

# Economic fundamentals for water markets

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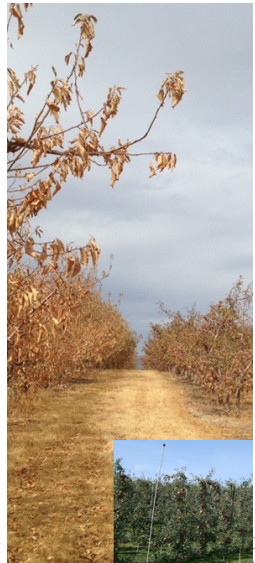
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19 November 2015

## Water use and value

- Roza Irrigation District, Late Sept. 2015.
- Smart water use: some crops fallowed; some fully watered. Water is applied strategically.
- On-farm decisions: “trade” between acres.
- Across farms: requires a transaction.
- Across districts, across uses. More difficult still.
- Strategic use *increases the value* of available water resources.

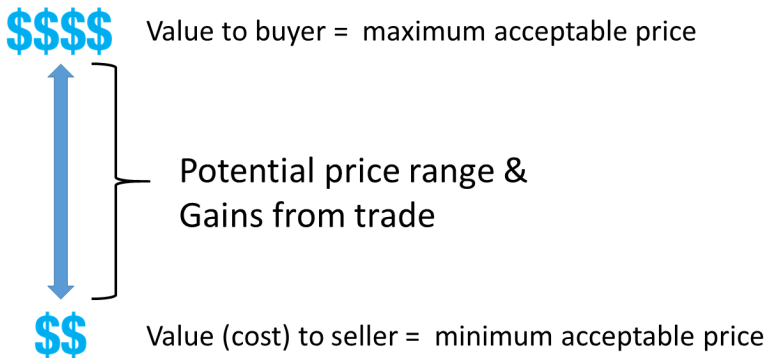


# Water rights: the fundamentals

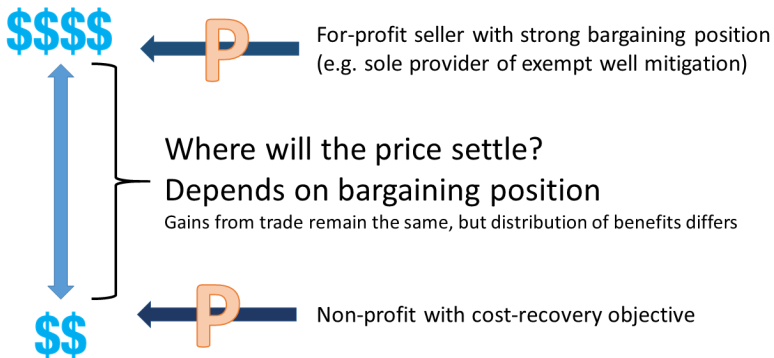
- To buy/sell, you need the right or capacity to do so.
- **Prior appropriations:** first in time, first in right.
- Seniority system and implications for droughts.
- Beneficial use: water rights granted for specific uses.
- Use it or lose it: trade-offs in “waste management” .
- Third party effects of water use and non-use.

Now: when water is leased or sold, how is price determined?

## Price determination



# Price determination



## Gains from trade and price variation

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Gains from  
trade.  
How big?

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- Gains from trade depends on the difference in value to the buyer and seller.
- Can be large: e.g. hay sold for required residential mitigation.
- Another implication: price variation can be large depending on buyer and seller positions.
- Could explain the big differences between for-profit and non-profit water bank prices in the Kittitas.

## Transactions, and markets

- A *transaction*: A trade or contract (e.g. lease, sale, multi-year contingent contract).
- *Market* as institutional *frame*: “rules & tools” for trading.
  - Property rights, rules of transfer (e.g. transfer based on consumptive use, no third-party effects).
  - Interface between buyers and sellers (e.g. the local restaurant).
  - Regulation (relinquishment requirements, water bank rules).



## Transaction costs

Market “rules and tools” affect *transaction costs*: the costs incurred through the act of buying/selling.

- Effort of finding willing buyers or sellers.
- Effort to assess personal value of water.
- Negotiation effort.
- Administrative requirements and costs.
  - Establishing the details of existing right.
  - Establishing right to buy or sell (establish past use).
  - Approval process/costs for a transaction.

A farmer allocating water on the same farm does *not* incur transaction costs, but does incur *opportunity costs* by leaving one (low-valued) crop dry.



## Gains from trade and transaction costs



- Transaction costs cut into gains from trade.
- Can be large enough to block an otherwise beneficial transaction.
- Reducing transaction costs can increase the value and volume of transactions.
- This suggests that *reducing transaction costs can be an important strategy for market development and improving market function.*

## When/where will water trading occur?

- When large gains from trade are likely, for many.
  - During drought.
  - To address mitigation requirements.
  - When there is variation in water value across uses.
  - When third-party concerns don't preclude trade.
- When the hassles and costs of buying and selling (i.e. transaction costs) are low.
- When senior water rights use water for low-valued uses.

## When/where will **markets** develop?

- When expected gains from trade are high.
- When expected transaction costs are high.
- Together they imply large economic losses from market failure.
- What drives change?
  - Inertia and information are important factors affecting markets.
  - New water use restrictions (e.g. response to lawsuit).
  - Technology change that increases gains from trade or reduces transaction costs.

## When/where have markets developed in WA? What's next?

- The most active water markets in WA have arisen because groundwater pumping can negatively affect more senior surface water rights and instream flows.
- The Skagit has similar problems, but the distribution of water and rights in the basin preclude active markets.
- I'll let the next speakers focus on these.
- If we seem more severe and more frequent droughts, we are likely to see more market development in preparation for and in response to drought. I'll talk a bit about this.

# Approaches to improving water markets

- Problems commonly noted
  - Uncertainty over water/weather as season unfolds; timing.
  - Buyer/seller Search and bargaining difficulties.
  - Uncertainty over water value.
  - Are relinquishment concerns a common barrier to sale?
- A couple of ideas
  - Adoption/promotion of contingent contracts.
  - Smart Markets.

## Contingent contracts

Contingent contracts (AKA dry-year contracts) are long-term contracts that specify prearranged water transfers during drought. Not new, but apparently not used much in WA. Can take many forms, but generally include several elements:

- trigger conditions for the water transfer option, including some drought condition index and a timing element.
- remuneration scheme that can include regular payment, drought-contingent payment, or both.
- This year, reports of pre-committed water for corn contracts. These types of commitments can inform water contract types.

## “Smart markets” to reduce transaction costs

- A colleague of mine has implemented a very innovative “smart market” that uses a computer algorithm that facilitates groundwater transactions in Nebraska.
- It takes bids and offers over a period of time (a month), then finds the value-maximizing sale-purchase arrangements, and splits the gains from trade among buyers and sellers.
- Runs through a non-profit business.
- Experimental stage, but informative and promising. The state could fund a pilot project for something like this, but it takes planning and time.