as the climates they are native to or cultivated in alter rapidly. Our null hypothesis was that there is no correlation between those two variables.

## Data

The data is made up of four key tables, one per major crop. Each table is indexed by coordinates, and has the following columns: yield amounts for years 1981-2014, average temperature for years 1981-2014, and the state the coordinate falls within. The data resulted from two datasets: the 'Global Dataset of Historical Yield' from PANGEA and the 'Global Land-Ocean Temperature Index' from NASA. A large amount of processing was needed to create the final data, both in matching the coordinate indices of the separate datasets, and in geofencing the data by country and state.

## Findings

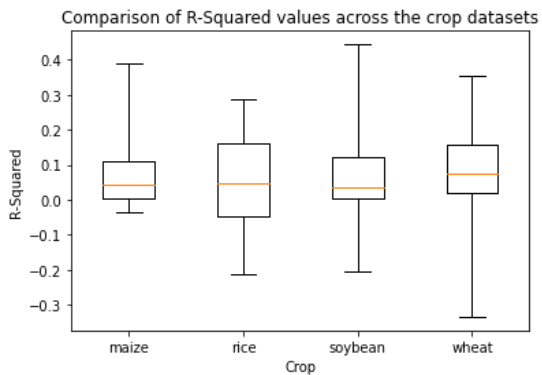
**Claim #1:** There is not enough evidence to suggest any correlation between average temperature and crop yield for the overall U.S. dataset.



### Support for Claim #1:

We completed a regression analysis over the set of all U.S. data for each crop, and our  $R^2$  values computed for each of the four crops was 0.0, showing that our regression analysis failed to accurately show any relationship. This figure is our regression line for maize in the U.S.

**Claim #2:** There is not enough evidence to suggest any correlation between average temperature and crop yield for any of the individual states in the U.S.



**Support for Claim #2:**

This figure shows the average  $R^2$  values across the state datasets for each crop. The averages are all near zero, and the lower bounds of each plot are all negative. Although  $R^2$  values are not the be-all end-all for statistics, since these are so insignificant, we cannot reject our null hypothesis.