Comparison and Evolution of Water Institutions in the U.S. Midwest

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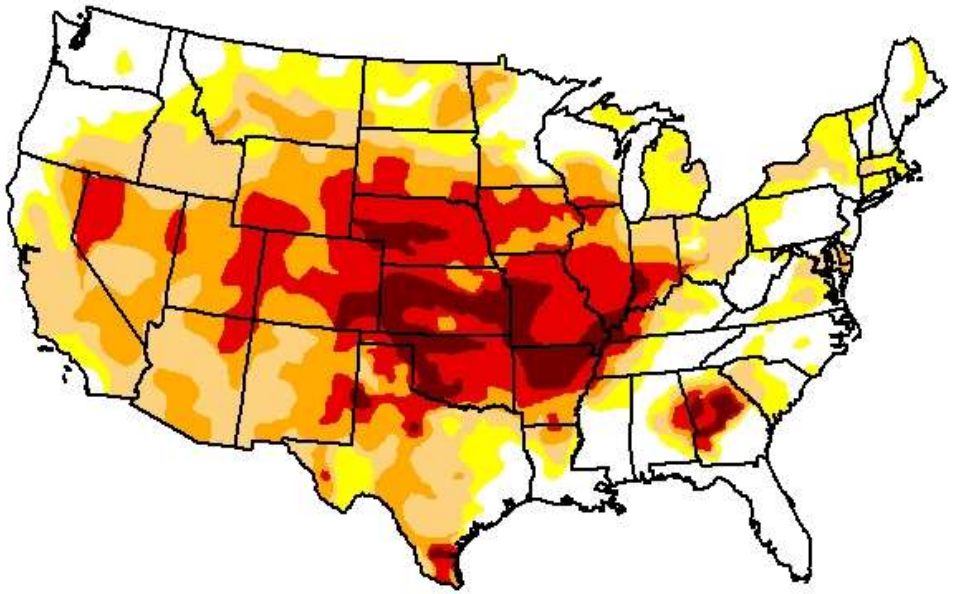
Motivation and background

- **Climate change and water scarcity**
  - Midwest -- hotter summers with longer dry periods and milder, wetter winters
  - Water withdrawals for farm irrigation will increase; reductions in agricultural production may reach 50%.
  - Midwest drought of 2012

U.S. Drought Monitor
CONUS



August 28, 2012

(Released Thursday, Aug. 30, 2012)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	22.31	77.69	62.89	42.34	23.18	6.04
Last Week 8/21/2012	22.72	77.28	63.20	44.03	23.01	6.31
3 Months Ago 5/29/2012	35.98	64.02	37.37	18.94	5.22	0.66
Start of Calendar Year 1/3/2012	50.41	49.59	31.90	18.83	10.18	3.32
Start of Water Year 9/27/2011	56.45	43.55	29.13	23.44	17.80	11.37
One Year Ago 8/30/2011	54.07	45.93	32.83	24.75	18.27	11.21

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

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http://droughtmonitor.unl.edu/

Motivation and background (cont.)

- **Common pool resources -- water**
  - 'Tragedy of the commons' (Garrett Hardin)
  - Resources that are non-excludable and rival are overused relative to an economically optimal allocation that maximizes welfare or even profits
  - This results in market failure
  - Example: depletion of the Ogallala aquifer that extends from N. Texas to S. South Dakota

Motivation and background (cont.)

- Water institutions “rules of the game”
  - Water law, policy and administration
- Property rights to water are one solution to overuse in U.S.
  - ✓ Riparian (based on English common law)
  - ✓ Prior appropriation (developed during the Gold Rush)
  - ✓ Regulated riparianism

Water management institutions in the literature

- **Adaptation to climate change**
  - Enhancement of adaptive capacity (van Vliet et al., 2013)
  - Polycentric governance (Ostrom, 2014)
  - (and technological change)
- **Institutional change**
  - ‘the central role of the state’ (public action)
  - ‘the scope for organized user management’ (collective action)
  - ‘larger role for market institutions’ (enabling private action)

