

Water Institutions and Agricultural Land–Use Change in the Western U.S.

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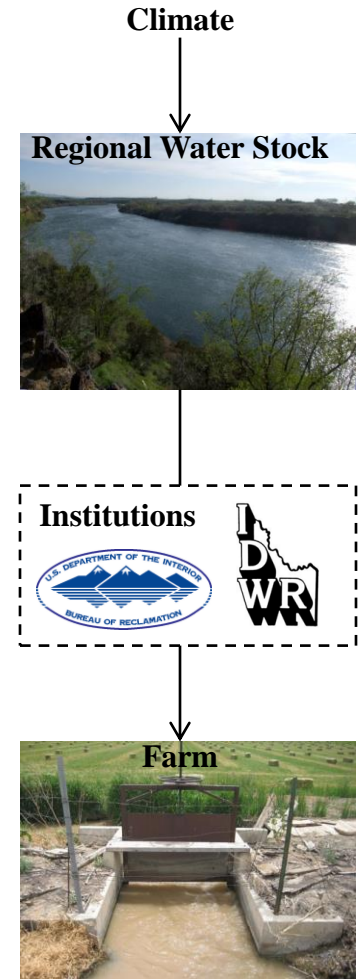
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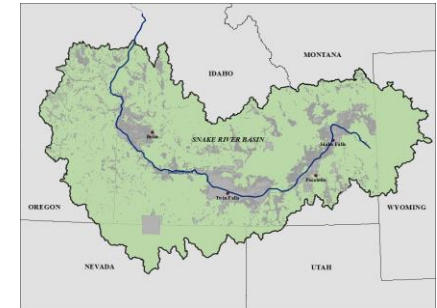
Introduction & Research Question

- How does climate change affect agricultural productivity? How do producers adapt? What are the implications for economic welfare?
 - Climate change alters the supply of water available for irrigation
 - Does not translate directly into changes in water available at the farm gate
- Water allocation institutions break the linkage between climate signals and water available at the farm
 - Institutions = storage rules and water rights
 - Increased water scarcity → pressure on institutions
 - Need for “robust and flexible water allocation systems” that facilitate adaptation, maintain productivity and welfare (FAO 2011)
- **Research Question:** How do water rights institutions influence agricultural decision-making in the face of climate-driven changes in water availability?

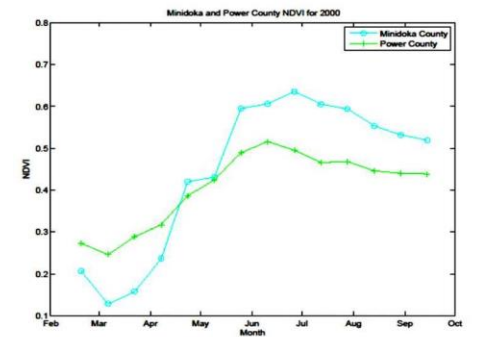
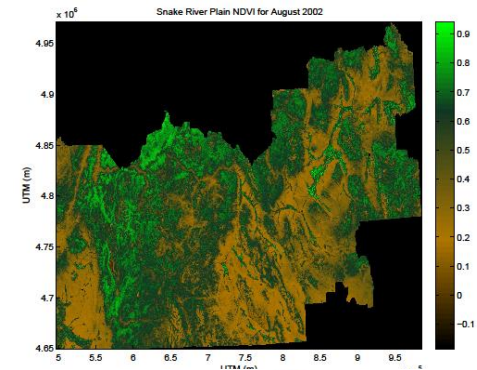


Project Overview

- Water allocation institutions
 - Create heterogeneity in water security
 - Influence land–use decisions
- Few empirical analyses to date
 - Requires data at spatial resolution of individual farms and a lengthy time series to capture changes in climate
 - We use MODIS and Landsat data to generate a time series of land–use on individual fields (irrigated/dryland production)
 - Dependent variable in an econometric model
 - We exploit spatial discontinuities across state lines and water rights boundaries to identify the effect of institutions on production
- Preliminary results
 - Producers with less stable water supply plant lower-value, drought-resilient crops
 - More pronounced effect for SW irrigators and large farms
 - Groundwater protects producers from uncertainty and redistributes economic welfare from oldest to newest farms



Study Region: Snake River Basin



MODIS data distinguishes irrigated from dryland agriculture; NDVI threshold to be applied to Landsat imagery