

Utah Agricultural Water Optimization: Water Savings From Drip Irrigation

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

Key Finding: Drip irrigation works, is less consumptive, requires less diversion, and maintains yield versus surface irrigation.

Field studies in 2019 and 2020 evaluated differences in consumptive water use or depletion between drip and surface irrigated onions. Can drip irrigation effectively optimize agricultural water use in Utah?

Drip irrigation is a good irrigation water optimization technology and can reduce diversion by more than 50% and reduce consumptive use by about 20%. With good design and proper management, drip irrigation can result in high yields while conserving water. Providing tools and information on drip irrigation design and scheduling (when and how much to irrigate) is needed to optimize yields and returns on investments. Crop coefficients were developed that can be used for irrigation scheduling and estimating irrigation water use.

Key Benefits of Drip Irrigation

- Requires less than half of the diversion of surface irrigated onions.
- Reduces depletion by 0.25 to 0.40 acre-foot per acre for equivalent yields.
- Turning areas at ends of fields are not irrigated (3% to 5% less irrigated land in the field).
- Provides the capability to establish onions with uniform germination and good stands.
- Provides excellent irrigation and fertilization management capabilities.
- Reduces irrigation labor requirements during the irrigation season.
- Onion yield per unit of water applied is about twice that of surface irrigation.

Key Disadvantages of Drip Irrigation

- Under-irrigation can easily occur if not designed or scheduled appropriately.
- Drip system has a higher cost and energy requirements.
- More time is required to install, set up, and remove drip systems.

Limitation to Implementation of Drip Irrigation

- Water availability from a timing perspective can prevent proper irrigation scheduling and limit irrigation time. Most irrigation water-turn rotation schedules can limit the use of drip irrigation systems.
- On-farm water storage reservoirs may be required for on-demand irrigation scheduling.

Recommendations

The following items would encourage the use of drip irrigation:

- Existing canal systems impede increased implementation of drip irrigation. Piping existing canals and laterals and automating ditch systems can help an open canal system deliver water more efficiently and provide more flexibility in delivery quantities and timing.
- A cost-share program to provide funding can help encourage the use of drip irrigation. A system would also need to be in place so that decreased diversions and reduced consumptive use is available for alternative water uses that benefit the funders.
- Education on the best management practices, soil moisture monitoring, and irrigation scheduling for drip irrigation systems can help obtain good yields.
- Irrigation water delivery flexibility can help producers use their water shares in different locations to increase total production.



Figure 1. Drip (left) versus Surface (right) Irrigation