Title: Maps comparing SVI for Household, Racial/Minority, SES, & Housing/Transportation factors in Arizona

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Overview

The Center of Disease Control (CDC) Social Vulnerability Index (SVI) is a measure of the relative vulnerability of populations to the impact of environmental hazards such as natural disasters or infectious disease outbreaks. We will explore the relationship between ***Household, Racial/Minority, Socioeconomic (SES), and Housing/Transportation SVI*** using geographic information system (GIS) tools from the Arizona Department of Health Services (ADHS) annual SVI calculations. The ADHS is derived as a replicate method of every two year CDC SVI calculations. The ADHS SVI data is published on the AZGeo data platform (https://azgeo-open-data-agic.hub.arcgis.com/) supported by the Arizona Geographic Information Council (AGIC) and Arizona State Land Department.

Socioeconomic Status (SES) and SVI THEME 1

Socioeconomic Status is a strong predictor of vulnerability to environmental hazards. The SVI variables and calculation methodology are listed below:

RPL_THEME1: Socioeconomic Status (SES)

1. Percent below poverty (PBPO)
2. Percent unemployed (PUNEMP)
3. Percent without a high school diploma (PLT_HSDP)
4. Percent aged 65 and older (PA65UP)

Formula for RPL_THEME1:

1. Assign a standardized score (z-score) to each of the four variables using the mean and standard deviation of the variable at the national level.
2. Average the four standardized scores to get the SES composite score.
3. Rank each census tracts SES composite score from highest to lowest.
4. Divide the rank of each census tract by the total number of census tracts in the county to get the percentile rank.
5. Multiply the percentile rank by 100 to get the final RPL_THEME1 value.

Household Characteristics and SVI THEME 2

Household characteristics and disability is a strong predictor of vulnerability to environmental hazards. The SVI variables and calculation methodology are listed below.

RPL_THEME2: Household Composition & Disability

1. Percent single-parent households (PSNGPNT)
2. Percent households with persons aged 65 and over (PH65UP)

3. Percent households with persons aged 17 and under and living below poverty (PHU18P)

Formula for RPL_THEME2:

1. Assign a standardized score (z-score) to each of the three variables using the mean and standard deviation of the variable at the national level.
2. Average the three standardized scores to get the household composition & disability composite score.
3. Rank each census tract's composite score from highest to lowest.
4. Divide the rank of each census tract by the total number of census tracts in the county to get the percentile rank.
5. Multiply the percentile rank by 100 to get the final RPL_THEME2 value.

Minority Status/Language and SVI THEME 3

Minority Status & Language is a strong predictor of vulnerability to environmental hazards. The SVI variables and calculation methodology are listed below.

RPL_THEME3: Minority Status & Language

1. Percent minority (PMINORITY)
2. Percent households where no one over age 14 speaks English only or speaks English "very well" (PNOENGL)

Formula for RPL_THEME3:

1. Assign a standardized score (z-score) to each of the two variables using the mean and standard deviation of the variable at the national level.
2. Average the two standardized scores to get the minority status & language composite score.
3. Rank each census tract's composite score from highest to lowest.
4. Divide the rank of each census tract by the total number of census tracts in the county to get the percentile rank.
5. Multiply the percentile rank by 100 to get the final RPL_THEME3 value.

Housing Type/Transportation and SVI THEME 4

In addition to socioeconomic status, housing type and transportation have also been found to be strong predictors of vulnerability to environmental hazards.

RPL_THEME4: Housing Type & Transportation

1. Percent occupied housing units that are mobile homes (PMOBILE)
2. Percent households without a vehicle available (PNOVEH)

Formula for RPL_THEME4:

1. Assign a standardized score (z-score) to each of the two variables using the mean and standard deviation of the variable at the national level.
2. Average the two standardized scores to get the housing type & transportation composite score.
3. Rank each census tract's composite score from highest to lowest.

4. Divide the rank of each census tract by the total number of census tracts in the county to get the percentile rank.
5. Multiply the percentile rank by 100 to get the final RPL_THEME4 value.

Mapping Social Vulnerability Indices (SVI) in Arizona

Arizona, like many other states, uses the CDC Social Vulnerability Index (SVI) to help identify communities that may be more vulnerable during emergencies and to help guide resource allocation and emergency preparedness efforts. For example, during the COVID-19 pandemic, the SVI was used to identify communities with higher rates of poverty, limited access to healthcare, and other factors that put them at greater risk for infection and severe illness. This information helped guide the distribution of vaccines and other resources to those communities.

In addition to emergency preparedness and response, the SVI is also used in Arizona to inform public health interventions and programs aimed at reducing health disparities and promoting health equity. For example, the SVI can help identify communities that may have higher rates of chronic disease or limited access to healthy foods and other resources, which can inform efforts to improve access to healthcare, healthy food, and other resources.

The map visualizations looking at the 4 major SVI indices show that there are differences in county ranking based on the different SVI calculated indices. When correlating health conditions with social vulnerability measures, individual measures and different aggregates will likely need to be assessed individually with smaller geographic tracts to best understand appropriate study and interventions for health conditions and disease.