

Natural Disasters

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The data we analyzed was obtained from the EMDAT database which provided information such as:

- Disaster Type
- Number Injured
- Number of Deaths
- Number left Homeless
- Number Affected
- Total Damage (Estimated)

Source: http://www.emdat.be/advanced_search/index.html

We also enriched the dataset with data from WorldBank. We mainly analyzed country indicators such as:

- GDP (in US dollars)
- Population
- Income Group (Gross National Income per Capita)

Source: <http://databank.worldbank.org/data/home.aspx>

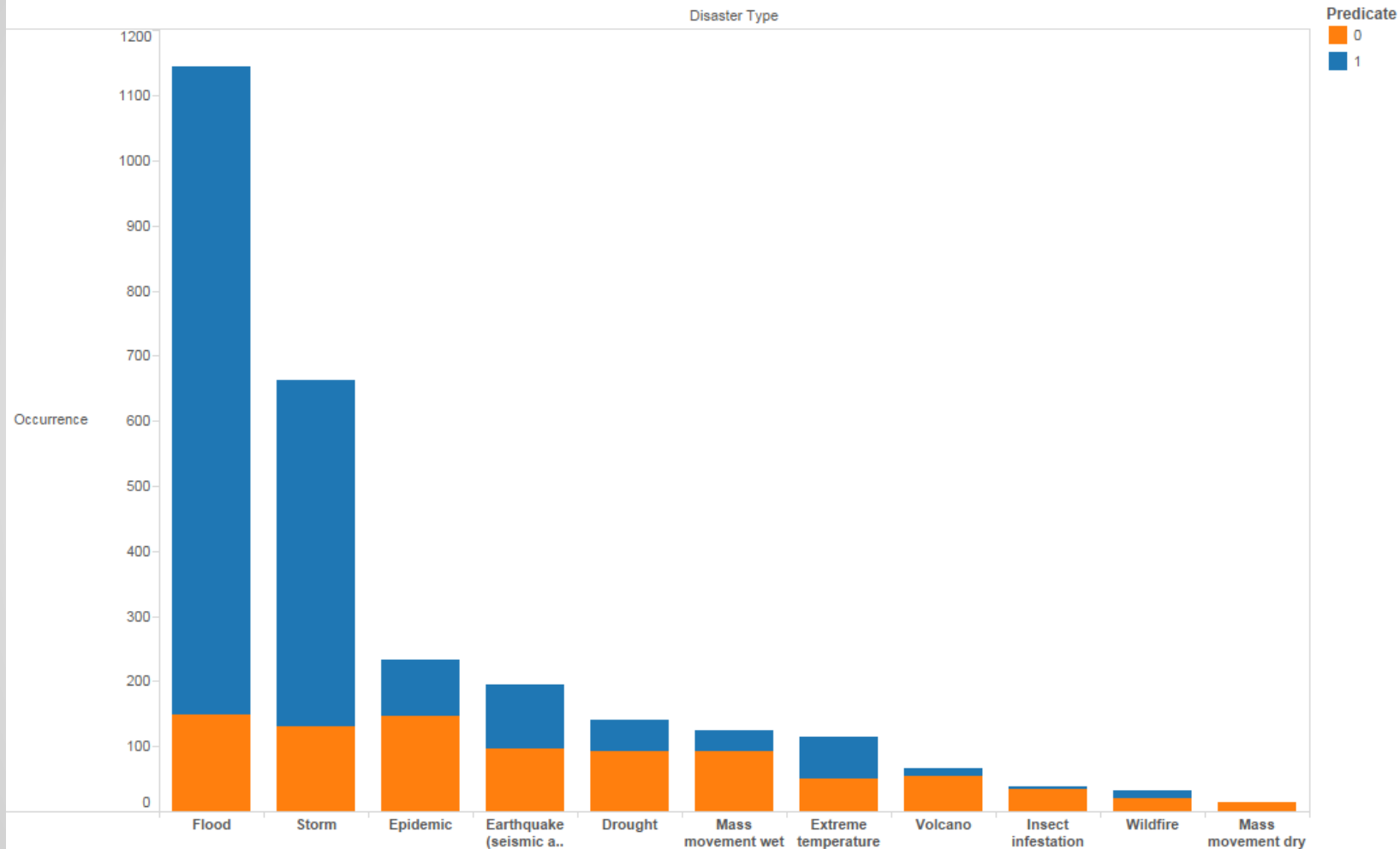
Disaster Trends

Anomalous records in our data have the following disaster type:

- epidemics
- volcanic eruptions
- insect infestations
- mass movement (dry/wet)
- droughts

