

Modeling Water-Use Behavior Under Uncertainty

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Goals

- Model the existing system of day-to-day water use behavior in the Wasatch Range Metropolitan Area (WRMA)
- Examine how such behavior, as well as longer-term investments in water infrastructure, is impacted by increasing social and natural uncertainties about future water supply



Figure 1. Showing the impact of this year's drought on water levels in the Providence Reservoir.

Research Methodology

A structured two-tiered approach using empirical models

1. Develop a basic conceptual agent-based model for short-term water-use decisions and a real-options model for the impacts of increased uncertainty on the decision to invest in water infrastructure in the WRMA
2. Incorporate natural science data into the human behavioral models via uncertainty considerations. For instance, stream flow data will be used to estimate trends and volatility in water supply compromising consumers' ability to receive predictable water supplies.

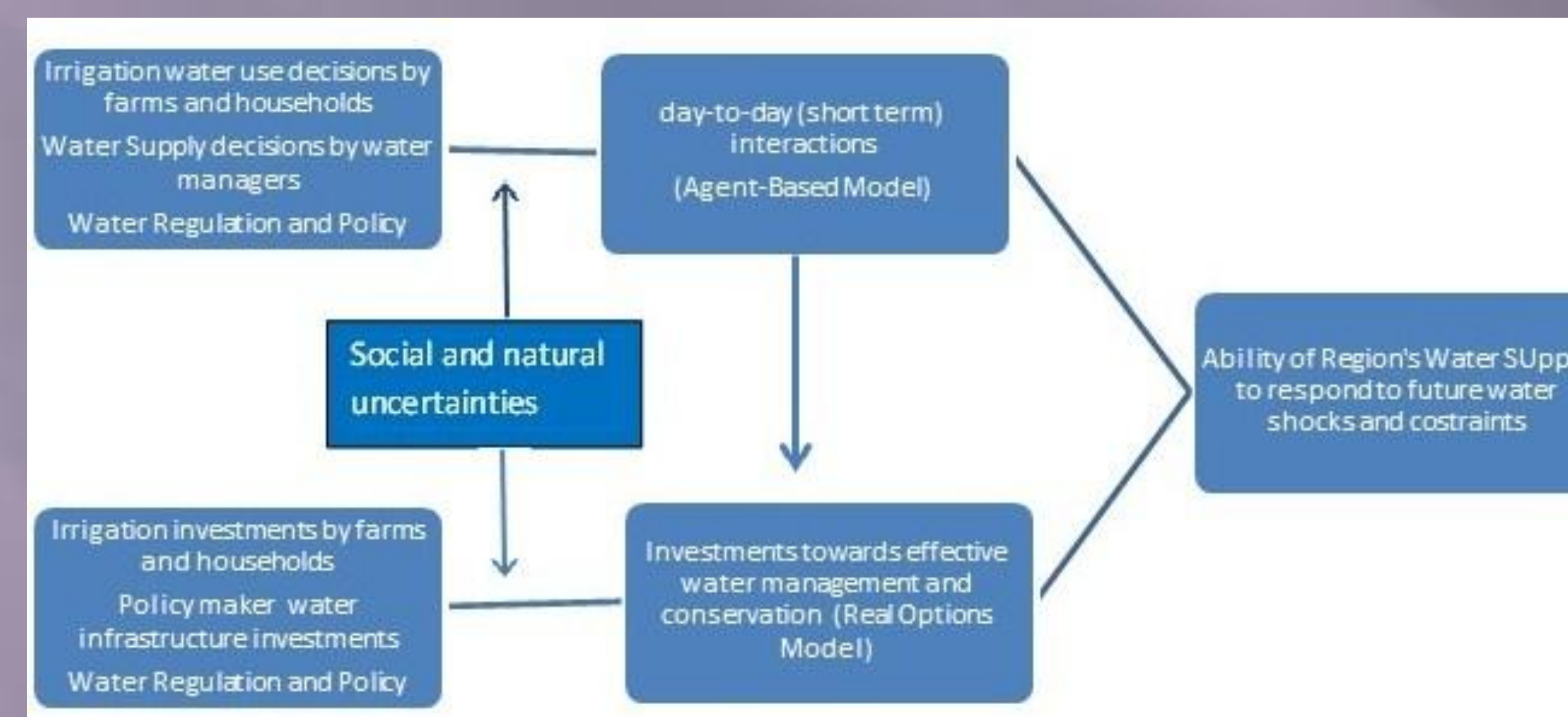


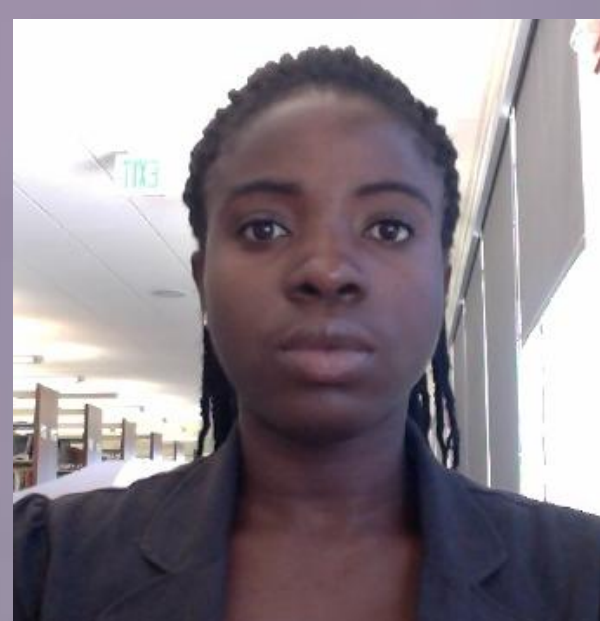
Figure 2. Emphasis on the inextricable linkage between natural and social science in water research.

Impact

- Establishing the status quo of water use and infrastructure investment in the region and how it is likely to respond to future uncertainties
- Improving understanding of how existing systems can best adapt to future constraints on water resources
- Serving as a bridge between the qualitative social science data on human behavior and quantitative natural science data



Figure 3. An example of investment in water infrastructure.



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