When Growth Displaces: Migration and Indigenous Decline in Yucatán

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Abstract

This report summarizes an exploratory analysis of demographic and housing changes in the state of Yucatán, Mexico, using 2010 and 2020 census data from INEGI. We investigate how internal migration, particularly from other Mexican states, may be associated with declines in the Indigenous population across municipalities. The study employs R for preprocessing, spatial mapping, and correlation analysis, revealing a moderate but statistically significant negative association between in-migration and Indigenous presence in urban areas.

INEGI and the Data

The **Instituto Nacional de Estadística y Geografía (INEGI)** is Mexico's official statistical agency, responsible for conducting national censuses, including population, economic, and geographic data. We used:

- `https://www.inegi.org.mx/programas/ccpv/2010/` – 2010 Census
- `https://www.inegi.org.mx/programas/ccpv/2020/` – 2020 Census
- `yucatan.geojson` – Municipality shapefile

Code and data cleaning scripts are publicly available at: `https://github.com/erne2086/analyzing_merida_data`

Methodology and Code Overview

Data were read into R using `read.csv()` with UTF-8 encoding. Municipality-level entries were isolated using:

```
filter(MUN != 0 & LOC == 0)
```

Key operations included:

- **Merging datasets**: 2010 and 2020 data were merged using `left_join()` on the `MUN` column.
- **Derived variables** included:
  - **Total Population Change**
  - **Change in Population Born in Other States**
  - **Change in Indigenous Language Speakers**
  - **Housing Pressure**: ratio of total population to inhabited private units
- **Normalization**: To compare municipalities with vastly different scales, we used Z-score normalization:

$$Z = \frac{x - \mu}{\sigma}$$

  via `scale()` on both migration and Indigenous change columns.
- **Mapping**: We read the shapefile using `sf::st_read()` and joined it to census data. Maps were created with `ggplot2::geom_sf()`.

Statistical Analysis

To explore potential displacement:

- We created a scatter plot comparing normalized migration increase and Indigenous population change.
- We ran `cor.test()` for Pearson correlation:

Results:

- $r = -0.403$ (moderate negative correlation)
- $p < 0.001$ (highly significant)
- 95% CI: [–0.55, –0.23]

This supports the hypothesis that areas with high in-migration tend to experience reductions in Indigenous populations.

Key Results

- Indigenous population declined in urban municipalities, especially Mérida.
- Housing pressure unexpectedly decreased — possibly due to smaller, wealthier households or underused seasonal housing.
- Migration from other states is significantly linked to Indigenous population decline.

Figures

Figure 1: Choropleth of Total Population Change (2010–2020)

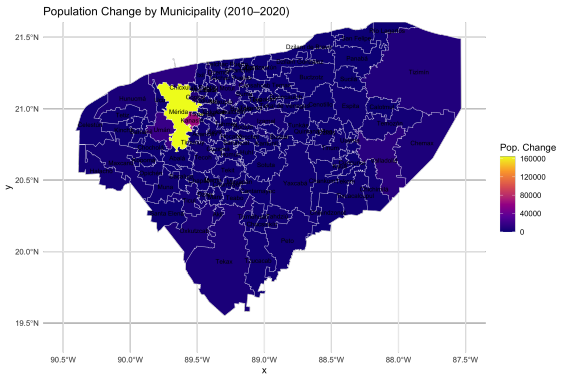
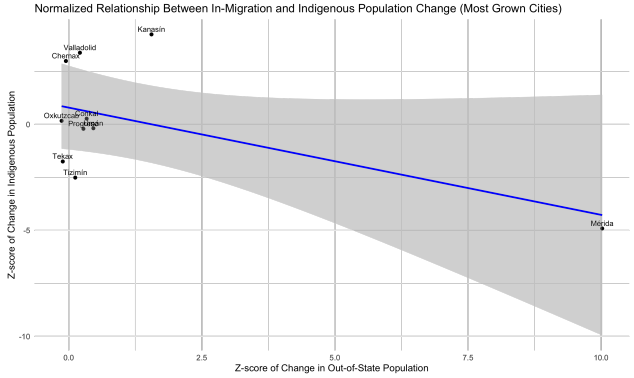


Figure 2: Scatter plot of Out-of-State Migration vs. Indigenous Change (Z-scores)



Conclusion and Next Steps

This study demonstrates a quantifiable link between internal migration and the reduction of Indigenous population in rapidly urbanizing municipalities.

- Further investigation is needed on service access and quality-of-life outcomes.
- Microdata and qualitative surveys could help validate the observed trends.
- Housing market data (e.g., second homes, rental platforms) may explain lower housing pressure despite rapid population growth.