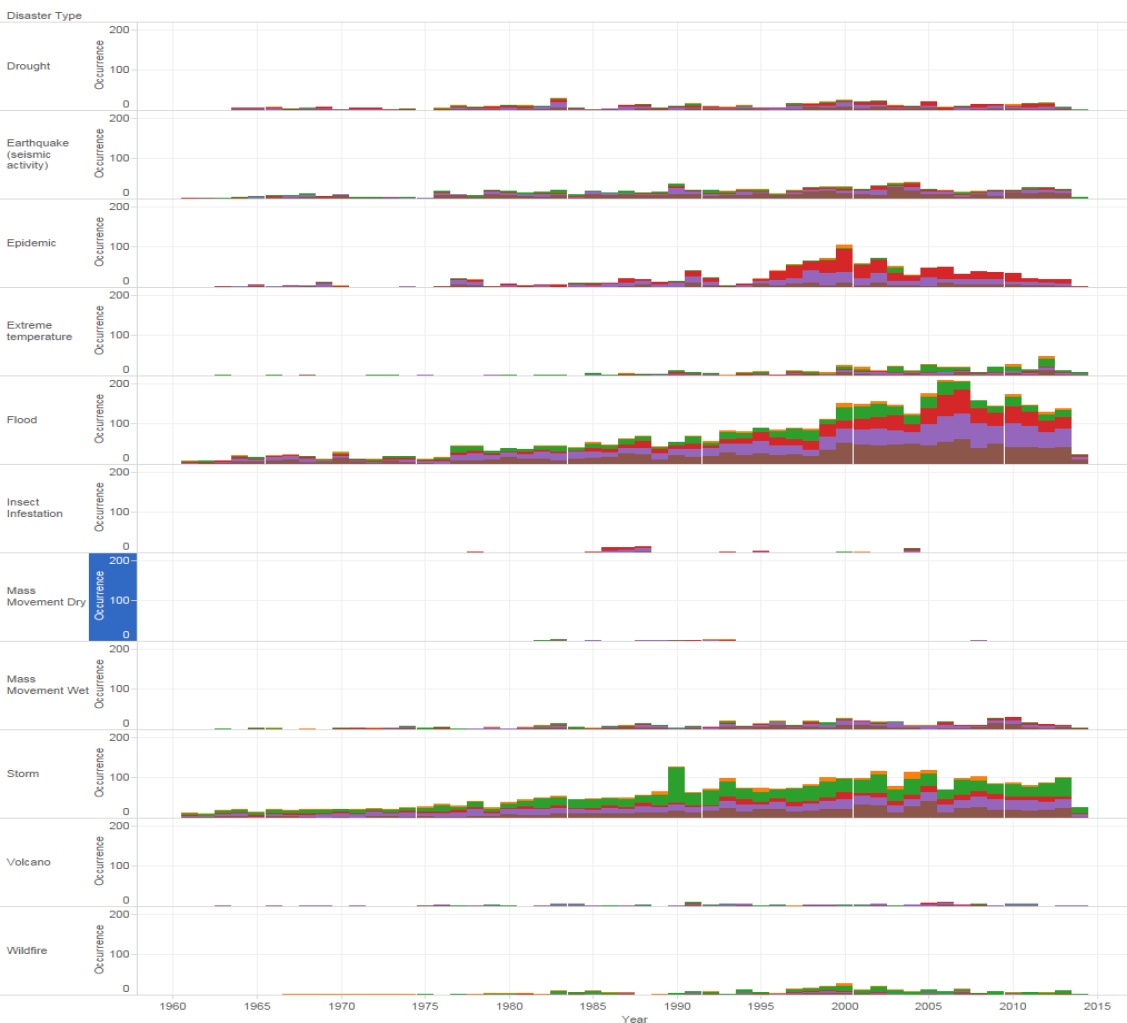
What we found: Insect Infestation and Epidemics are more frequent in lower income countries.

Occurrences by DisasterType



Occurrence for each Disaster Type broken down by Occurrence. Color shows details about Predicate.

Disaster Trends



INCOME_GROUP
 High income: nonOECD
 High income: OECD
 Low income
 Lower middle income
 Upper middle income

These series of bar charts plot the Occurrence vs Year for each disaster type we analyzed. Each bar is broken into color coded income groups to see the distribution of occurrences.

The Occurrence measures how many times the disaster of that type occurred in a certain country for that year.

Out of all the disaster types high income countries seem to deal with frequent storms.

Disaster occurrences seem to be on the rise except for epidemics, insect infestation, mass movement (dry/wet), volcanoes, and wildfires.

Measuring Disaster Significance

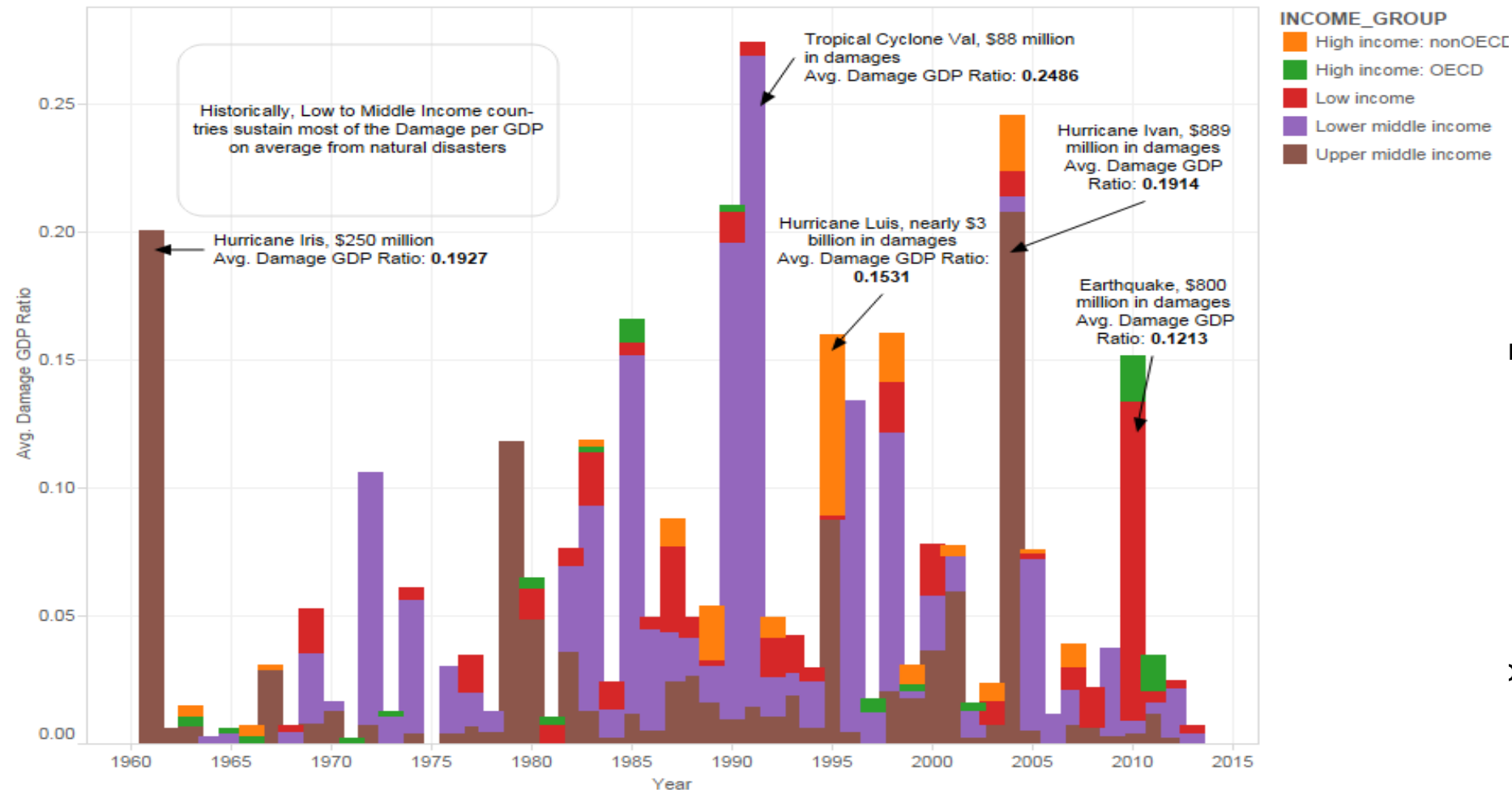
Demographic Damage Ratio=(#Affected + #Injured + #Deaths + #Homeless)/Population of Country

