Group 4

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GIS Final Project: Stage of Development Index

Main Goal:

Our goal is to take variables that are not inherently geospatial to better understand a country's stage of development and how this relates to their impact on nature and the environment. We hope to rank countries according to their performance in our areas of interest: Education, Population, and Environment.

Background:

The world's consumption is vastly asymmetrical. According to the IPPCC, 50% of carbon emissions come from activities from 10% of the world's population. Traditionally, economic progress and indicators such as Gross Domestic Product (GDP) have been used to determine the "best" countries. We hope to take measurements that are not usually involved in this ranking of countries, especially those that can measure quality of life and sustainability, and use them to create an index more indicative of a country's status in the face of global environmental issues like climate change.

Scope and Characteristics of the Study Area:

Because we hope to rank the countries of the world, the scope of our project is global in nature. However, when attempting to create an index for every country, our access is limited. While we hoped to include data for every country, that is not always available to us due to the

specific nature of individual countries, the statistic format in which we are able to access the data, or the flat out absence or inaccuracy of certain data we obtained.

Methodology:

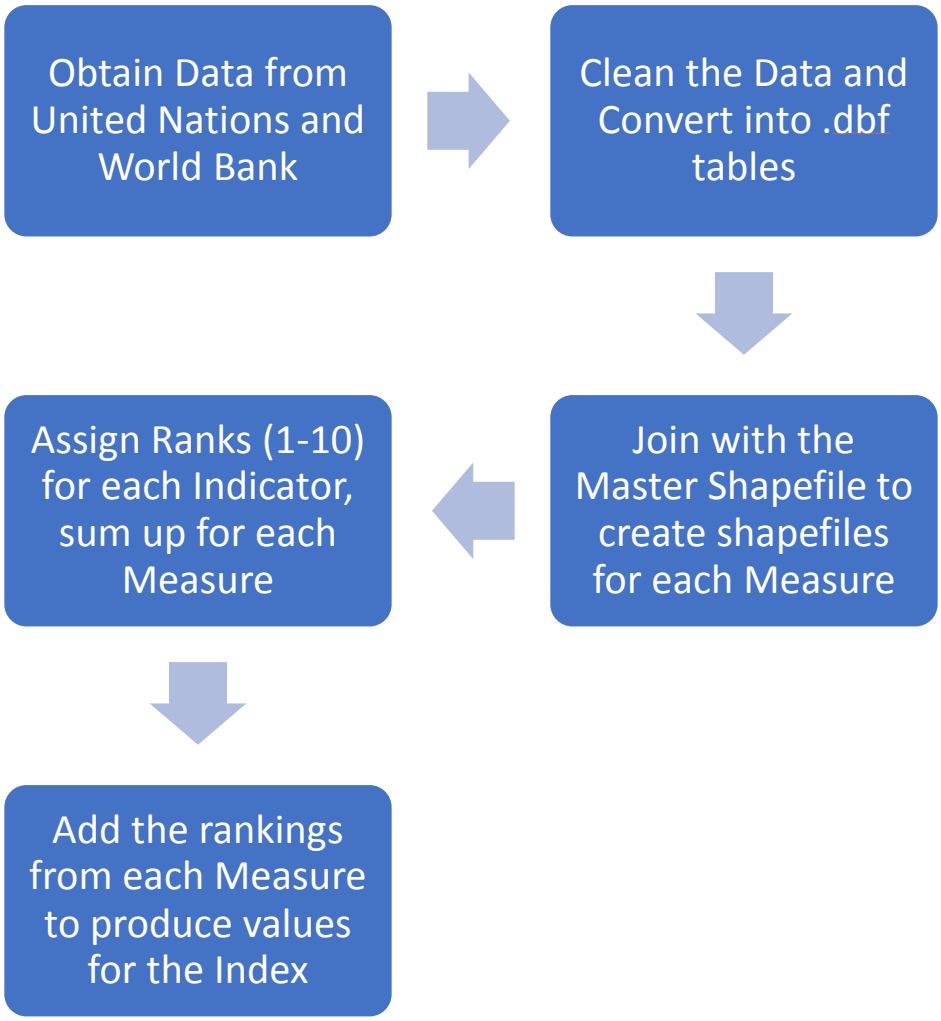


Figure 1: GIS methodology flow chart

Elaborating upon the flowchart shown above, the scope of our project was as follows: we obtained statistics for three main subgroups: population, education, and environment. We took into account several sets of statistics, or *indicators* playing into how well a country fares in that measure. Once we obtained those, based on the nature of the scale of the numbers, we assigned a

