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TRANSBOUNDARY WATER SECURITY IN THE ARID AMERICAS

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Transboundary waters

- Rivers that cross international (or state boundaries)
- Rivers that form borders
- Shared groundwater aquifers
- Mountain source-waters that traverse borders
- Water transfers
- Shared infrastructure
- Virtual water exports

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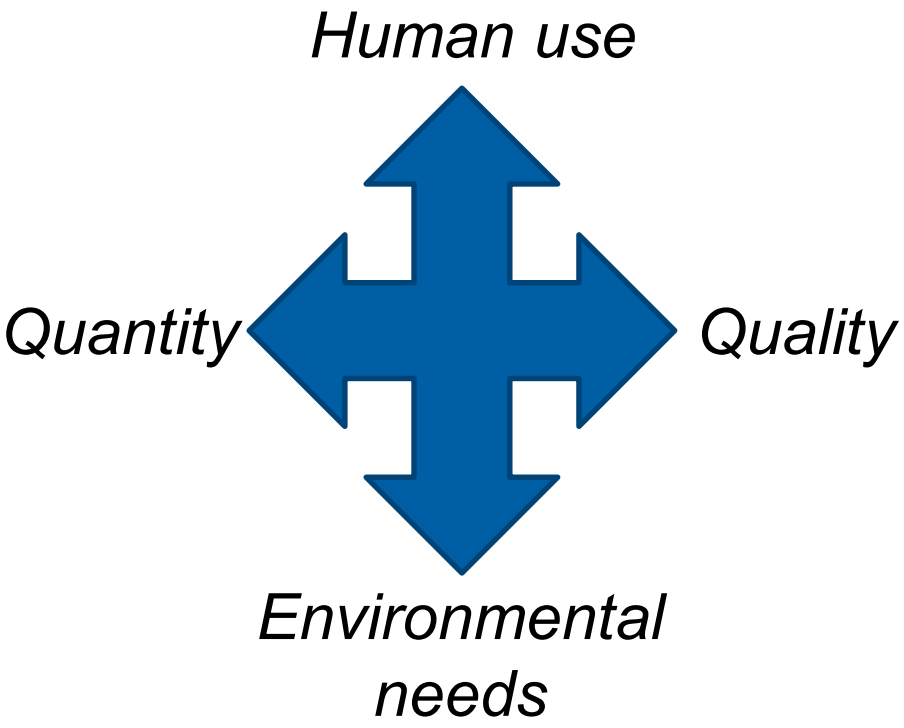
Water security is multidimensional



Definitions in the literature generally have *at least 6* attributes

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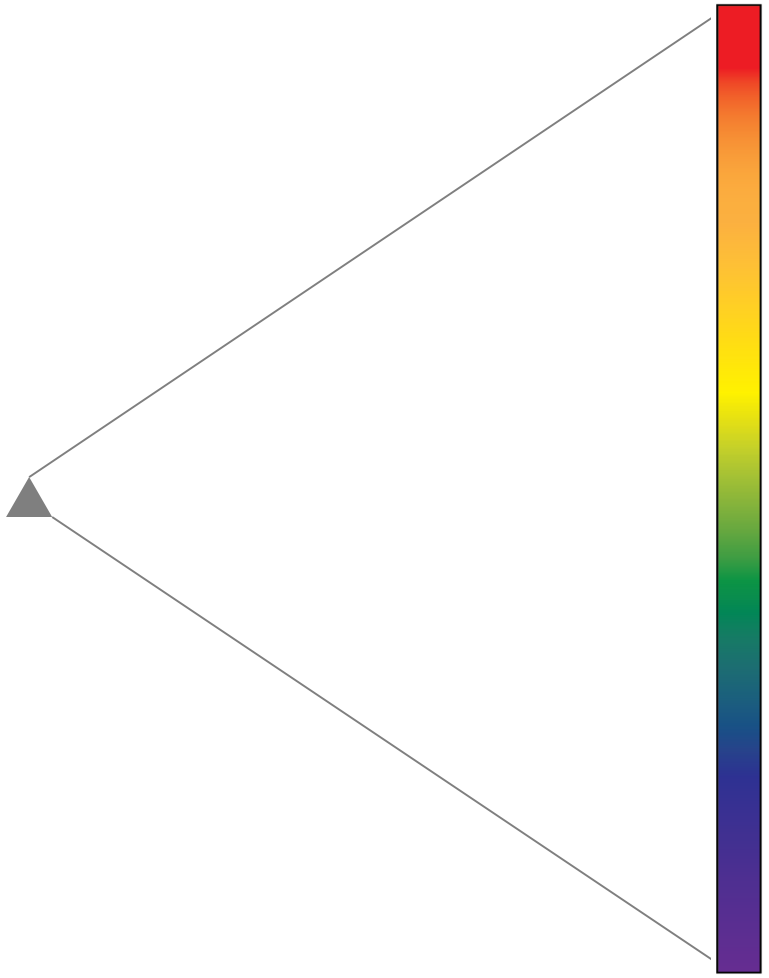
Water-security attributes



