

Increasing Institutional Resilience for Water Conservation

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Background

- Growing evidence of water shortages in many regions of the world
- Need to ensure food and water security for growing populations

Background

- Understanding any basin's institutional resilience needed to adapt to climate variability and change.
- Little current knowledge of measures to improve water institutions that could increase economic and ecological resilience to climate variability.

Objectives

- **Characterize** resilient water conserving institutions
- **Identify** criteria for resilient water institutions
- **Evaluate** selected water institutions of important to NM's Rio Grande Basin

Water Institutions

- Rules affecting the development, allocation, or use of water
 - International Treaties
 - Compacts (e.g., Rio Grande Compact)
 - Trading arrangements (e.g., water right markets, water leasing, intra-basin transfers, renting)
 - Legislation (e.g., Endangered Species Act)
 - Private water rights
 - Adjudications
 - Shortage-sharing agreements
 - Project operation rules (e.g. Rio Grande Project)

Water Conserving Institutions

- Institutions that promote reductions in use over time for which benefits exceed costs

Resilient Water Institutions Adapt to Changes in

- Demand
 - Population
 - Values and uses
- Supply
 - Climate change
 - Droughts
 - Floods
- Quality
 - Natural
 - Man induced

Criteria for Evaluating Resilience

- Economically efficient
- Equitable
- Sustainable
- Protect water and food security

Quest

- Institutions that adapt to unexpected supply, demand, or quality changes with minimum economic loss.

Economically Efficient Structures



Economically Efficient Institutions

- Produce high economic benefit from supplies
 - irrigation
 - urban
 - environmental
 - energy
- Avoid using scarce water for low-valued uses
- Promote orderly development

Equitable Institutions Promote



The Water Court of Valencia, Spain, ranks as one of the oldest democratic institutions in Europe. The Court convenes at noon each Thursday in the center of the city, where farmer-elected judges hear and resolve local irrigation disputes.

- Social justice
- Fairness
- Equal opportunities for access
 - By use
 - By gender
 - By location
 - By generation
 - By watershed

Sustainable Institutions



Sustainable Institutions

- Avoid depleting non-renewable aquifers
- Use only renewable supplies
- Last for many generations (Ostrom)

Protect Water Supplies



Protect Water Supplies

- Food security: irrigation
- Water security: drinking
- Human right to water
 - Quality
 - Quantity: WHO guidelines
 - Economic access

Scoring Water Institutions' Resilience

- Application to NM
- Of some international interest
- Disclaimers
 - Still qualitative
 - Still a framework

| | Efficiency | Equity | Aqf Sustain |
|--|------------|--------|-------------|
|--|------------|--------|-------------|

Rio Grande Compact

| | | | |
|-----------------|--------|--------|-----|
| without trading | Medium | high | low |
| with trading | high | medium | low |

US MX Treaty 1906

| | | | |
|-----------------|--------|--------|-----|
| without trading | low | low | low |
| with trading | medium | medium | low |

US MX GW Treaty

| | | | |
|-----------------|--------|--------|------|
| without trading | medium | high | high |
| with trading | high | medium | high |

Domestic well development

| | | | |
|---------------------|--------|--------|------|
| No offsets required | medium | high | low |
| Offsets required | high | medium | high |

Stream/Aquifer Adjudication

| | | | |
|-----------------|--------|--------|------|
| without trading | medium | high | high |
| with trading | high | medium | high |

Summary: Identifying Resilient Water Conserving Institutions

- Is Important
- Is Complex
- Is Controversial
- Is Time-consuming
- **Complements** infrastructure
- **Should be** debated, open, and transparent
- **Can be** informed by hydrologic and economic models

