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Water Security and Adaptive Capacity in a Transboundary Context

Science-Policy Dialogues in the U.S.-Mexico Border Region

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Mileposts for today's talk



- What do we mean by “water security” and “adaptive capacity”?
- Enhancing adaptive capacity via science-policy dialogues in a transboundary context
- The U.S.-Mexico border region
- Transboundary asymmetries
- Mitigating and adapting to climate change via a water security network in the Americas

“Water security”

Working definitions

Water security = Availability of adequate quantities/qualities of water for societal needs & resilient ecosystems, in context of current & future global change.

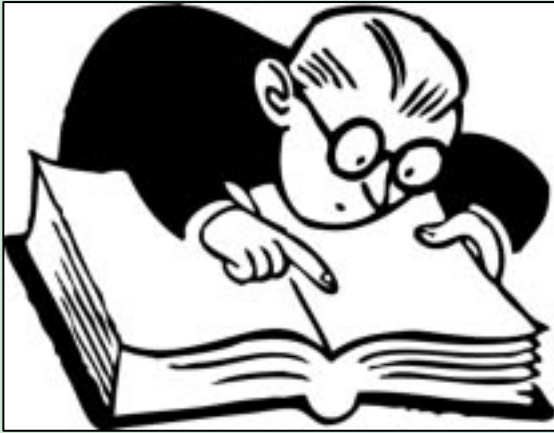
Scott, et al., 2013



Water security involves a shift away from balancing human needs with available water . . . toward state intervention to "securitize properties that water can provide, including hydration of human populations, irrigation of food crops, local climate regulation, and energy production."

Adapted from Staddon and James, 2014





“Adaptive capacity”

Working definition

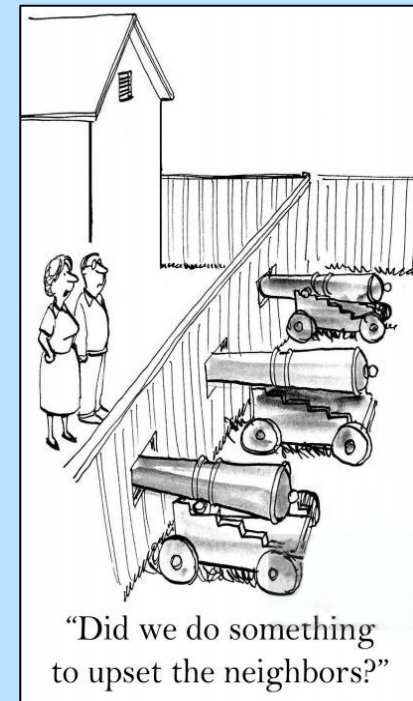
Adaptive capacity = Ability of a social or environmental system to:

- Respond to or recover from internal/external demands of environmental change
- Cope with consequences
- Engage in “social learning” leading to a desirable system state & reduced vulnerability

Wilder, et al., 2013

Ingredients of effective transboundary science-policy dialogues for climate mitigation & adaptation

- **Public participation** in decisionmaking by full range of stakeholders **from all Nexus sectors** (water, energy, food)
- Robust **communities of practice** that link policymakers, managers, scientists & social scientists from all bordering states
- Strong institutions, esp. **binational/multinational institutions**
- Recognition of interconnectedness & inseparability of **water management** and **climate mitigation & adaptation**
- **Trust** is needed for genuine transnational, transborder cooperation
- Access to **comparable data** & reliable **information flows**
- Significance of **governance** and **soft-path solutions**



Building a water security network in the arid Americas



Past and ongoing efforts, supported by



National Oceanic & Atmospheric Administration (NOAA)



National Science Foundation



Inter-American Institute for Global Change Research (IAI)

Water-climate-drought in U.S.-Mex. border area



AQUASEC: Ctr. of Excellence for Water Security



Water Security in the Americas

The International Water Security Network (IWSN)

IWSN partners

- University of the West of England
- Monash University/South Africa
- University of Arizona, Udall Center
 - AQUASEC (partner institutions)