Damage GDP Ratio= Total Damage /GDP of country

What we found: Low to middle Income countries contribute disproportionately more to the average of the demographic damage ratio and the damage gdp ratio.

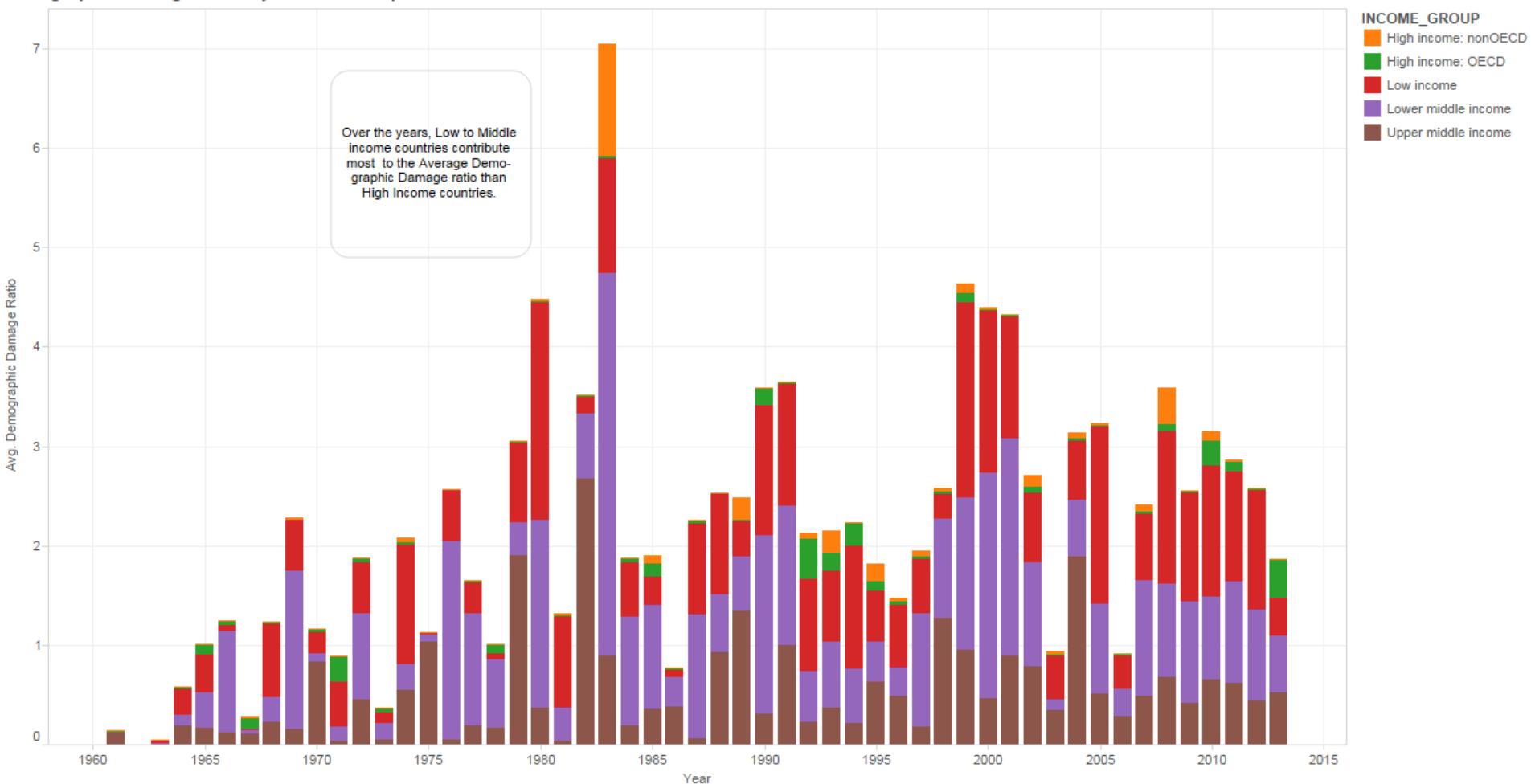
This implies low to middle income countries suffer disproportionately compared to high income countries in terms of economic damage and casualties (demographic damage).

