Open Water Trade: A Water Trading Exercise Software for Education and Water Market Design

Educating water users, water managers, and other stakeholders about water trading and different types of water market structures is a critical first step in designing water markets. We have found that water trading exercises, or "games," that allow users to experience different types of water market structures and actually trade hypothetical water allocation is essential for market design.

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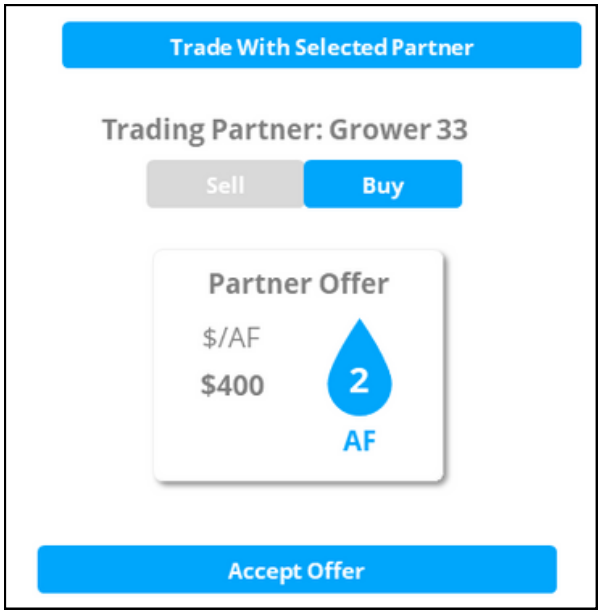
This research highlight does not have an associated peer-reviewed paper.



Aside from some notable exceptions, water transfers in western states have primarily reallocated water from agricultural uses to environmental flows or growing municipalities rather than between agricultural users. Most frequently, these transfers occur between large water districts, water user groups, federal, state, local, and tribal organizations, rather than between individual farmers.

Infrequent trading between individual agricultural water users despite significant differences in the value of water between farms is indicative of high transaction costs. Howitt (2014) reports the highest going price for water in Westlands water district during the 2009 drought year at $500 per acre foot, while 50 miles away other Central Valley Project water users paid less than $40 per acre foot. There are many factors that make water trading difficult for a grower to navigate on their own, including a lack of education and training on participation in water markets. We address many of these gaps under the Technology for Trade grant.

Under this project we developed a web-based water trading game to educate growers and other stakeholders, allow them to explore alternative market structures, evaluate outcomes from water trading, and experience water trading through an exercise/game software. The water trading game allows players to take on the role of a farm manager and execute water trades. Basic concepts relating to water trading the game conveys include:

- Exploring different types of market structures, including bi-lateral trades and smart markets.
- Determining the value of water on their own operation.
- Using their operation's water value to determine what types of trades could potentially generate additional value for their operation.
- Measuring the financial outcomes to their operation with and without water trading.

\By better understanding the basics of water trading, growers and other stakeholders will be better equipped to identify opportunities for water trading. In addition to basic concepts, the water trading game also aims to introduce players to more complex topics, including market structures. The exercise is a web-based software that allows the administrator to run games virtually or in person with stakeholders. It is designed as a tool for researchers to better understand individuals' behavior in water markets and to help stakeholders understand and explore alternative markets. The initial version of the game is being developed with no specific treatments in mind. In the future, researchers may use the platform to test different research objectives.

The water trading game will be accessible via the web through administered game sessions. The project team will grant administrator privileges to those who wish to administer the game. The administrator will then be able to invite individuals to play the game and view results when players complete the game. Figure 1 shows a screenshot of the game.

In the future, the water trading game could be augmented for educators or Extension to administer it in a group setting. Administrators or Extension would be able to request a group session, in which participants would be able to trade with one another in real time. By trading with other individuals, rather than computer-generated players, players would get to experience a water market that much more closely resembles the real world. In addition, multi-player functionality could present interesting opportunities for researchers to collect data.

