

Environmental Impact by Country

Introduction

With sea levels rising, crop patterns shifting, and our planet warming, it is becoming increasingly clear with each coming year how our activity on this planet affects the environment and its fragile ecosystems. A monumental increase in industrial activity coupled with an absence of accountability starting with the industrial revolution has led to morbid conclusions from the scientific community should we continue on our current path of consumption. Policy change that requires global cooperation has not followed this same trajectory as nations struggle to agree even on issues we are able to quantify, namely greenhouse gas emission limitations. This failure, though not entirely, can be somewhat attributed to global expectations of state sovereignty, which limit the power of any supranational organization hoping to mitigate anthropogenic effects on the environment. Setting global politics aside though, nations are responsible for the health of their own environments and should be judged by how they treat them, not by how successfully they can impose restrictions on others. I created the T-SSAW index to illustrate this sort of behavior for

each country over the last two decades. The scale ranks countries and incorporates their influence on the quality of their air, water, and soil, as well as the extent of deforestation and health of native plant and animal populations.

T-SSAW Index

A T-SSAW is a number between 10 and 50 assigned to each nation that measures the anthropogenic impact on the environment relative to the rest of the world over the last two decades. The index is an attempt to capture measurable human induced changes for a number of natural resources. The areas of concern include air, soil, water, forests, plants, and animals, all invaluable components of the environment that are of paramount importance to the health and well-being of the planet.

Air Quality

Anthropogenic impact on the quality of our air is measured in total greenhouse gas emissions from 1995 to 2005. Due to the fluid nature of the air we breathe, pollution is not confined to a country's borders. We all feel the effects of a depleted ozone layer and consequently, nations are given a score based on their contribution to the total GHG emissions over that period of time. This number is weighted slightly

more than other categories as air pollution constitutes one of our most pressing concerns.

Water Quality and Deforestation

A secure supply of clean drinking water is a basic human right, yet is one that eludes too much of our population. Impact on the quality of water is measured by the total volume of freshwater consumed or polluted within a country's borders, normalized by the area of that nation between 1995 and 2005. Similar to the air quality score component, this piece of the T-SSAW score is weighted slightly more to account for the current and predicted importance of clean water in the years to come.

The protection of our forests has been an ongoing point of contention between the global North and South as less

developed nations have begun to harvest and exploit those resources more aggressively, a behavior they argue paved the way to fast economic growth for the

North. Regardless, our forests represent a major carbon sink and are home to many of the world's biodiversity hotspots. Their importance cannot be overlooked which is why a score is given to each nation for their fractional forest cover change between 1990 and 2000.

Soil Degradation and Health of Species

Human induced soil degradation in the form of erosion and compromised quality can result in reduced crop output, poor water quality, and can be detrimental to native species. Part of the T-SSAW score is the mean level of degradation across a nation, a figure assessed by the United Nations on a regional basis between 1995 and 2005.

The health of native plant and animal populations is measured as the fraction of plants and animals that are listed as

biodiversity hotspots should translate to heightened awareness and stricter environmental regulations, not the increased exploitation of valuable biological resources. Plant and animal health are given separate scores but are weighted the same.

