Managing Water for Drought Resilience:
An Economics Perspective

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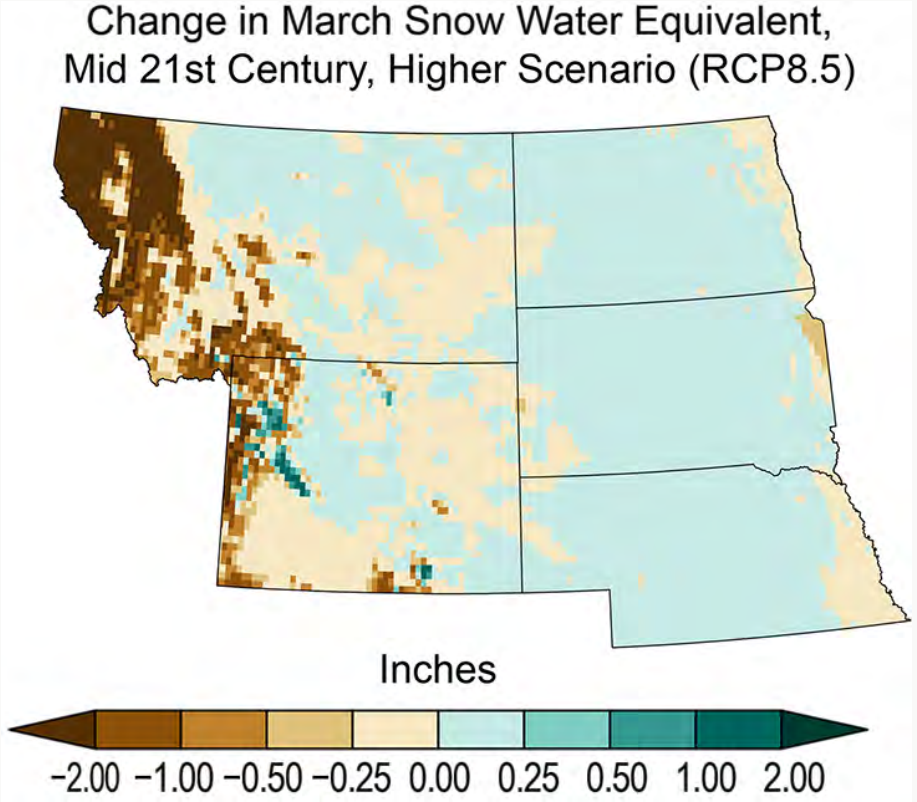
Water management policies may be due for new ideas

- Frameworks for managing water were set up in different times
  - Wetter / less variable
  - Less competition
- May be worth re-examining now that demand regularly exceeds supply
- Need policies that can:
  - Ensure wise use of scarce water
  - Minimize harm when droughts occur
  - Allow for flexibility to changing conditions
  - Share resources fairly and equitably



Three broad principles from economics

1. Make people want to conserve
2. Save for a non-rainy day
3. Can’t manage what you don’t measure

1. Make people want to conserve

Bring individual incentives into line with conservation requirements

Two examples:

A. Drought surcharges
B. Water transfers

1. Make people want to conserve: Drought surcharges

- Utility-scale water conservation is challenging
- Broad-brush mandates create more harm than necessary
  - E.g., blanket prohibitions on lawn watering
- **The idea:** Raise water rates during droughts
  - Price reflects the true value of the water
- Households and irrigators are free to choose how to respond
  - Some will find water use worth the higher price
  - Others will reduce their use
- Equity concerns? Overall water bills need not go up
  - Block rate pricing: Set prices low (or free) up to a threshold

Example: City of Bozeman's Drought Management Plan

Rate increases (as of 2021):

	STAGE 1: DROUGHT WATCH	STAGE 2: DROUGHT ADVISORY	STAGE 3: DROUGHT WARNING	STAGE 4: DROUGHT EMERGENCY
Single Family and Low Income Residential				
Tier 1 (0-6 HCF used)	0%	10%	20%	25%
Tier 2 (6-25 HCF used)	21.9%	39.6%	100%	200%
Tier 3 (25-55 HCF used)	21.9%	39.4%	100%	200%
Tier 4 (55 HCF used)	21.8%	39.4%	100%	200%
Multi-Family Residential	15.6%	23.8%	23.8%	25%
Government	15.6%	25%	25%	25%
MSU	15.6%	20.9%	20.9%	25%
Commercial	15.6%	25%	25%	25%
Industrial	11.1%	11.1%	11.1%	11.1%

Example: Self-imposed pumping fees in Colorado's San Luis Valley

MENU | High Country News

Farmers agree to tax those who deplete groundwater

Amid drought and climate change in Colorado's San Luis Valley, farmers vote for a new approach to rein in their overpumping of groundwater.

Cally Carswell | Feb. 25, 2013 | *From the print edition* | PRINT

1. Make people want to conserve: Water transfers

- Current system of water rights is inflexible
  - Junior users lose their water before senior users cut back at all
- **The idea:** Transfers between users would enable mutual gains
- Some examples so far (with more experiments starting up)

  Colorado: Big Thompson Project

  Nebraska: Platte River Basin

  California: Mojave Basin

  Texas: Rio Grande Valley
- Widespread, smoothly functioning markets would improve flexibility
  - Streamline the regulatory approval process
  - Set up a centralized clearinghouse
  - Build in protections for downstream users & environmental flows

2. Save for a non-rainy day

- Water is much more valuable when it is scarcer
- So look for ways to create (non-)rainy day funds that can be tapped during droughts

Examples:

- Water banking in reservoirs, where feasible
- Recharging groundwater where effective
- Banking/borrowing of pumping rights
- Farming practices that hold in soil moisture

3. Can’t manage what you don’t measure

- **Current situation:** Poor visibility of water use
  - Utility bills are opaque
  - Local/state managers often rely on annual self-reports
- Accurate measurement of water use is necessary:
  - For users to know how much they’re using
  - To verify conservation savings from incentive programs
- More widespread measurement would help to:
  - Quickly scale up incentive or leasing programs
  - Better predict future water availability
  - Resolve disputes in real time
- **Examples:** Smart meters; use of satellite data

Reliable Monthly Data at the Field Scale

OpenET provides data at daily, monthly, and annual time steps. ET data are available at the field scale or for other user-defined boundaries with minimal data latencies - making OpenET a powerful tool for real-time water management and decision-making.

Economics principles that can help guide resilient drought policy

1. Make people want to conserve

2. Save for a non-rainy day

3. Can’t manage what you don’t measure