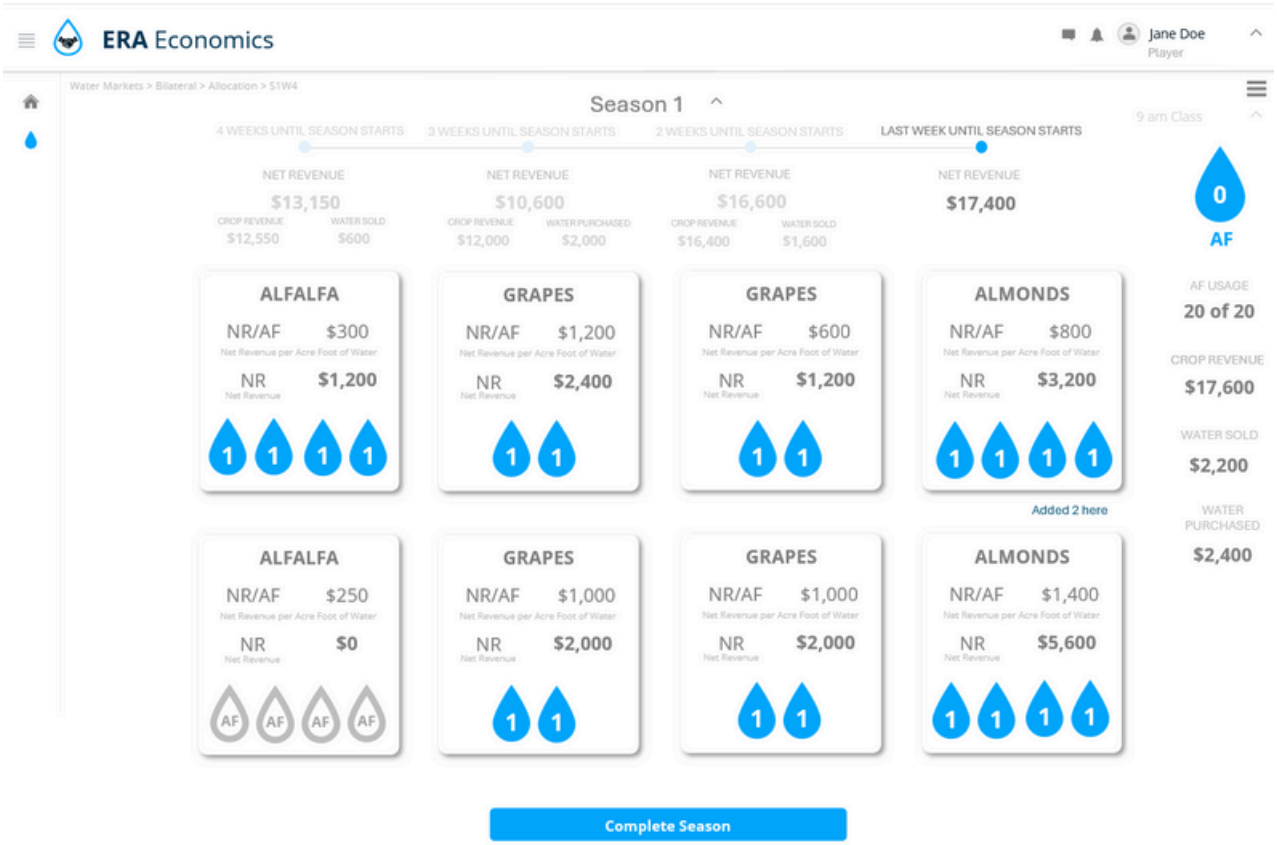


Figure 1. Water Trading Game Snapshot

Disclaimer: This research highlight is a game based the Open Water Trade Research Highlight and its draft peer-review manuscript.

References:

Howitt, Richard E. "Are lease water markets still emerging in California?." Water Markets for the 21st Century: What Have We Learned? (2014): 83-102.

Authors:

Brooks Ronspies is an Economist at ERA Economics specializing in water markets, geospatial analysis, and application of data tools to integrated hydroeconomic analyses. He has worked with water managers in California to implement the Sustainable Groundwater Management Act. Brooks develops tools to support water management in California and across the west, including groundwater markets in California and Washington.

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Joseph Cook is a Professor at WSU with a research focus on water and sanitation policy in low-income countries, water resources economics and policy, and nonmarket valuation. His research has appeared in outlets such as the Journal of the Association of Environmental and Resource Economists, Environmental and Resource Economics, and Water Resources Research.

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