Two-thirds of the world’s population (4.0 billion people) experience severe water scarcity for at least one month each year (Mekonnen and Hoekstra, 2016). The sixth Sustainable Development Goal is to ensure access to water and sanitation for all, a key component of which is to substantially reduce the number of people suffering from water scarcity (UN, 2015).

The development literature has demonstrated that water scarcity affects many key development outcomes, including crop productivity, deforestation, educational attainment, and manufacturing productivity (Damania et al, 2017). However, the implications of water scarcity on migration are not yet fully understood. In this paper, we test how international migration responds to water scarcity (as measured by low levels of rainfall) and temperature, and the extent to which investments in irrigation modulate these responses.

Our methodology is to run a series of cross-country regressions that incorporate decadal international migration data, decadal averages of temperature and rainfall, and country-level data on irrigation usage and income levels. Earlier related work has found evidence of a migration poverty trap: higher temperatures reduce agricultural yields, which in turn reduce outmigration in low-income countries (Cattaneo and Peri, 2016; Cai et al, 2016). Building on this work, our study finds that the migration poverty trap holds, but only for countries with low levels of irrigation, demonstrating a potential important protective role for irrigation investments in the context of migration.

We contribute to a growing literature on environmental migration, summarized by Millock (2015). Our primary scholarly contribution is being the first paper to integrate the analysis of irrigation into international migration research. As climate change accelerates, the combination of higher temperatures, more erratic rainfall, and excess groundwater withdrawals will all work together to exacerbate water scarcity. A key practical application of our study is to highlight that countries facing a double challenge (low levels of irrigation and also low income levels) will be hardest hit by this shift.

More broadly, our results on the role of irrigation water in modulating the climate–migration relationship, speak to the need of simultaneously considering multiple adaptive responses when analyzing environmental challenges faced in developing countries.