

United States Department of Agriculture
Project Initiation

Project Data for Accession Number 1032236

Project Title

Building Resilience: Incentivizing Agricultural Water Conservation in Utah Amid Climate Uncertainty and Prior Appropriation Water Rights

Project Details

Sponsoring Institution National Institute of Food and Agriculture	Project Status ACTIVE
Funding Source NIFA Non Formula	Grant Year 2024
Grant No. 2024-67024-42700	Cumulative Award Amt. \$527,360.00
Proposal No. 2023-09527	Multistate No. (N/A)
Project Start Date Aug 01, 2024	Project End Date Jul 31, 2027
Program Code [A1651] Agriculture Economics and Rural Communities: Environment	

Project Director

Li, M.

Recipient Organization

UTAH STATE UNIVERSITY
1000 OLD MAIN HL
LOGAN, UTAH 843221000

Performing Department

Applied Economics

Non Technical Summary

This submitted proposal focuses on Environmental and Natural Resource Economics (ENRE) . The long-term goal of our research is to support evidence-based policymaking by designing policy incentives that encourage farmers to conserve agricultural irrigation water in the contexts of uncertain water supplies and complex institutional water arrangements. This project aims to understand the mechanisms underlying farmers' water-related agricultural decisions and develop feasible policy options to inform the development of sustainable and resilient agriculture under present and future climates. To achieve this goal, we propose four objectives: 1) collect irrigation water rights and runoff data and compile a parcel-level geospatial database covering three Utah watersheds, 2) explore the impact of appropriate water rights and water supply uncertainty on farmers' agricultural management practices, 3) estimate individual farmers' willingness-to-accept payments in exchange for irrigation water-saving, and 4) design incentive-

United States Department of Agriculture Project Initiation

based agricultural water-saving policies and estimate the marginal costs of agricultural water conservation under different policy options and climate change scenarios. Our interdisciplinary team will bring together expertise in economic modeling of water resources management and agricultural land management and hydroclimate modeling and climate change science to develop new models and tools to understand economic and water conservation impacts of certain policy choices. By carefully examining the implications of farm management practices and their relationship to water conservation, our project will contribute to understanding the economic tradeoffs of water conservation in agriculture. Ultimately, our work will inform the design of incentives, estimated costs of agricultural water conservation, and real-world implementation.

Animal Health Component

Animal Health Component: 0%

Research Effort Categories

Basic	0%
Applied	50%
Developmental	50%

Classification

Knowledge Area (KA)	Subject of Investigation (SOI)	Field of Science (FOS)	Percent
605	0210	3010	100%

Knowledge Area

[605] Natural Resource and Environmental Economics

Subject Of Investigation

[0210] Water resources

Field Of Science

[3010] Economics

Keywords

Irrigation, climate change, water conservation, water rights, willingness to accept, water uncertain

Goals / Objectives

The primary goal of this research project is to understand how appropriative water rights and farm profits jointly affect farmers' water-related land-use decision-making, and design incentive-based policies that encourage farmers to conserve agricultural water under climate uncertainty. The goal is supported by the following four objectives: 1. Collect water rights, water-related land-use, and runoff data, incorporate them into the existing 30-meter geospatial database, and compile a parcel-level geospatial database for the period 2017-2023/4. 2. Explore the impact of appropriative water rights on farmers' water-related agricultural decision-making under the uncertainty of water supply caused by climatic factors. 3. Develop an econometric land-use model, based on the outputs from phase I, to estimate individual

United States Department of Agriculture Project Initiation

farmers' willingness-to-accept (WTA) payments in exchange for irrigation water conservation using historical data.4. Design alternative incentive-based policies for agricultural water conservation under the present and future climates, and use the WTA payments to estimate the marginal costs of agricultural water conservation under different policy options and climate scenarios. Compare the opportunity costs of different policy options in terms of agricultural production.

Project Methods

To address objective 1, this research project will collect publicly accessible geospatial data from multiple sources, integrate them with socioeconomic data, and build a spatial database at the land-parcel level with parcel administrative boundaries from county assessor's offices, including ownership information. To address objective 2, this research project will develop econometric models using the collected annual geospatial data on the period 2017-2023 /4. It involves two steps. In the first step, a panel data regression approach will be used to analyze the joint effects of water rights seniority, water rights quotas, and water shortage risks on water rights holders' crop selection and irrigation method decisions. In the second step, a difference-in-differences (DiD) approach will be used to analyze the policy impact of the use-it-or-lose-it clause. To address objective 3, this research project will use the historical data (2017-2023/4) to estimate a land-use model at the parcel-level, and then calculate each individual farmer's willingness-to-accept (WTA) conservation payments in exchange for adopting better water-saving practices. To address objective 4, this research project will use the estimated WTA payments under objective 3 to assess marginal costs of water conservation in agriculture under different scenarios.