Damage GDP Ratio by Income Group



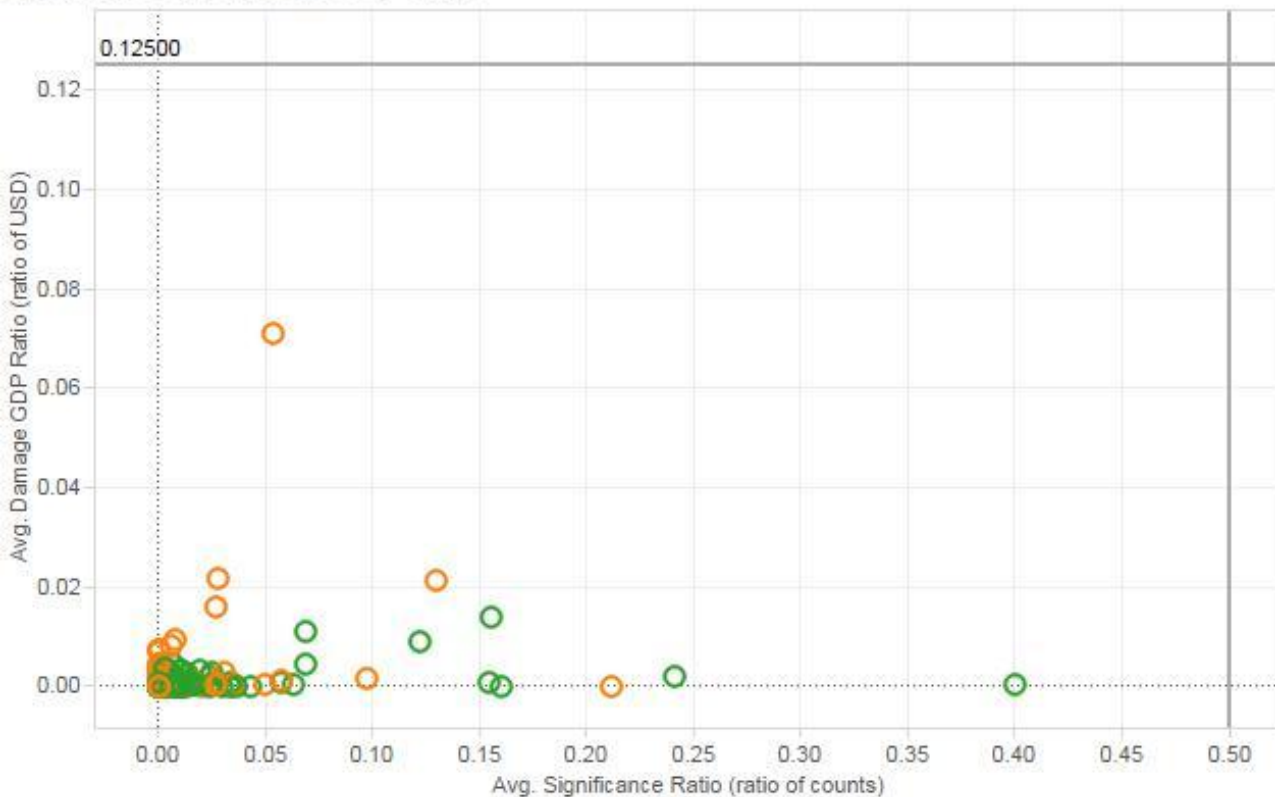
The plot of average of Damage GDP Ratio for Year. Color shows details about INCOME_GROUP. Details are shown for Country Name and Disaster Type. The data is filtered on sum of Damage GDP Ratio, which ranges from 0.002 to 1.

Demographic Damage Ratio by Income Group



The plot of average of Demographic Damage Ratio for Year. Color shows details about INCOME_GROUP. Details are shown for Country Name and Disaster Type. The view is filtered on average of Demographic Damage Ratio and INCOME_GROUP. The average of Demographic Damage Ratio filter keeps non-Null values only. The INCOME_GROUP filter keeps High income: OECD, High income: nonOECD, Low income, Lower middle income and Upper middle income.

Sig. Ratio vs. Damage GDP Ratio



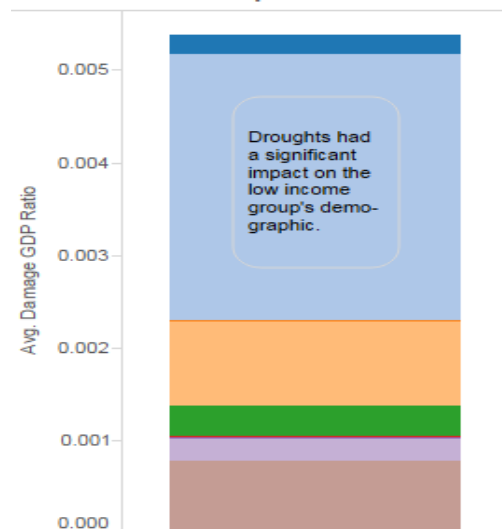
High income countries suffer less economic and demographic damage among natural disasters according to our data. Surprisingly, Low Income countries mostly lie in the third quadrant.

INCOME_GROUP
High income: nonOECD
High income: OECD

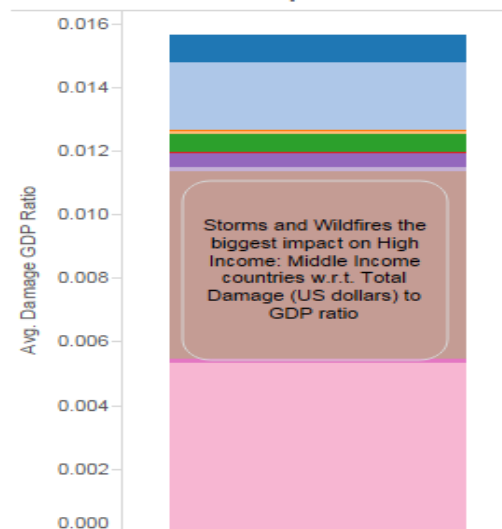
This scatterplot shows which disasters contributed most to the average Demographic Damage Ratio and the average Damage GDP Ratio (the averages were calculated across all years).

