

# Literature Review of Current and Upcoming Irrigation Technologies and Practices Applicable to Utah

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**Focus Question:** What irrigation and agricultural management practices can increase water productivity (that is, the beneficial output or yield per volume of water consumed) in Utah?

**Key Finding:** Proven technologies and methods for optimizing irrigation, cropping, and tillage already exist that can reduce consumption and maintain agricultural production. These technologies can be leveraged, improved, and implemented in Utah.

Irrigation is essential for economical agriculture production in western semi-arid regions, such as Utah. The effects of droughts and competition for water due to population growth mean that more effective use of agricultural water supplies will be needed in the future. This document examines the historical, current, and upcoming irrigation technologies and practices applicable to the State of Utah. Can we feasibly optimize agricultural water use in Utah? How?

## Background

Irrigators in the state continue to make steady improvements toward adopting technologies that enable them to improve both water use efficiency and overall crop productivity while protecting the environment. Recent trends show an increase in sprinkler adoption from 53% to 56% between 2013 and 2018 and a subsequent reduction in surface (furrow) irrigation. While Utah's adoption rate is below several western states, given the significant upfront costs associated with center pivot sprinkler systems, this 3% increase represents a considerable investment by the irrigation community.

## Results

Twelve strategies for reducing agriculture water demand were examined. As shown on Figure 1, deficit irrigation with water spreading and conservation tillage are the only two profitable options for irrigators (negative costs). Each of the other 10 options resulted in some additional costs to irrigators. Several low-cost options, such as Low Energy Precision Application, evapotranspiration-based irrigation scheduling, and mobile drip irrigation have adoption potential in areas with water shortages. Financial incentives for implementing these strategies could be modest.

## Recommendations

1. Learn from the past. Hype does not always translate to success. Understand what motivates a water user to change how they irrigate. Simple is often better.
2. Continue support for irrigation management education and demonstration projects. Knowledge is power.
3. Prioritize the "biggest bang for the buck" (Figure 1).
4. Continue to educate and demonstrate no-till and strip-till.
5. Move toward on-demand water delivery to maximize water productivity.
6. Allow water spreading (that is, use conserved water or at least a portion of it to irrigate additional acreage).
7. Consider that surface irrigation is not always bad.
8. Move center pivot sprinklers as close to the ground as possible.
9. Avoid big guns when possible.
10. Encourage urban water users to be more efficient.
11. Implement drip irrigation for high-value crops.
12. Obtain good irrigation system designs completed by certified irrigation designers.

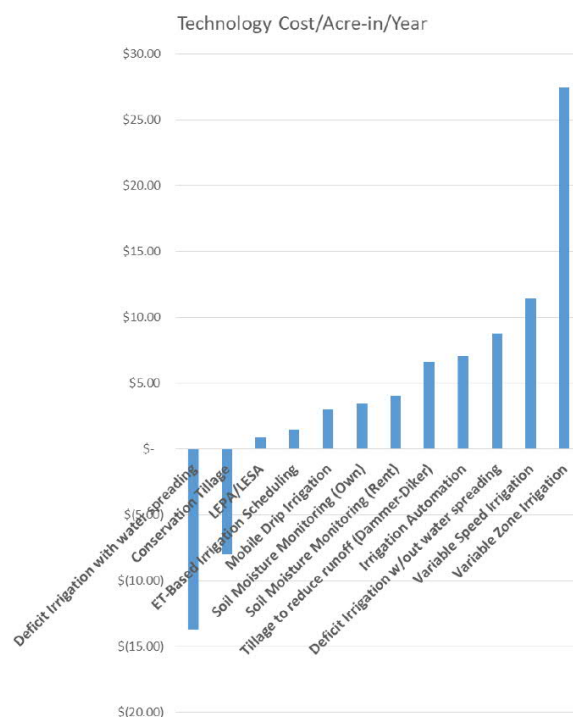


Figure 1. Summary of the estimated costs per acre-inch of water conserved per year for each technology (lower is better)