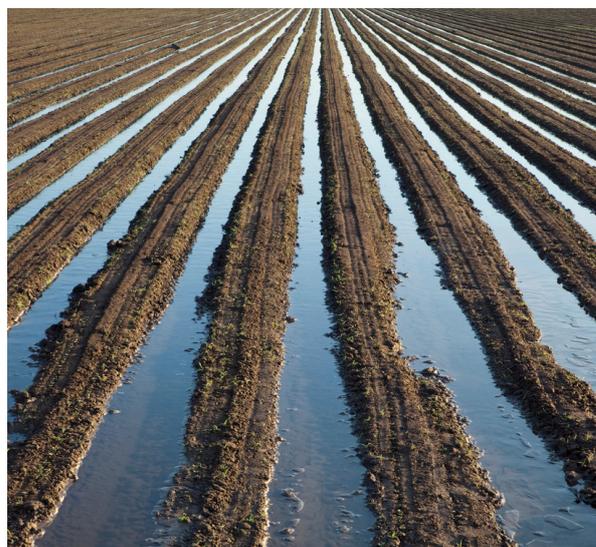


Technology for Trade: New Tools and New Rules for Water Use and Allocation in Agriculture and Beyond

The Technology for Trade (T4T) project has extended the development and application of three promising and complementary emerging technologies that provide more reliable information relating to water: 1) improved seasonal forecasting, 2) remote measurement of crop water consumption, and 3) computer-aided 'smart' water markets. The work focuses on four diverse watersheds in the Columbia River Basin where water is in demand, and water security is of concern.

Jonathan Yoder and Georgine Yorgey



Water allocation decisions are important for making the most of naturally variable water resources for diverse instream and off-stream purposes in the Columbia River Basin and across the western United States. Given the myriad competing uses of water resources, inherent tradeoffs exist, especially during drought years when available water is limited. Maximizing opportunities for water to be put to its highest valued potential use, both within agricultural systems and across other sectors, is important for

The Columbia River watershed covers parts of seven states and extends into British Columbia, Canada. Source: EPA

making the most out of scarce water resources. Emerging information technologies (IT) can enable new water management strategies and provide opportunities for enhancing water use efficiency and the region's resilience to drought. Such IT-driven innovations are already changing the legal and management landscape of water resources in the western United States.

The Technology for Trade project (T4T) has extended the development and application of three promising and complementary emerging technologies that provide more reliable information relating to water: improved seasonal forecasting, remote measurement of crop water consumption, and computer-aided 'smart' water markets. In addition, the project has been exploring legal, regulatory, and contractual constraints and innovations that might either prevent or allow water users to use these technologies effectively while protecting the water rights of others (Figure 1).

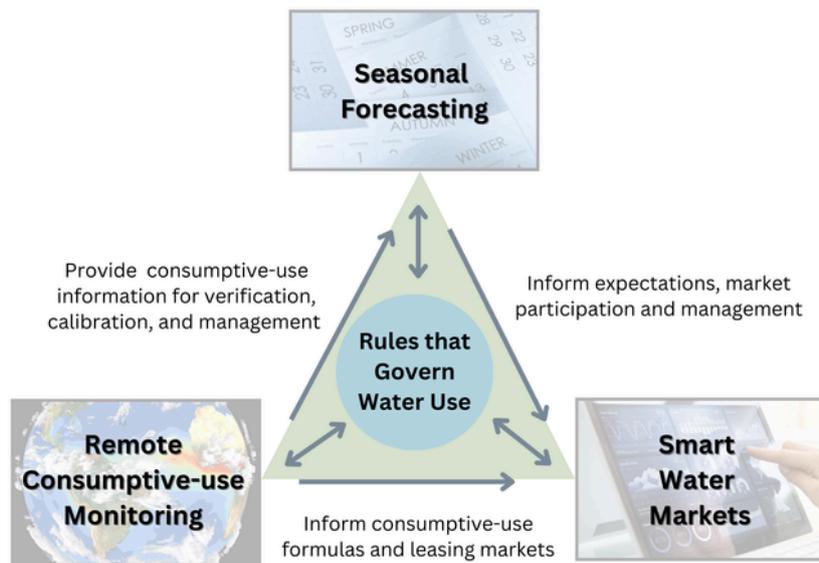


Figure 1. The three focal technologies of this project compliment each other, and provide information that, in combination with the rules that govern water use, creates new opportunities for water use.

While these technologies have the potential to be relevant across the Western U.S. and beyond, for this project we focused on four diverse watersheds in the Columbia River Basin where water is in economic demand, and water security is of concern: the Methow, the Okanogan, the Yakima, and the Walla Walla (Figure 2).

The T4T research highlight articles capture some of the diverse work moved forward as part of this project. This includes focused research on individual technologies such as the work on improving seasonal forecasting to support water use decisions, advancements in consumptive use measurement using satellite imagery and modeling for increased precision, work on an Agent-Based Model of water markets to facilitate exploration of water use and regulatory alternatives in simulated scenarios using real-world data, as well as open source water market “games” to allow stakeholders to learn about how water markets work.

In addition, many articles examine the intersection of these technologies with governance and regulatory innovations. Examples of this work include an

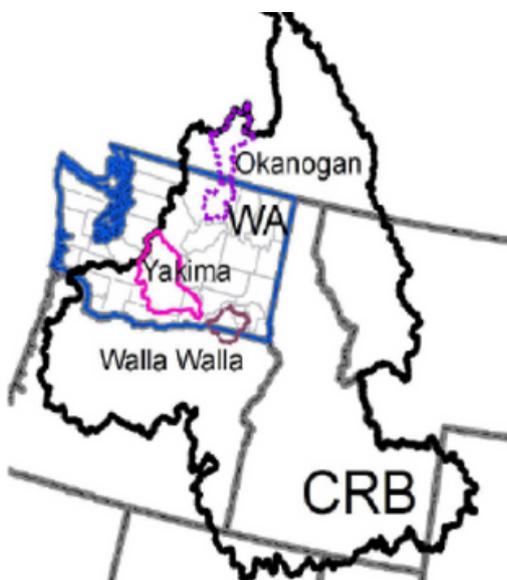


Figure 2. The main focal areas of the project include the Yakima, the Walla Walla, the Methow, and the Okanogan watersheds in the Columbia River Basin (CRB).

examination of [improved consumptive use measurement and deficit irrigation allows opportunities for water use efficiency gains](#), and examinations of [how farmer preferences, understanding, and other factors affect perspectives on water markets](#).

While the funding period for the Technology for Trade project ended in June of 2024, associated

research activity continues through ongoing faculty work and with new extramural funding. For example, Technology for Trade researchers and new collaborators are examining how Artificial Intelligence can be harnessed to improve water use efficiency as a part of the USDA-funded [AgAID Institute](#). Additional benefits will accrue through the next iteration of the Columbia River Basin Long-Term Water Supply and Demand

Forecast (2026) that the State of Washington Water Research Center carries out every five years with the support of the Washington State Department of Ecology's Office of Columbia River (the 2021 report can be found [here](#)). These and several other new projects will extend the life, reach, and impact of the Technology for Trade project for years to come.

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