The outliers in the 1st, 2nd, and 4th quadrants are lower to upper middle income countries. This plot reveals the outliers contributing disproportionately to the overall Averages of Demographic Damage and Damage GDP Ratios.

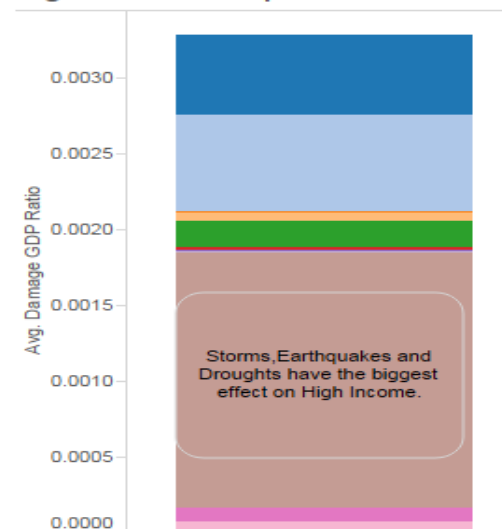
Low Income Group Disasters



Middle Income Group Disasters

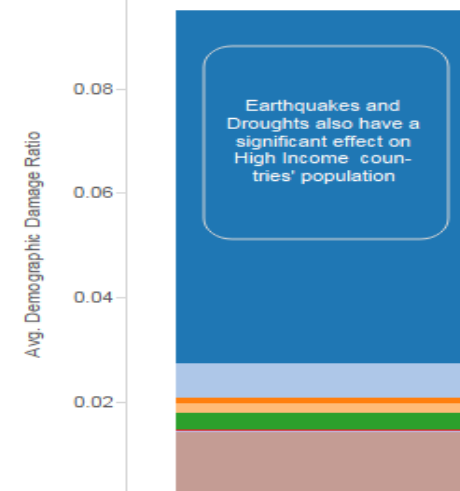
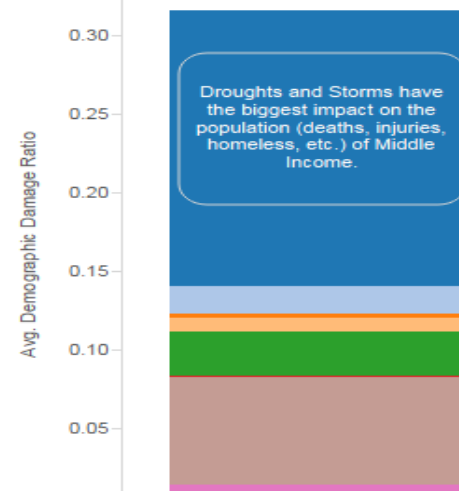
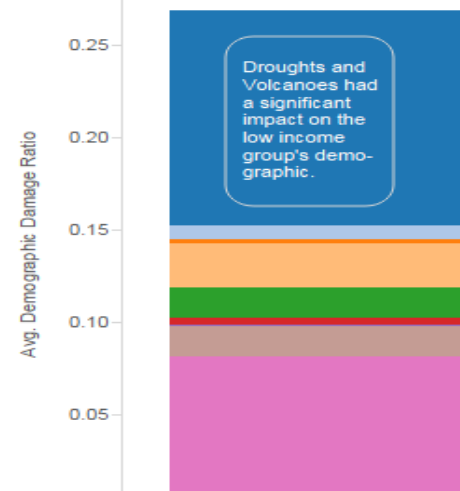


High Income Group Disasters



Disaster Type

- Drought
- Earthquake (seismic activity)
- Epidemic
- Extreme temperature
- Flood
- Insect Infestation
- Mass Movement Dry
- Mass Movement Wet
- Storm
- Volcano
- Wildfire