Physical	Quantity Quality Ecosystems Watersheds Global change
Human	Access Health/Well-being Economic growth Political stability Policy Livelihoods Sanitation Time/Reliability Preference Transport Industrial resources
Cross-cutting	Sustainability Risk/Hazards Resilience Uncertainty Food and energy resources

Sources: FAO 1996; GWP 2000; Grey & Sadoff 2007; UNEP 2009; Norman et al. 2010; Zeitoun 2011; Lautze & Manthrithilake 2012; Bakker 2012; OECD 2013; UNESCO 2013; UN-Water 2013; Scott et al. 2013; Jepson 2014; Wheater & Gober 2015; Gain et al. 2016. Adapted and revised from Gerlak et al. 2018.

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Water security is contextual…

…how do borders matter?

- Traverse continuous landscapes, ecosystems, habitats
- Border regions share languages and cultural traditions

…what institutional responses do we see in arid regions?

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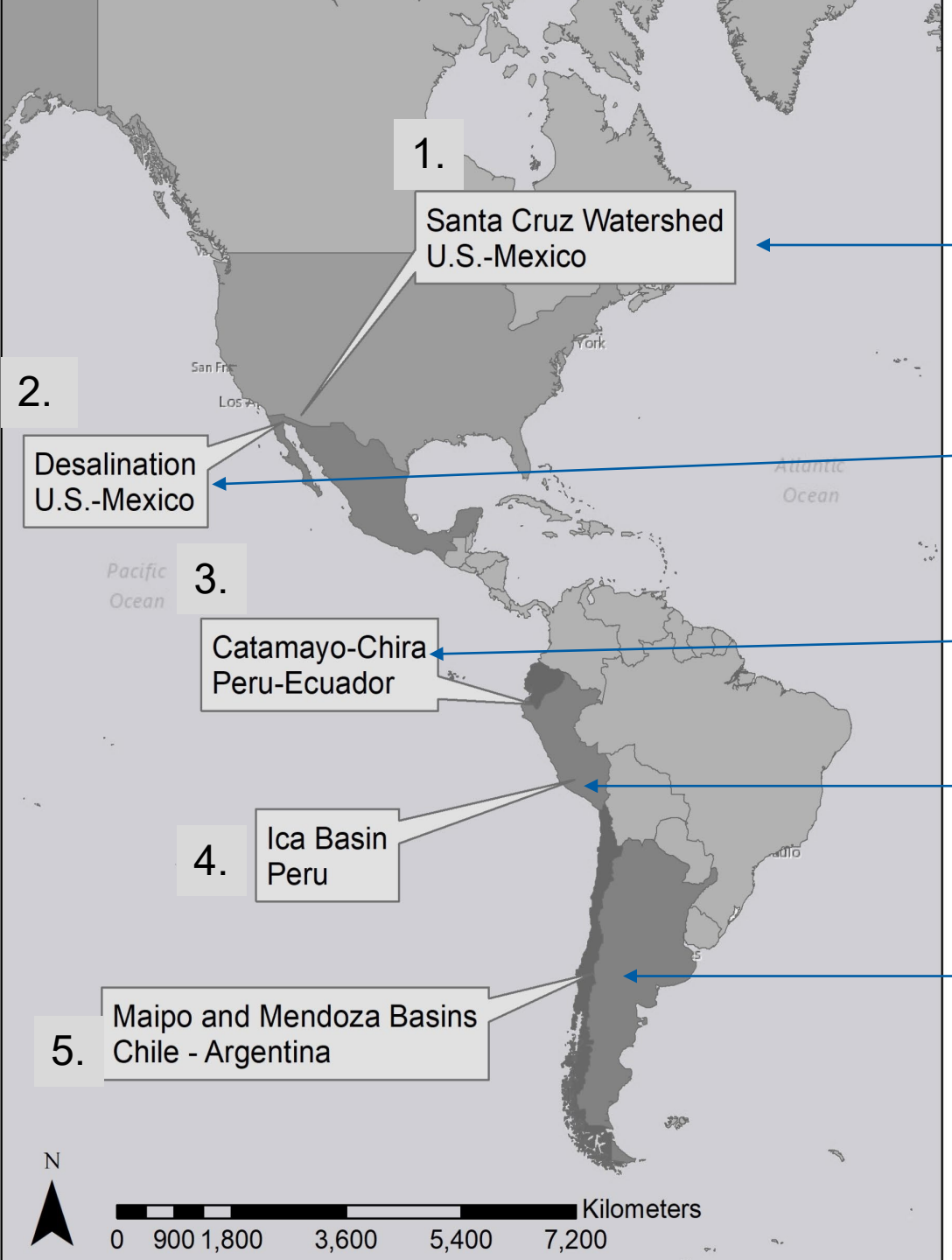
Cases from the Arid Americas