ten-level ranking system and gave each country a score of one to ten. For example, if a particular indicator provided data in percentages (with higher percentages inherently better, such as percentage access to clean drinking water), we scaled the ranking system so that a score of one was given to countries with statistics in the 0.1% - 10% range, a score of two was given to countries with statistics in the 10.1% - 20% range, and so on and so forth until all the countries were scored into ten ranks. This was done for every single indicator and the individual scores for each subgroup were calculated, as well as the overall score and a color gradient ArcGIS map for every subgroup (all of which are shown in the following pages). The color gradient map (and the ten-rank weighted average system) was formulated using the classification tool within ArcMap.

For the population subgroup, these are the indicators that were used:

- life expectancy
- infant mortality rate
- poverty ratio
- income held by the lowest 20% of the population
- mortality rate per 1000 people aged 15-60

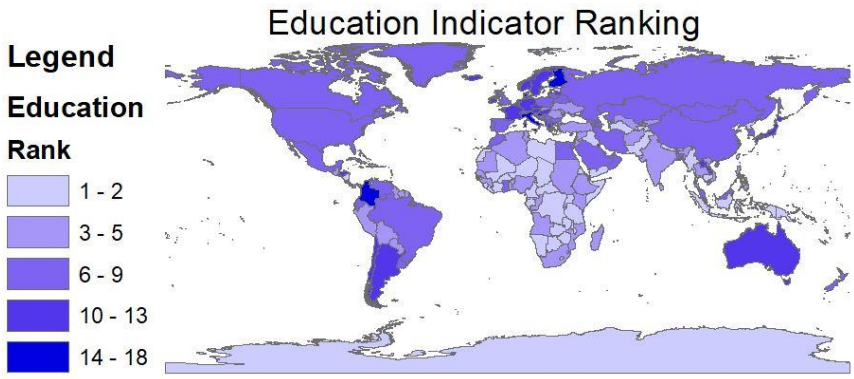
For the environment subgroup, these are the indicators that were used:

- percentage of forested land
- percentage of renewable energy
- total energy produced
- CO_2 produced
- percentage access to clean drinking water

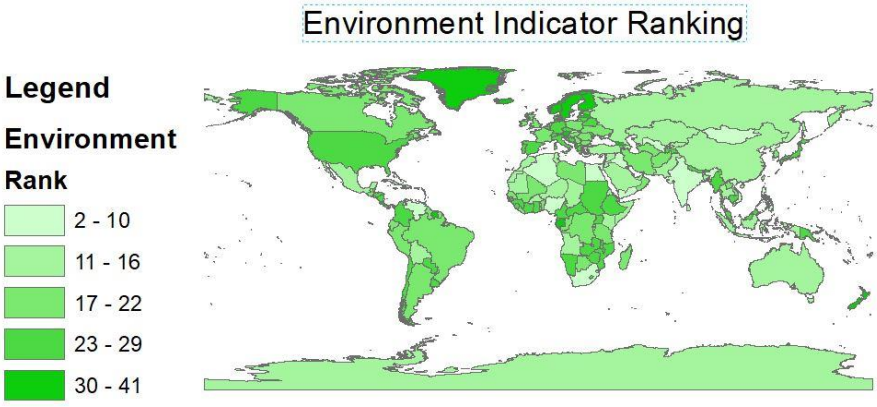
For the education subgroup, these are the indicators that were used:

- students enrolled in higher education
- internet access

Results and Discussions: The maps created are shown below.