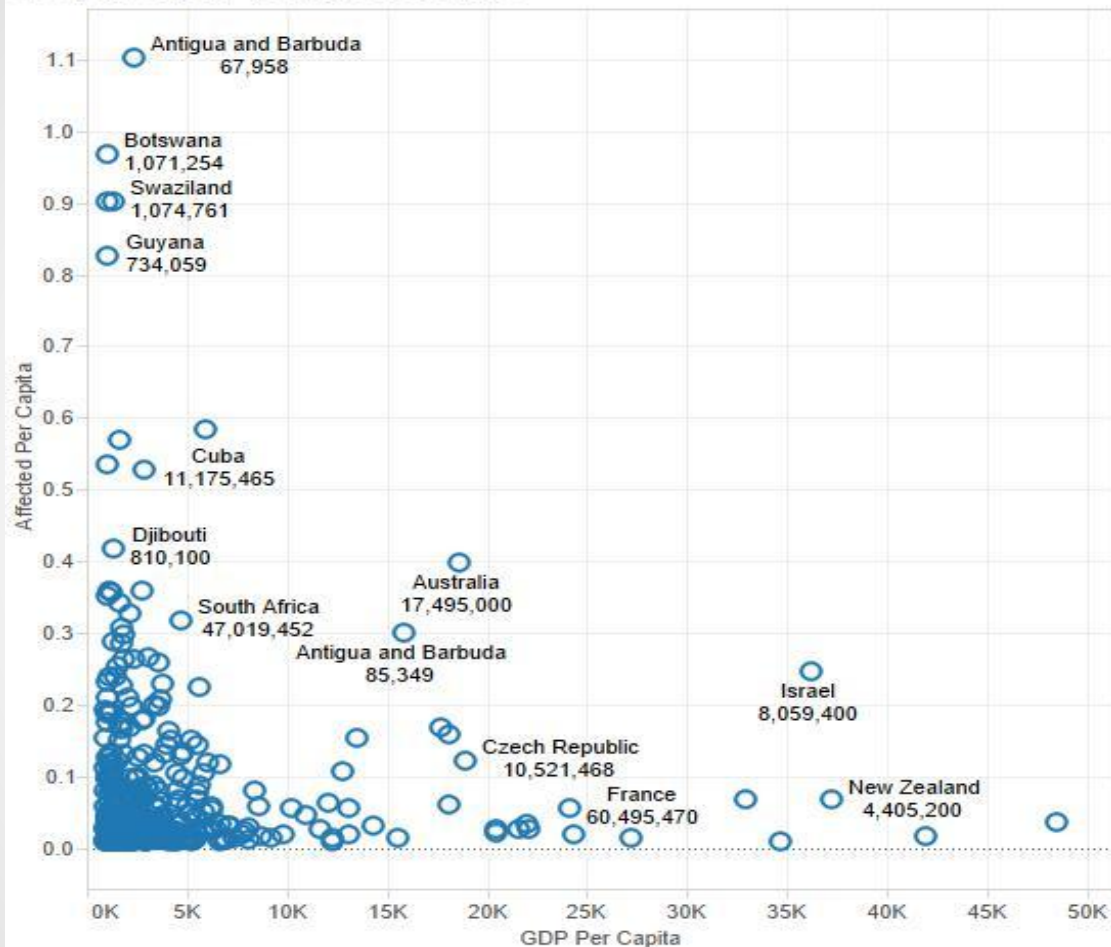


Per Capita Analysis

What we did:

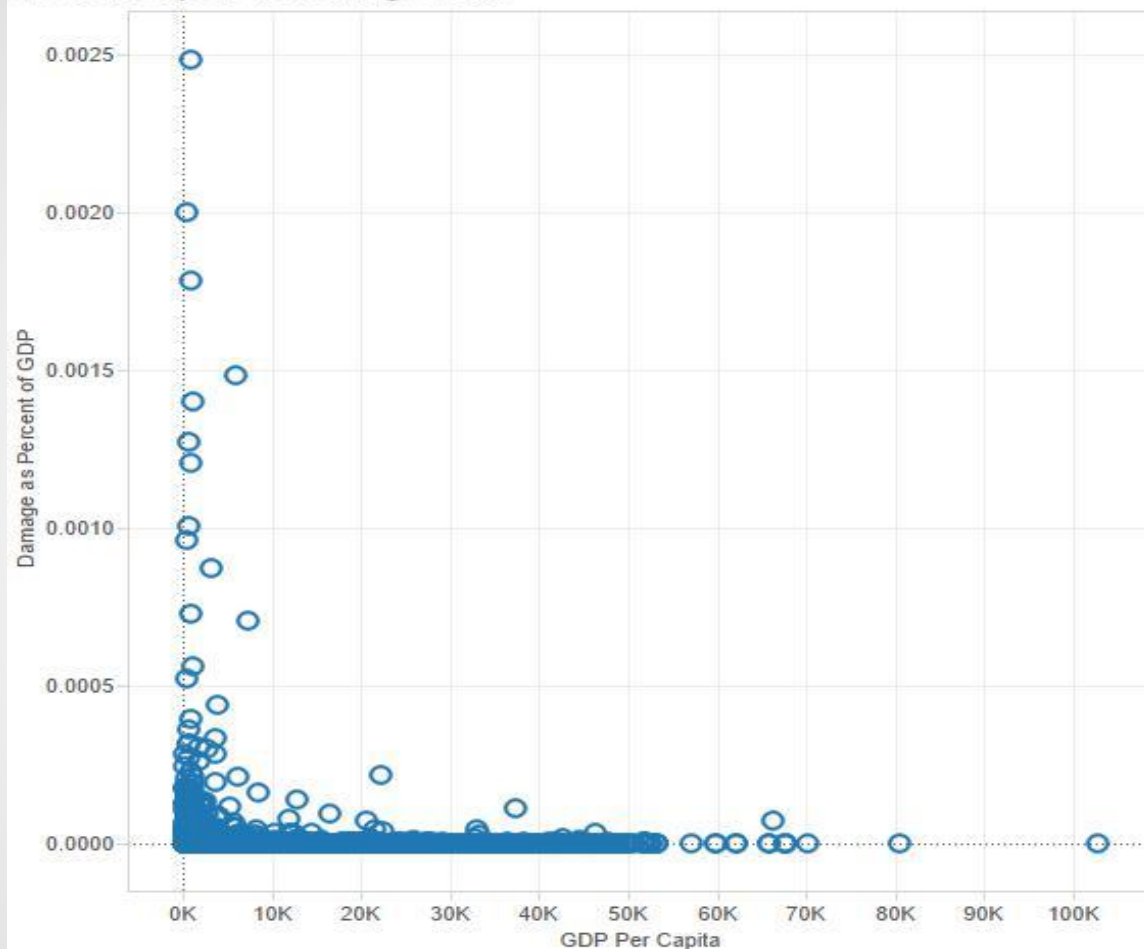
- Calculated GDP per capita, number of affected people per capita, number of deaths per capita, and the ratio of economic damage to GDP.
- Ran cluster builds which indicated:
 - The vast majority of disasters (up to 98%) affect only a small portion of the populations of countries that they hit (< 11.5%).
 - The remaining disasters are the ones which affect a much more substantial portion of the populations (sometimes even more than 50%).
 - These disasters are limited almost exclusively to countries with a relatively low GDP per capita, or low income classification.