1. ***Transboundary aquifer***: Cooperation on scientific studies progresses amid contentious binational relations

2. ***Binational desalination***: International water transfers in fragile ecosystem & volatile political environment

3. ***Transboundary river***: Developing institutional arrangements for transboundary rivers amid international mistrust & dispute

4. ***Trans-jurisdictional river:*** Asymmetries between poor upstream & prosperous downstream provinces

5. ***Shared glacial headwater:*** Industrial development and climate change threaten water availability for two nations

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Map: Adriana Zuniga-Teran

Salient water-security attributes

Case	*1*	*2*	*3*	*4*	*5*
	Santa Cruz aquifer, U.S.-Mexico	Binational desalination, U.S.-Mexico	Catamayo-Chira, Ecuador-Peru	Ica River basin, Peru	Maipo-Mendoza glacial headwaters, Chile-Argentina
Quantity		X			X
Quality	X		X	X	
Ecosystems		X			
Global Change	X				X
Access			X	X	
Sanitation	X		X	X	
Transportation		X		X	
Industrial resources					X
Economic growth	X			X	
Political stability	X	X	X	X	
Policy		X	X		X
Energy resources		X			
Uncertainty	X				X

Institutional Responses

Case	Advances	Limitations
1. Santa Cruz transboundary aquifer, US and Mexico	• Binational scientific cooperation • Water Treaty • Social networks	• Limited coverage for groundwater in binational water treaty
2. Binational desalination, Mexico and US	• Expands water supplies • Binational institutional capacity and national water management	• Weak environmental policy in MX • Limited environmental protection and equity in binational benefits-sharing
3. Catamayo-Chira transboundary basin, Ecuador and Peru	• Growing binational dialogue • Binational peace agreement	• Incongruous national water laws
4. Ica River interjurisdictional basin, Peru	• Local-level planning and cooperation	• Limited basinwide planning and equity • Limited support from higher governance levels
5. Maipo-Mendoza shared glacial headwaters, Chile and Argentina	• Binational scientific cooperation • Civil society leveraged support for a national glacier protection law in Argentina	• National glacier protection law only in Argentina • Limited inclusion of glaciers in regional treaties

What can we learn?

- Transboundary compounding factors
  - National sovereignty and priorities
  - Uneven capacities and relationships
  - Insufficient institutional capacity (national & int'l legal frameworks)

- Some challenges are common among cases, but institutional responses vary
  - Climate change, water quantity, water quality and sanitation
  - Range from informal to formal
  - Local, national, international

- Overarching need for greater governance capacity at multiple levels
  - Flexibility and adaptability
  - Fit for context

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Thank you!

Questions? talbrecht@email.arizona.edu

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