Title: Maps Ranking of SES and Housing Type/Transportation SVI in Arizona Tracts

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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* **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 SVI 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

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.

Housing Type/Transportation and SVI

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 Socioeconomic Status and Housing Type/Transportation with SVI

Mapping of SES SVI percentile ranking with Housing/Transportation percentile ranking shows some visual discordance. In Arizona, there may be a relationship between the SES SVI and the HT SVI in certain tracts. For example, tracts with low SES may also have poor housing and transportation infrastructure. In these areas, residents may have limited access to affordable housing, reliable transportation, and healthcare services, making them more vulnerable to disasters. In addition, residents may have limited resources to prepare for disasters or to recover from the impacts of disasters. However, it's important to note that not all areas with low SES will necessarily have poor housing and transportation infrastructure, and vice versa. Some areas may have high SES but still lack adequate housing and transportation infrastructure, while other areas may have adequate housing and transportation infrastructure but still be vulnerable due to other factors such as environmental hazards or social isolation.