GDP per Capita vs. Affected Ratio



GDP Per Capita vs. Affected Per Capita. The marks are labeled by Country Name and Population. The data is filtered on GDP Per Capita and Affected Per Capita. The GDP Per Capita filter ranges from 876 to 102678.797916178. The Affected Per Capita filter ranges from 0.01 to 1.165047848.

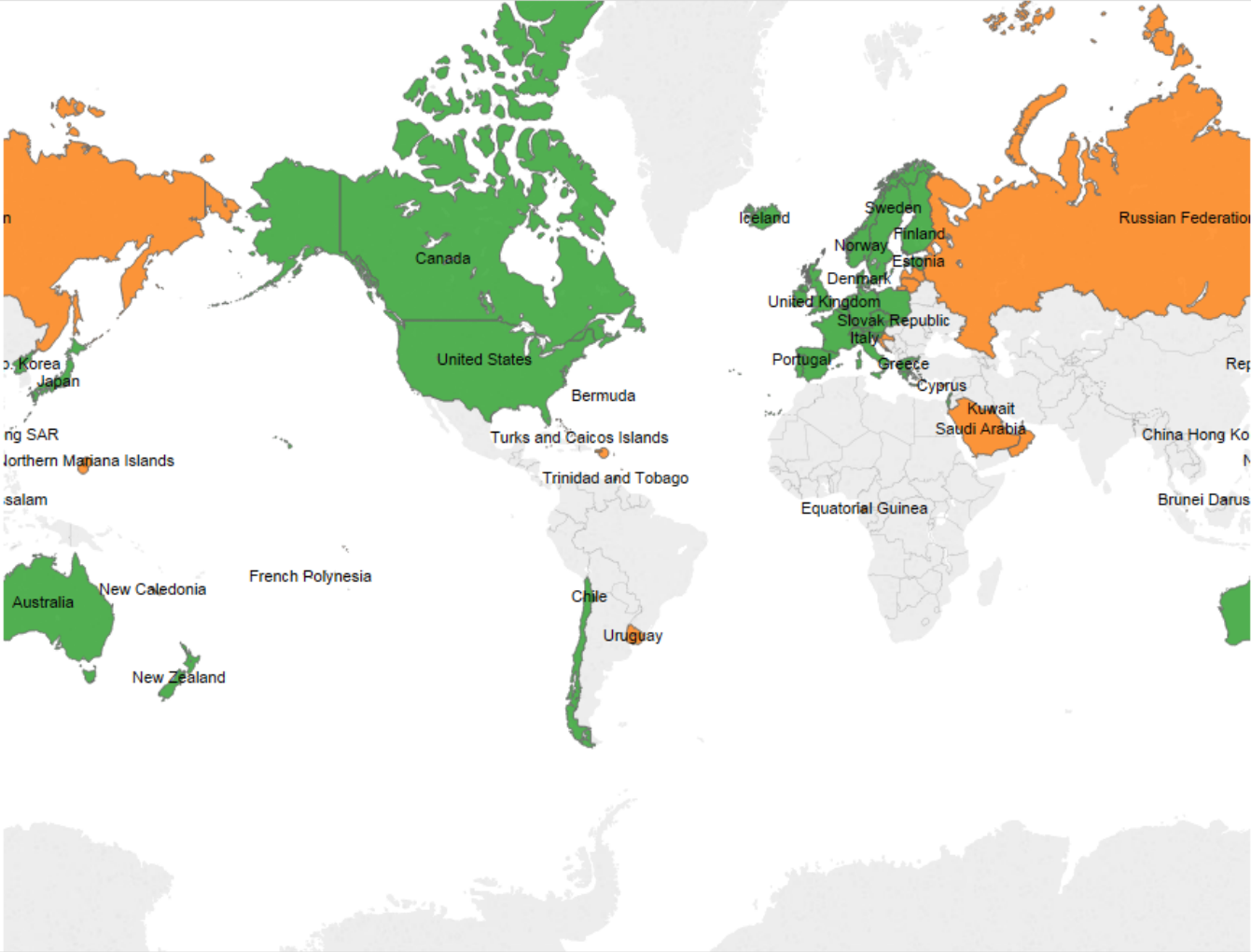
GDP Per Capita vs. Damage Ratio



GDP Per Capita vs. Damage as Percent of GDP. The data is filtered on GDP Per Capita, Total Damage and Gdp Us Dollars. The GDP Per Capita filter keeps non-Null values only. The Total Damage filter ranges from 1 to 210000000. The Gdp Us Dollars filter ranges from 1 to 168000000000000.

