Predicting Future Internal Migration Patterns Within the United States Resulting From Shifts in Temperature and Precipitation

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The annual migration of millions of people within or between countries can create resource strain, tighten job markets, and fuel political realignment. One factor that can play a role in shaping the movement of migrants is the environment, which will likely play an increasing role in the upcoming years due to climate change. In the United States, although significant shifts in temperature and precipitation are anticipated, research on internal U.S. climate migration still remains limited. Thus, this study first determined the contemporary relationships between temperature/precipitation and migration. Linear regressions and granger causality testing were conducted for every county in the continental United States. They demonstrated that temperature and precipitation play a county-dependent role in driving migration. Subsequently, a novel machine learning model was constructed for internal migration within the United States with features ranging from baseline factors like county land area to climate features like temperature and precipitation. The model proved to be highly accurate ($R2 > 0.85$) and feature analysis indicated that higher temperatures and decreased precipitation lead to decreased net-migration to an area. The resulting model was applied to future predictions of the U.S. climate to determine shifts in migration due to climate change. The model predicts significant reductions in net-migration to Texas and increases in net-migration to New York, Michigan, and Pennsylvania. In total, 5-year state-level migration flows are expected to shift by ~5.1 million to ~7.6 million people depending on the severity of climate change. Using the knowledge of where migrants will move, policymakers can implement the necessary policies to adapt to the shifts in population.

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