



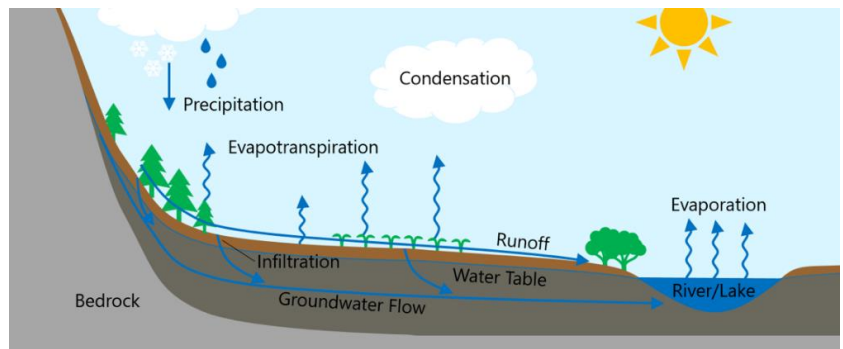
Understanding Irrigation Water Optimization Guide

Limited water and competing demands make irrigation water conservation, efficiency, or optimization important components of overall water resource management. Optimization practices change the quantity, quality, and timing of water flows. It is important to consider the possible hydrologic impacts of irrigation optimization efforts to avoid implementing practices that have little appreciable effect relative to the desired outcome.

Water conservation: typically involves reducing water use.

Water optimization: may also include reducing water but also includes making water use more productive.

The hydrologic cycle, also called the water cycle, demonstrates how water sources are filled and potential ways water is lost before reaching the crops. Water optimization methods target preventing loss at certain stages of the hydrologic cycle.



There are many ways to reduce water loss and improve water optimization including using lined irrigation, pipes, or changing forms of irrigation used. Whether or not an optimization practice would be considered beneficial is situation specific. One often unintended consequence of optimizing irrigation water use is that some optimization practices increase consumptive water use. Unless coupled with some other reduction in consumptive use, like less wind and evaporation loss, improved irrigation efficiency and uniformity can often result in increased consumptive use per acre irrigated. However, crop production may also improve, less energy may be required to apply water, and there may be less stress on supply reservoirs. Any such benefits must be weighed against the cost of increased consumptive use.

Optimization practice ¹	Likely to reduce diversion/withdrawal?	Likely to reduce consumptive use?
Fallowing	Yes	Yes
Deficit irrigation	Yes	Yes
Change crops	Possibly	Possibly
Canal lining/piping	Yes	No
Improve surface irrigation efficiency	Yes	No
Improve sprinkler irrigation efficiency	Yes	Possibly
Improve drip irrigation efficiency	Yes	No
Convert surface irrigation to sprinkler	Possibly	No
Reduce sprinkler wind drift/evaporation	Yes	Yes
Convert surface irrigation to drip	Yes	Possibly
Convert sprinkler irrigation to drip	Yes	Yes
Scientific irrigation scheduling	Possibly	Possibly

View full factsheet: <https://extension.usu.edu/irrigation/research/understanding-irrigation-water-optimization>

Utah State University is an affirmative action/equal opportunity institution and is committed to a learning and working environment free from discrimination, including harassment. For USU's non-discrimination notice, see equity.usu.edu/non-discrimination

Authors: Katelyn Parker, Burdette Barker, Jody Gale, Mark Nelson and Matt Yost, Utah State University Extension, June 2025