- Highest Ranking Countries
  - Italy - 16
  - Denmark - 14
  - Finland - 14
  - Australia - 13
- Lowest Ranking Countries
  - Cambodia - 1
  - Democratic Republic of the Congo - 3
  - Chad - 1
  - Central African Republic – 1

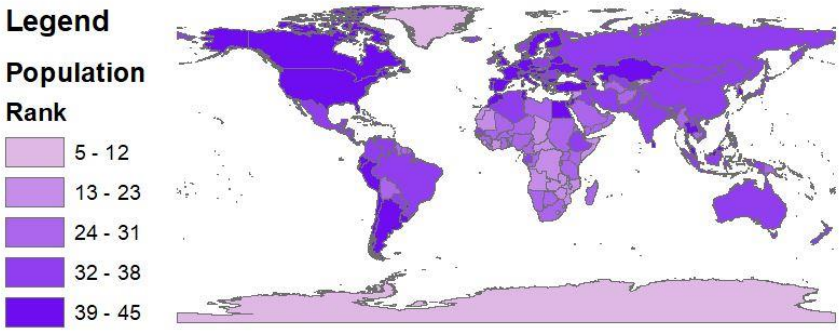


- Highest Ranking Countries
  - Iceland - 41

- Costa Rica → BIAS? - 39
- Slovenia - 37
- Latvia - 36

- Lowest Ranking Countries
  - Egypt → BIAS? - 3
  - Yemen - 3
  - Slovakia – 7

Population Indicator Ranking



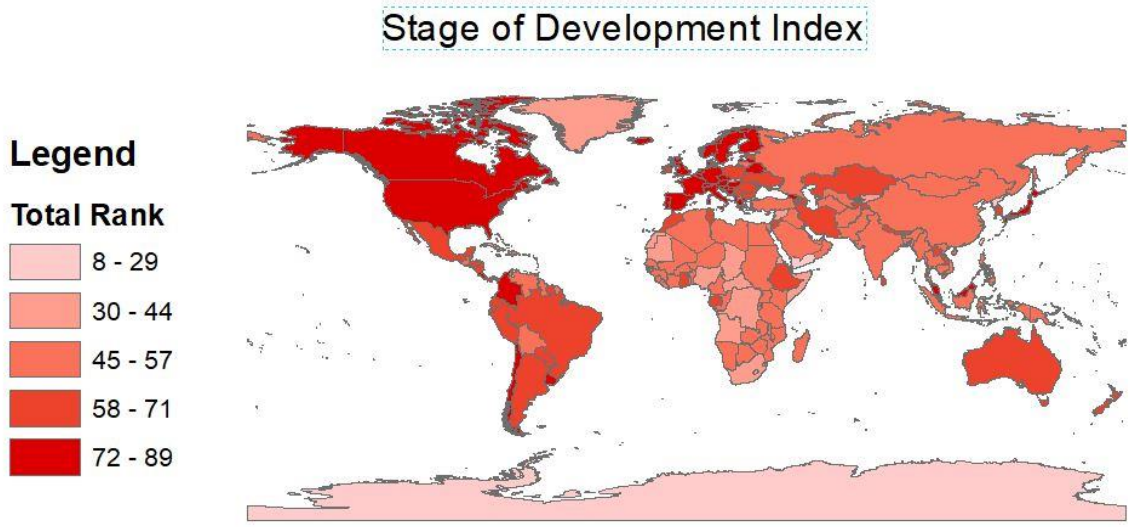
Highest Ranking Countries:

- Canada - 45
- Czech Republic - 45
- Sweden - 45

- Lowest Ranking Countries
  - Swaziland - 16
  - Democratic Republic of the Congo - 17
  - Central African Republic - 17

Somalia – 17

Conclusions:



- Top Countries:
  - Finland - 89
  - Iceland - 89
  - Sweden - 87
- Lowest Ranking Countries
  - Taiwan - 19
  - Hong Kong - 26
  - Yemen – 29

As you can see from the map, many countries that did well on our world development index are clustered together. These countries seem to share similar political views and make an effort to be more environmentally conscious in their policies and business practices.

Final Rankings:

1. Finland - 89
2. Iceland - 89
3. Sweden - 87
4. Albania - 86
5. Costa Rica - 85

6. Austria - 85
7. Croatia - 85
8. Denmark - 84
9. Italy - 83
10. Montenegro - 83

In the end, the results were on par with many other world development indicis. We attempted to relate a country's level of development to its environmental impact. We found that those countries with environmental policies, better education, and a higher quality of life scored higher on our stage of development index. Those countries who had no forests, lacked emphasis on the use of renewable energy and had higher mortality rates showed to be lower on our development index with greater negative effects on the environment.

None of these countries either created or solved these issues overnight but have been the consequences, both positive and negative, of hundreds of years of human development. If we want to continue to make the world a better place, we might need to start looking back at the past to better understand how these problems came about in the first place in order to help find answers for our future generations.