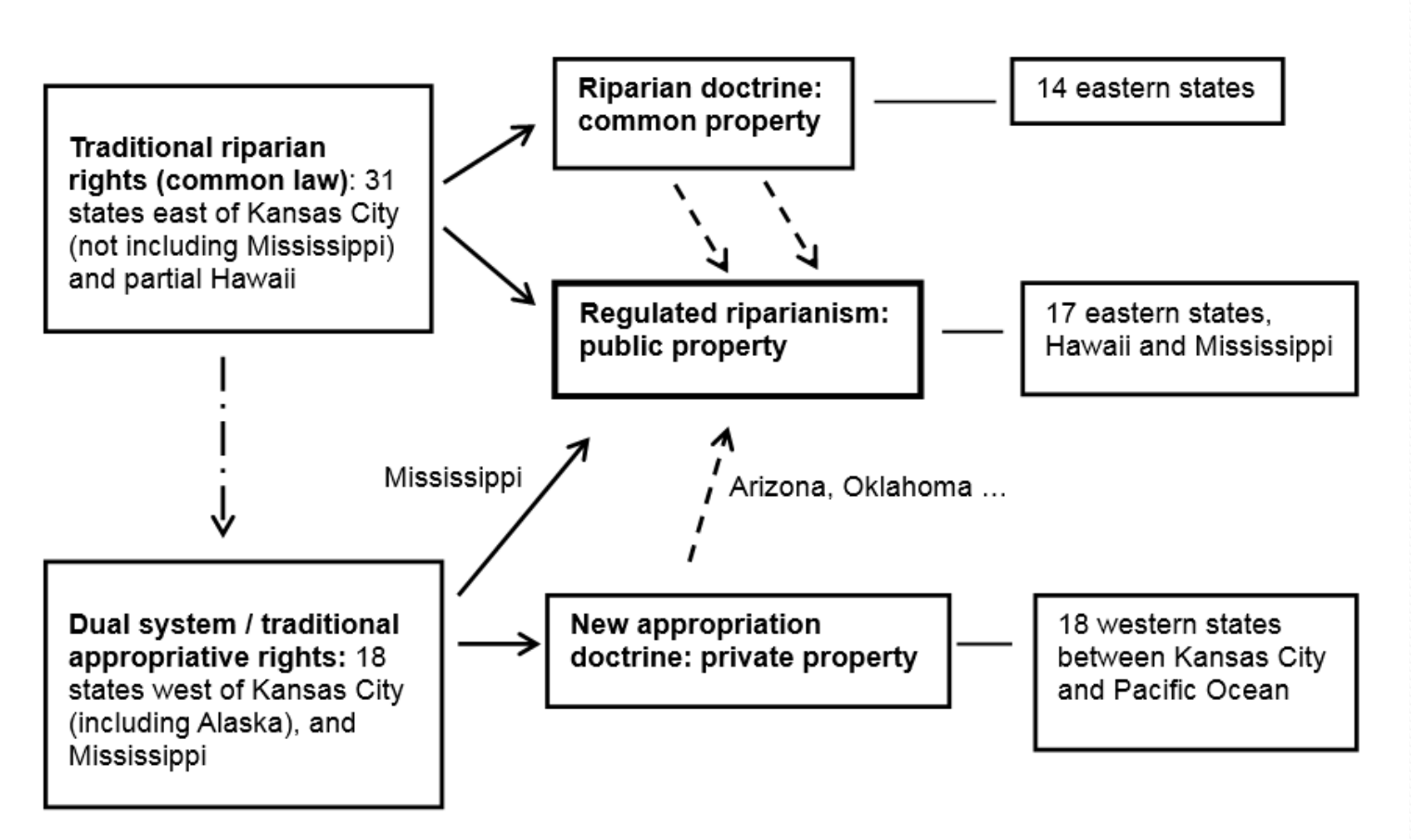
    (Meinzen-Dick, 2007)

Research objective

- To elaborate the differences and evolution of institutions in managing water resources in two Midwestern riparian states, i.e., Illinois and Missouri, through a comparison with Iowa, Kansas and Nebraska.

U.S. institutions for managing water resources

Evolution of water allocation rights in U.S.



Sources: Beck (2000), Dellapenna (1990, 1994, 2001, 2006, 2010, 2011), etc.

Comparison of water allocation rights/doctrines in U.S.

Allocation rights	Nature of right	Underlying rules	Midwest states
Riparian rights	Common property	Reasonable use	Illinois, Missouri
Regulated riparianism	Public property	Reasonable use with time-limited permits	Iowa, Wisconsin
Appropriative rights (prior appropriation)	Private property	Beneficial use, 'first in time, first in right', use it or lose it	Kansas, Nebraska (surface water)

Sources: Dellapenna (2006, 2011)

Comparison of water institutions and institutional changes in five Midwestern states

- Illinois
  - First restrictions in 1983
  - Illinois Dept. of Natural Resources created in 1995, has a Division of Water Resource Management
  - Permits required for groundwater withdrawals over 100,000 gpd,
  - Duration 5 years
- Missouri
  - First restrictions in 1983
  - Missouri Dept. of Natural Resources created in 1974
  - Permits required for water use exceeding 100,000 gpd
  - Duration 5 years

Comparison of water institutions in five Midwestern states (cont.)

- Iowa
  - Iowa Natural Resources Council created in 1949
  - First restrictions in 1957, permit system created for surface and groundwater
  - Council was a leader in floodplain management including approval of structures and excavation
  - Both quality and quantity issues are addressed
  - Iowa Dept. of Natural Resources created in 1986
  - Permits required for over 25,000 gpd
  - Duration 10 years

Comparison of water institutions in five Midwestern states (cont.)

- Kansas
  - Kansas State Agricultural Society became the Kansas Dept. of Agriculture in 1994 (water not under the EPA-like organization)
  - Permits required for any non-domestic uses, those issued after 1984 have to meet streamflow requirements
  - Duration 5 years
- Nebraska
  - Surface water managed since 1895
  - Nebraska Dept. of Natural Resources issues permits/appropriations for surface and groundwater
  - Since 1993, all wells drilled must be registered
  - Diversions limited to 1/70 cfs per acre for irrigation
  - Duration as long as a beneficial use

Conclusions and policy implications

- A switch from traditional riparian to regulated riparian doctrine in some eastern states (i.e., IA) indicates water is considered to be *public or state property* rather than common property.
- *Lower transaction costs* switching from traditional riparian to regulated riparian than to prior appropriation.
- *Path dependence* directs the evolution of water institutions and helps ensure new policy is a good fit with local, physical and cultural context.

Acknowledgements

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Questions & Comments ?