Relationships & capacity-building

- Researcher-scientist networks
- Graduate (postgraduate) student involvement
- Stakeholder engagement & workshops
- Development of communities of practice

Research

- Regional/local projects & transboundary settings
- Development of water-security index
- Identification of hotspots



Background

Conditions in the U.S.-Mexico Border Region



- Western part is monsoon-dependent & water-short; frequent drought, occasional heavy flooding
- Traditional economy: cattle ranching, copper mining, irrigated agriculture
- Fragile ecosystems (riparian areas, wetlands, river delta, wildlife corridors, bird flyways, rare plant species)
- Rising populations
- Growing urbanization, industrialization

Background

Transboundary asymmetries

- Culture/language
- Economy
- Human resources
- Physical infrastructure (esp. for water)
- Strength & vitality of Nexus sectors (water, energy, food)
- Legal systems: Napoleonic vs. British
- Administration: federal vs. decentralized
- Regulation & enforcement
- Revenue-raising capacity
- Robustness of institutions & civil society
- In Mexico, border region is considered relatively prosperous; in the U.S., it's among the nation's poorest areas



Background of environmental research in the border region



State of border environmental-policy research, c. 1980-90

- Few studies, mostly technical/engineering
- New attention following the La Paz Treaty of 1983
- Formation of binational, thematic working groups via EPA and SEDUE
- Rise of environmental NGOs in U.S.
- Interest in binational copper-smelter-related air quality in late 1980s
- Strong support for community-oriented research by private foundations in U.S.: e.g., Ford, Hewlett, Mott, Pew



Background of environmental research in the border region (2)



Simultaneous emergence of global climate change as an issue

- First IPCC report, 1990: new awareness of changing climate and its potential effects
- Creation of U.S. Global Change Research Program in 1990
- Interest in NASA, NOAA, other US agencies; special programs on “human dimensions of climate change”
- Establishment of Inter-American Institute for Global Change Research (IAI) in 1997



Trajectory of water-climate research in the border region



Impact of North American Free Trade Agreement (1994)

- New institutions created to harmonize regulations, and to evaluate and fund environmental-infrastructure projects, esp. water
- New vigor among existing institutions engaging binational issues: Mexican natl. water authority, US federal & state agencies, binational water commission
- New consciousness in environmental decisionmaking: public participation by stakeholders, sustainability, transparency
- Advent of Integrated Water Resources Management (IWRM) and its adoption internationally
- Incorporation of these concepts in environmental-policy research

Influential new publications about border region

- On policy, governance, equity, conflict prevention & resolution, and “soft-path” approaches to development and water security



Trajectory of water-climate research in the border region (2)

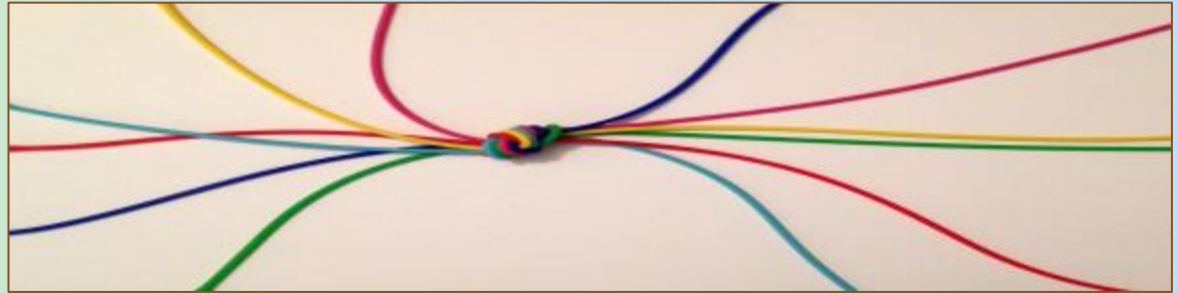


Joining of two research agendas and action agendas: water policy and climate information has led to:

- Acknowledgment of inter-relatedness of two topics
- A new consensus emerged about *how to* conduct water-climate research in the border region—involve decision-makers and policy makers in the definition of research questions and helping to define answers and solutions
- Recognition of the need to understand and distinguish between risk, vulnerability, mitigation, and adaptation
- Funding made available by U.S. agencies and international organizations
- Major, multi-year projects undertaken in partnerships at universities in U.S. & Mexico



What have been some common themes in research on water, climate, vulnerability, and adaptation?



