

Explanation of Assumptions

Assumption 1: City Boundaries

For the first iteration of this project, we defined the city boundaries by using Earth Engine's Geometry.Rectangle function to select a rectangle around the city. We used two cities that we were familiar with (Seattle and Campo Grande) and defined the rectangle with latitude and longitudinal points based on city boundaries that we were familiar with and could obtain through Googling. There are a couple of methods that we could take to improve this in the next iteration of this project:

- Use Google Earth Engine's Geometry.Polygon function instead of Rectangle to more closely define the region like the city boundaries instead of a rectangular snapshot of the general city area.
- Isabel found additional datasets on Google Earth Engine that could potentially help clip the area of the satellite image used in the NDVI calculations. These include GAUL ([Global Administrative Unit Layers](#)) which defines city and state boundaries globally (except for in the US, Northern Europe, and China). Another one could be the TIGER datasets in the US which include the [US Census 5-digit Zip Code Tabulation Areas](#) (different from actual zip codes). However, the contents of these are in Shapefiles and we have yet to find a method to view these, so we can't figure out which options we can filter by, and guessing and checking has had limited success, so we don't include a semi-implemented version in this submission.

Assumption 2: City Selection

For the first iteration of this project, we selected cities that we were familiar with (reasoning described in the previous section). However, for the final project, we will add additional cities, including some in China and Eastern Europe, as recommended by conversations with external experts (namely Prof. Perry who did his PhD in political science) who were familiar with regions/countries that had undergone rapid development and thus might give us interesting results.

Assumption 3: Satellite vs Terrain Images

In this assignment we use the Landsat dataset which offers satellite images. We use a variety of Landsat datasets including Landsat 5 (1984-2012), Landsat 7 (1999-2022) and Landsat 8 (2013-2022), giving us access to results from 1984 to present day. We chose to use the Landsat satellite imagery because it provides better spatial resolution (compared to MODIS, an alternative, which provides better temporal resolution). However, as we are interested in the detail of cities, spatial resolution is critical for our project and thus Landsat was the best choice.