Marketing Conserved Water: Lessons from Australia for the Western United States

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The Problem

- Property rights regimes for water can be inflexible, protecting historic rights at the expense of present needs
- Property rights in water are too often defined in ways that make it hard to buy and sell them (*non-fungible*)
- Agricultural users fear loss of dominant position and are wary of change
- Political systems tend to protect agricultural rights regimes

Another view of the problem

How do we move water from ag to urban use?

A proposed solution

- Recognize as Australian did that (some) water rights must be defined in fungible units of trade
  - For the Western U.S. this means defining water in terms of *water consumption*
- For political reasons, limit water marketing to schemes that protect agricultural communities
  - By allowing the transfer of "*conserved water*" only farmers can keep farming

What is “conserved water”

- It’s not water that was being reused by others
  - For example, changing inefficient irrigation practices that provide return flows to downstream users
- It’s water that is saved by reducing consumption
  - Crop switching
  - Deficit irrigation
  - Rotational fallowing

Water savings from crop switching

Crop	Crop water need (mm/season)	Mean crop water need (mm/season)	Potential water savings from alfalfa baseline (%)
alfalfa	800-1600 (508-1200)	1025	0
soybeans	450-700	575	44%
barley	450-650	550	46%
bean	300-500	400	61%
beets	250-380	315	69%
cantaloupe	350-500	425	59%
maize	500-800	650	37%
potato	500-700	600	41%
sugar beet	550-750	650	37%
sunflower	600-1000	800	22%
sweet potato	250-350	300	71%

Water savings from deficit Irrigation

Crop	Potential Water Savings	Potential Yield Reductions
Alfalfa	up to 33% (varies by region)	~25% (varies by region)
Maize	24% (55-60% during early vegetative stages)	no significant reduction
Rapeseed	40%	8%
Almonds	11%	little decline, but slightly smaller kernel size
Pistachio	23.20%	no reduction
Citrus	25%	no decrease in profits (reduced yield, but higher quality)

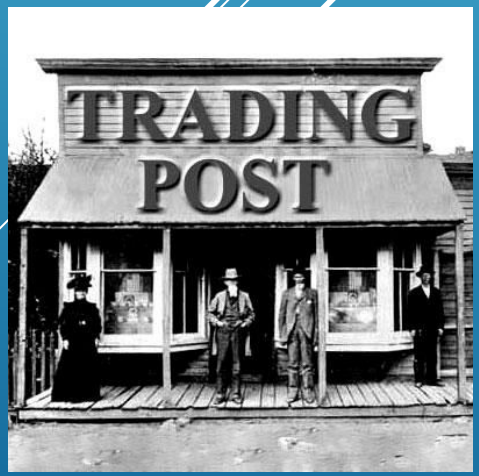
Rotational Fallowing

Year 1	Year 2	Year 3	Year 4	Year 5
Year 6	Year 7	Year 8	Year 9	Year 10
Year 6	Year7	Year 8	Year 9	Year 10
Year 1	Year 2	Year 3	Year 4	Year 5

- 10% of land fallowed; 10% of water can be marketed
- Patterns may vary but generally fallowed lands are rotated
- Less productive lands can be fallowed
- Periodic resting of lands restores nutrients
- Palo Verde Irrigation District (PVID) example

Translating savings to marketable water

- In stressed water systems and absent transaction costs, conserved water should have a high market value
- But legal regimes in the Western U.S. make transfers difficult and expensive (high transactions costs)
  - "*No injury*" rule
  - In most states *no legal right to sell conserved water*
  - Quantifying marketable units poses challenges



Lessons from Australia

- Australia sets a cap at *sustainable levels* of water use
  - Water rights are separated from land rights
  - Water rights are defined in fungible (tradable) units
  - Vast amounts of water are traded quickly and efficiently
    - Temporary (seasonal) trades typically take 5 days or less
    - Permanent rights are traded in 20 days or less
  - The process is entirely transparent with prices and trading information available on the MDBA website

Applying the lessons to the American West

- Despite its attraction, capping water rights in much of the American West is politically impractical, especially in the short term
  - But water rights could be redefined in fungible units
  - Instead of solely by diversion amounts *by the amount historically consumed*
- States could then allow the transfer – temporary or permanent – of any water not consumed over a given period

What would it take?

- Limiting transfers to “conserved water” might gain better acceptance in the agricultural community
  - Except in California will require legislation
- Will require administrative agency to define baseline water rights AND quantify conserved amount
- Must be a transparent process with a deferential standard that discourages challenges
  - Keep transaction costs low and afford the public confidence in the integrity of the process and numbers

Improve verification systems

- Employ drones and on the ground inspections to verify changes in crops and land fallowing
- Require audits of lands subject to deficit irrigation
- Make reporting and inspection information transparent to other water users and the public on the internet

Conclusion

- *Allowing farmers to market conserved water might flip current incentives to over-consume water*
  - *Will require defining rights as fungible units*
  - *Streamlining/reforming the transfer process is critical*
- *A viable market could free cities of the current practice of hoarding water*
- *Additional research needed to verify potential water savings*