Modeling Climate Driven Migration in the United States

Annotated Bibliography

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Black, Richard, W. Neil Adger, Nigel W. Arnell, Stefan Dercon, Andrew Geddes, and David Thomas. 2011. "The Effect of Environmental Change on Human Migration." *Global Environmental Change*, Migration and Global Environmental Change – Review of Drivers of Migration, 21 (December): S3–11. https://doi.org/10.1016/j.gloenvcha.2011.10.001.

This article lays out a framework for conceptualizing the effect of climate change on migration by identifying five key types of drivers: economic, political, social, demographic, and environmental. The framework is highly interconnected and emphasizes that the felt effects of environmental changes are dependent on an individual's context. External barriers, such as legal systems and material costs, that could prevent drivers' translation into action are also included in the decision structure. The authors claim that their framework can be used for both international and internal migration, which means it could be applied to the United States.

Cattaneo, Cristina, and Giovanni Peri. 2016. "The Migration Response to Increasing Temperatures." *Journal of Development Economics* 122 (September): 127–46. https://doi.org/10.1016/j.jdeveco.2016.05.004.

This is one of the few papers with a fair amount of quantitative data. The authors looked at the effect of increased temperature on migration in 115 countries over 40 years (1960-2000). The countries, which were categorized as "poor" or "middle-income" experienced different trends: in "poor" countries higher temperatures reduced the probability of migration, while in "middle-income" countries higher temperatures were correlated with increased migration rates. For those with means, migration was an effective adaptation strategy; however, those without means were trapped. Though the trends identified were on a country-size scale, a similar pattern might emerge in the United States when modeling potential climate migration scenarios.

Fussell, Elizabeth, Lori M. Hunter, and Clark L. Gray. 2014. "Measuring the
Environmental Dimensions of Human Migration: The Demographer's Toolkit."
Global Environmental Change 28 (September): 182–91.
https://doi.org/10.1016/j.gloenvcha.2014.07.001.

This article not only reviews key studies that take seriously environmental drivers of
human migration, but also provides the reader with a "toolkit" of methods to measure/model
migration and its drivers. The authors talk about how to measure migration, sources of
migration data, how to combine demographic survey data with environmental data, and how to
simultaneously analyze environmental and population data. Though their case studies are
predominantly from the Global South, there is still much to be gained from this straightforward
review of environmental migration methodology.

McLeman, Robert, and B. Smit. 2006. "Migration as an Adaptation to Climate
Change." *Climatic Change* 76 (1): 31–53.
https://doi.org/10.1007/s10584-005-9000-7.

This is one of the earliest papers in the field of climate change migration. It is a
preliminary attempt at linking migration theory with the predicted environmental effects of
climate change. The authors look at two conceptual representations of vulnerability, which
relates to the varied responses different populations will have to a changing environment. They
then illustrate the iterative process of creating a conceptual model of migration as a response
to climate change, and ultimately test and tweak this model against historical data from a
period of drought in Oklahoma in the 1930's. Though a bit dated, this piece identifies the
prolific intersection of climate change modeling and migration theory and lays the foundation
for future models.

McLeman, Robert. 2018. "Thresholds in Climate Migration." *Population and
Environment* 39 (4): 319–38. https://doi.org/10.1007/s11111-017-0290-2.

This article takes as its starting point the variability in potential climate-driven migration
outcomes, proposing that this variability is due to the presence of 6 main thresholds within
climate migration that radically alter the system, and therefore the outcomes. These 6
thresholds, or tipping points, are as follows: "(1) adaptation becomes necessary; (2) adaptation
becomes ineffective; (3) changes in land use/livelihoods become necessary; (4) in situ

adaptation fails and migration ensues; (5) migration rates become non-linear; (6) migration rates cease to be non-linear." This is one of the more recent articles on climate migration, and these thresholds will be helpful when modeling potential non-linear surges of migration.

Piguet, Etienne. 2010. "Linking Climate Change, Environmental Degradation, and Migration: A Methodological Overview." *Wiley Interdisciplinary Reviews: Climate Change* 1 (4): 517–24. https://doi.org/10.1002/wcc.54.

This paper gives a detailed description and comparison of six common research methods for studying climate change migration: ecological inference based on area characteristics, individual sample surveys, time series, multilevel analysis, agent-based modeling, and qualitative/ethnographic methods. The authors suggest that the most effective way to study the climate-migration nexus would be a combination of the aforementioned methods for collection and analysis of future data. The analysis of these different methods will be helpful as I conceptualize what an accurate model of urban climate migration in the United States might look like.