Mapping the Distribution of Climate Displacement in Brazil

SCHOOL OF PUBLIC HEALTH

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Background

Climate displacement: forced movement away from a habitual residence because of extreme weather

In May 2024, Brazil experienced its **largest climate displacement event** in its recorded history.

Goal

Understand the **spatial distribution of climate displacement in Brazil**, to identify areas in Brazil where emergency responders and health professionals can target resources.

Importance to Public Health

Displaced populations are **more vulnerable** to adverse health outcomes.

Targeted climate adaptation can prevent displacement in communities across Brazil.

Objectives

Understand the scope of climate displacement risk in Brazil due to **floods, droughts, and storms**

Identify areas where **displacement risk is highest and determine where resources are needed**

Methods

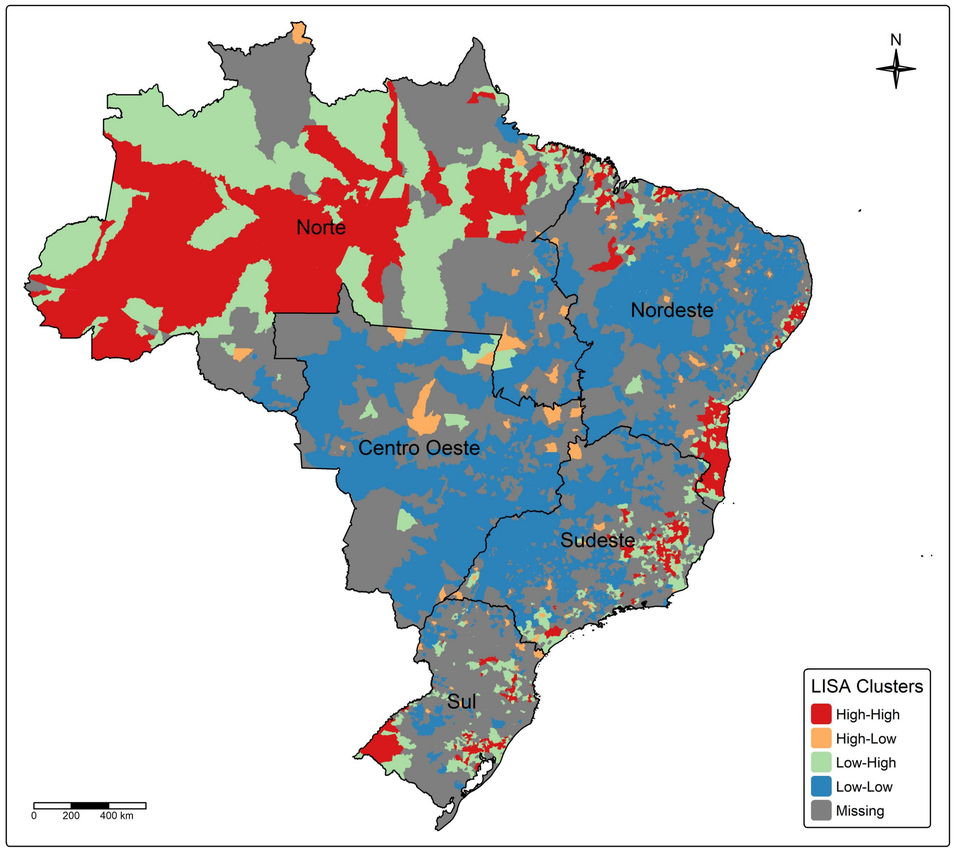
Brazilian National Disaster Database contains records of extreme precipitation events from January 2013 to December 2025.

Displacement Risk = *(Number of displaced people/population at the time of the disaster) *100,000*

Conducted spatial autocorrelation analysis of average displacement risk for municipalities in Brazil using both **Global and Local Moran's I methods** in R Studio.

There are significant clusters of *high displacement risk* in North, South, and Southeast Brazil.

Figure 1| Average Climate Displacement in Brazil by Region



Results

Global Moran's I = 0.1841 with p-value <0.0001

- Indicates significant, positive spatial correlation
- States with similar values are closer together

Hazard-Specific Global Moran's I Values:

- Flood = 0.179 ($p < 0.0001$)
- Storm = 0.1273 ($p < 0.0001$)
- Drought = 0.2483 ($p < 0.0001$)

Table 1| Climate Displacement Statistics for Brazil

Hazard	# Events	Displacement	Average Displacement Risk (per 100,000)
Drought	*30,965*	124,883	27
Flood	7,294	2,776,246	*1507*
Storm	11,258	*3,338,104*	1096
Overall	49,517	6,239,233	488

Table 2| Housing Damages as a Result of Climate Disasters

Hazard	Damaged Housing	Destroyed Housing	Total Value of Destroyed Housing (USD$)
Drought	142,682	280	43,171,840
Flood	921,426	33,348	1,675,788,902
Storm	*1,392,207*	*84,437*	*3,030,280,736*
Overall	2,456,315	118,065	4,749,241,478

Conclusions

There is significant spatial autocorrelation of average displacement risks among Brazilian municipalities.

Future research should investigate the drivers of displacement on the state-level especially in the North, South, and Southeast regions of Brazil.

Scan Here for more information!