

## IRRIGATED AGRICULTURE

Irrigation has been developed to allow stable, high yield agriculture and avoid the effects of drought. However, water scarcity in many regions of the US is a problem due to declining groundwater levels, increasing competition for water by municipal and industrial users, and increasing frequency and severity of drought. In a water-limited setting, the most promising approach toward a sustainable and cooperative management of water resources is to improve agricultural water productivity. That is, produce more crop for every drop of water.

The crop water stress index (CWSI) is a widely used indicator that provides an estimate of the crop water status. The CWSI is measured using widely available surface temperature thermometers (e.g. remote sensing devices). CWSI values near 1 indicate a high stress environment for the crop wherein water needs to be added. Likewise, CWSI near 0 indicate that a crop is well hydrated. By measuring CWSI across a crop field, for example, farmers are able to know when their crops require watering and, hence, can better manage their water resources by not adding water until necessary.

While CWSI is useful for knowing *when* to apply water, it does not indicate *how much* water to add. Knowing how much water to add requires knowledge of the soil water content (SWC; the amount of water present in the soil). Measuring SWC, in contrast to CWSI, is expensive. However, if a unique relationship could be established between CWSI and SWC then CWSI could be used to understand SWC and, subsequently, manage the amount of water used by the farmer.