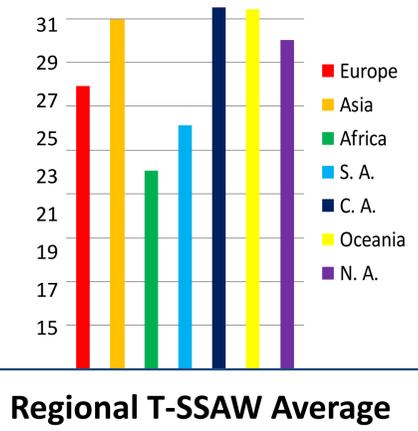
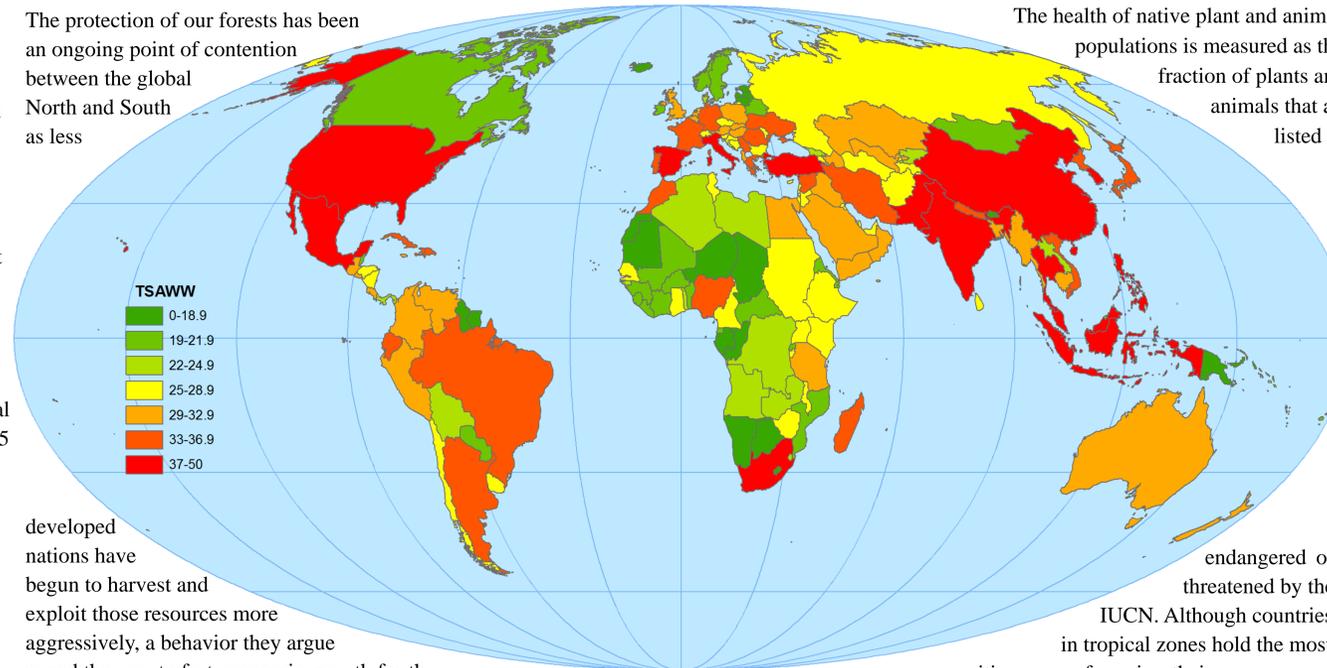
Results and Interpretation

It becomes apparent after studying the final T-SSAW index map and regional averages graph that there are clear geographic trends. There exists a large swath extending from the north of Australia to Western Europe that exhibits a high level of negative environmental impact. The continent of Africa appears to be have had the smallest impact over the last twenty years while the United States, China, India, and other industrialized nations constitute the most damaging end of the spectrum.

While these maps do show the relative impacts among nations, it is important to note that this index corresponds primarily to the last two decades. The extent of deforestation would change considerably if historical forest boundaries were considered just as the measure for soil degradation would. The prioritization of environmental health over the last twenty years has been more common in developed nations and as a result these environmentally conscious states may receive scores not necessarily indicative of their past. The motive behind ranking countries based on environmental harm is not to explain their history though. The goal is to bring to light the treatment of our planet in lieu of an increasingly large and available database of scientific research; a wealth of information documenting the imminent and impending repercussions our activity has. The T-SSAW score reflects how individual nations have responded to this new understanding and should be used to identify where policy change is needed most.

Extensions

Additional variables could be added to this index to incorporate environmental policy changes as well as more local environmental health measures to illustrate impact on a local or regional level.



| Rank | Country | Score |
|------|----------------|-------|
| 177 | Western Sahara | 11.5 |
| 176 | Estonia | 14 |
| 175 | Iceland | 15 |
| 174 | Suriname | 16 |
| 173 | Niger | 16 |
| 172 | Congo | 16 |
| 169 | Namibia | 16.5 |
| 167 | Bhutan | 17.5 |
| 165 | Botswana | 17.5 |

| Rank | Country | Score |
|------|---------------|-------|
| 1. | India | 43 |
| 2. | Indonesia | 42 |
| 3. | Philippines | 41 |
| 4. | Thailand | 41 |
| 5. | South Africa | 39.5 |
| 6. | Mexico | 39 |
| 7. | Spain | 38.5 |
| 8. | Turkey | 38.5 |
| 9. | United States | 38.5 |

