



## **The value of season-ahead forecast information: Can season-ahead water right allocation forecasts inform option contracts and improve water market-scale economic efficiency in agriculture dominated basins?**

Justin Delorit and Paul Block

University of Wisconsin-Madison, Madison, United States (delorit@wisc.edu)

Option contracts for water facilitate temporary water transfers between water rights holders, and help mitigate uncertainty in water demand and prices for goods produced using water, by providing a mechanism for expeditious transfers of water to highest value uses, with limited institutional barriers. Option contracts allow a potential water buyer to pay a premium to have the right, but not the obligation, to purchase some fixed flow or volume of water at a future date. Typically viewed as a liberalized water transfer policy, options contracts have resulted in more active trading, particularly between agricultural producers. In basins where the per-water right allocation value is uncertain, and set annually based on reservoir storage and expected hydroclimate conditions, options contracts may be appealing to irrigators, to mitigate allocation value uncertainty, if the value is issued after cropping and associated investment decisions are made. Where skillful season-ahead reservoir allocation forecasts exist, and water market price information is known or derived, this information can be linked options contract premium price models to determine the value of forecast information and contract efficacy. Here the value of allocation forecast information is evaluated for semi-arid Chile, where irrigators engaged in agriculture face annual allocation uncertainty. A retrospective analysis is completed for two growers' cooperatives. Daily, pre-irrigation season contract premiums are calculated using the Black-Scholes method. A two-stage forecast informed and a price and climatology informed case are compared to a perfect foresight formulation to determine whether inter-cooperative arrangements could benefit from forecast informed water option contracts.