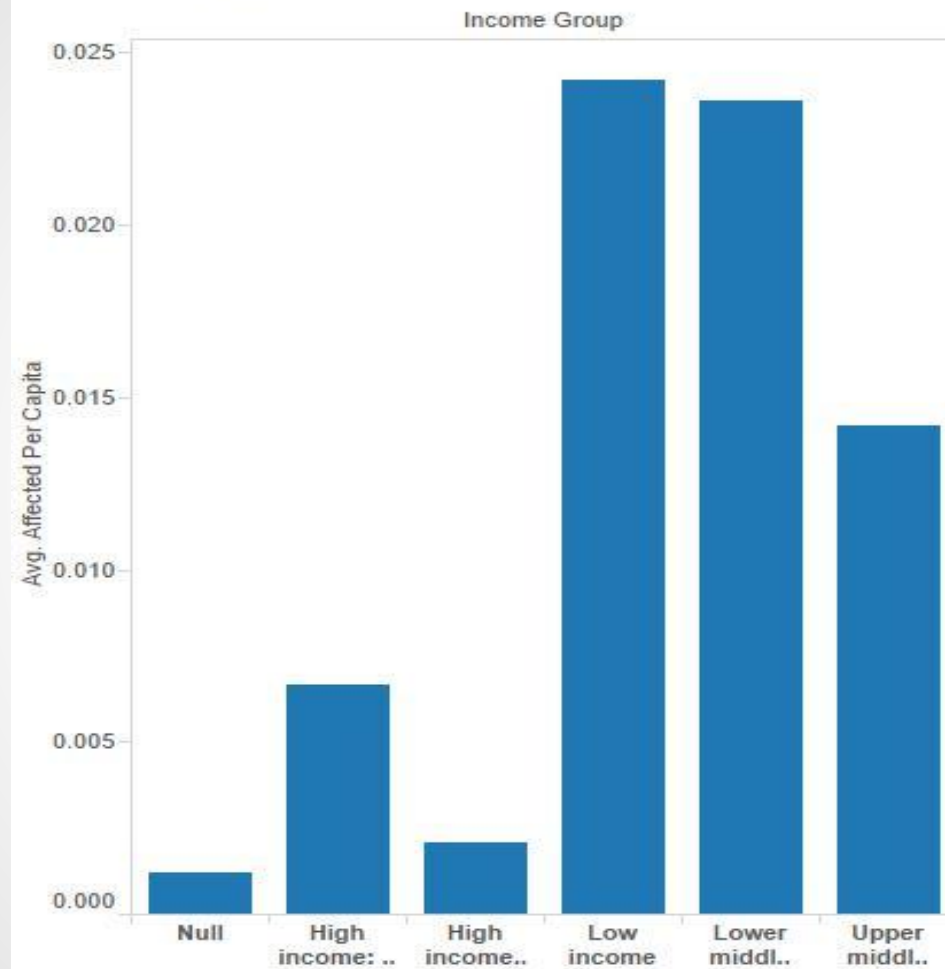
Income Group

- INCOME_GROUP
- High income: nonOECD
 - High income: OECD



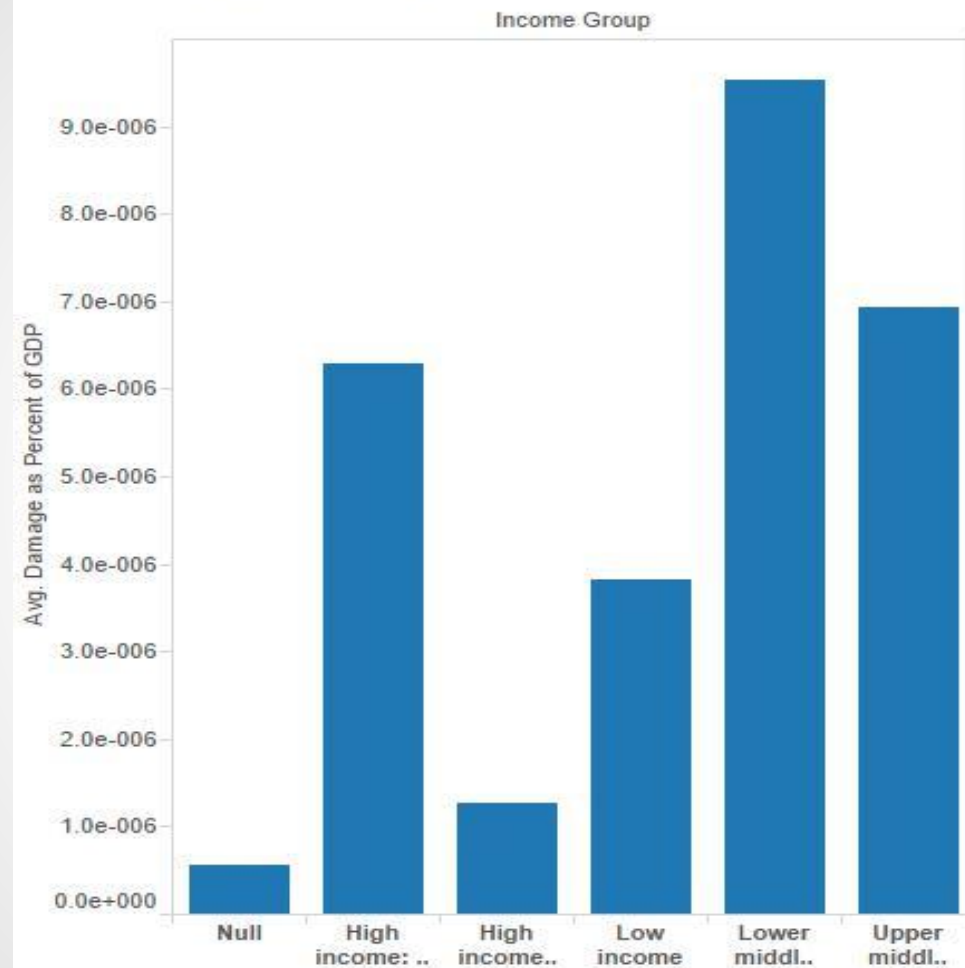
Map based on Longitude (reprojected) and Latitude (reprojected). Colors show details about INCOME_GROUP. The map is labeled by Country Name. Details are shown for Country Code. The view is centered on the Atlantic Ocean.

Income Group vs. Affected Ratio



Average of Affected Per Capita for each Income Group.

Income Group vs. Damage Ratio



Average of Damage as Percent of GDP for each Income Group..

Are any of the disasters Low to Middle Income countries face already preventable?

In the future we could:

- identify the particular disasters such as epidemics that low income countries face, research which treatments or vaccines have been available, and compare the cost of these treatments with the cost these epidemics have already taken.
- Identify why droughts do so much demographic damage across all countries.
- Find correlations between damage done by disaster types across different income groups (e.g. does extreme temperature play a role in droughts? How much stronger or weaker is this correlation if we restrict our analysis to low to middle income countries?)

...To the Demo