- The essential role of institutions in water policy—esp. *binational* institutions, including the ones established as a result of the North American Free Trade Agreement and those that have been strengthened & energized since then.
- The importance of genuine binational, transborder cooperation built on *trust*
- The value of *public participation* by stakeholders in the decisionmaking process
- The vital significance of *information flows* and access to comparable data
- The critical role of *communities of practice* that include institutions on both sides of the border

Common themes 2



- The fundamental interconnectedness and inseparability of the water-climate nexus with the environment, the energy and food-production sectors, economic and demographic development, politics, and social fabric
- The need to apply thinking from *as many disciplines and perspectives as possible*
- The *added degree of complexity* of dealing with already-difficult problems in a *transborder setting* that exhibits major differences and asymmetries in culture, law, administration
- The centrality of *human agency* in changing the environment and in managing the resulting change

Changing institutions



- If regions and communities are to adapt to climate change and other environmental change, institutions also must be able to adapt
- Adaptive-capacity *measures* must therefore be able to *assess* whether, how, and at what rate institutional roles and practices are changing
 - Are these institutions using the best available data and research?
 - Are they well-connected to scientists and other researchers?
 - Are they employing current models, scenario-analysis technology?
 - Do they have necessary trained personnel?
 - Do they have sufficient flexibility and resilience in structure and management?
 - Do they seek and heed stakeholder input?

Changing institutions (2)



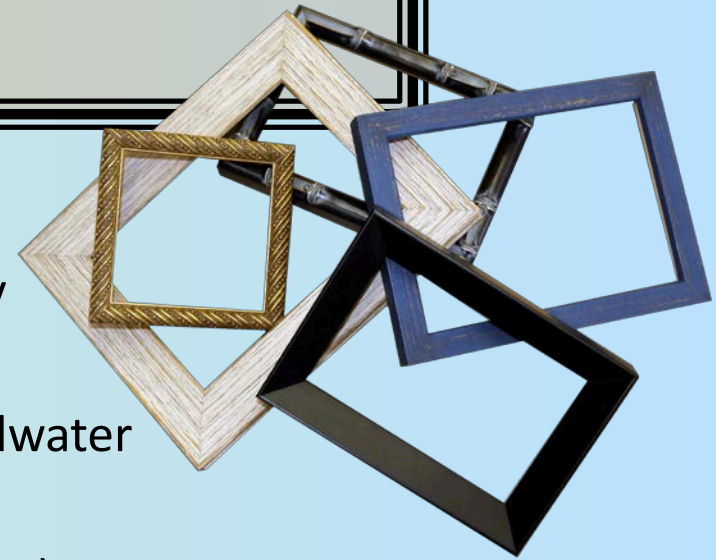
- Are they transparent?
- Are they financially viable?
- Are their procedures and policies sustainable?
- Are they backed by appropriate authority?
- Do they share best practices with other, related institutions?
- In short, are these institutions effective in adapting to climate change and other environmental forces?

A strategy for enhancing water security via adaptive capacity

Framing the problem

Key elements

- Scarcity & social vulnerability
- Rate of urbanization
- Degree of reliance on groundwater
- Ecosystem resilience
- Water-energy-food (and larger) Nexus
- Transboundary considerations
- Ability to measure adaptive capacity
- Inclusiveness of decisionmaking process



Some implications for Southern Africa from our Americas experience

- Ways to frame water security, adaptation, and adaptive capacity
- Techniques for identifying & engaging with key players (government, NGOs, private sector)
- Appreciation of complications of transjurisdictional & cross-border conditions
- Incorporating role of transboundary institutions
- Giving due consideration to resource-use dynamics and inter-connectedness of sectors
- Assessing, measuring, and enhancing security & capacity



Water Security and Adaptive Capacity in a Transboundary Context

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