

California Almond Water Footprint

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PROJECT SUMMARY

Objectives for current year:

- Calculate an accurate water footprint for California almonds, using the most recent statewide data and where possible, local or regional research products to inform data-use, such as actual crop evapotranspiration values.
- Compare almond water footprint to economic benefits gained from almond production and sales.
- Carry out a more detailed analysis of the water footprint of almonds compared to food value components and total food value.
- Analyze the effects of variation in evapotranspiration rates (ET_o and ET_c) geographically, temporally, by variety, and with physiological status.
- Compare the water footprint to other types of footprint (e.g., ecological, energy/carbon) and life cycle analysis in order to identify production and management actions that could contribute to reducing water impacts and increasing efficiency.

Background and Discussion:

The domestic and international media have recently started focusing on the water footprint of California almonds and have related the water footprint to water use and the drought. The water footprint is an index of the complete use of, and impacts to, water systems. It is the sum of water impacts from production of a good or service used by people. It is typically expressed per unit production, per region, or per capita. It goes

beyond consideration of water use (e.g., from irrigation) and according to the International Standards Organization is similar to the life cycle analysis approach. Besides the problem of perception that California almonds have a large water footprint, there is the additional problem that the water footprint estimate quoted in the press is not accurate. It is likely that the California-almond water footprint is smaller than estimated and is gradually improving over time. Finally, the many nutritional and economic benefits that almond production and almonds provide are lost in a water footprint calculation that report volume of water per unit weight of almonds. Almond production provides a large economic and employment benefit to California. Almonds are also replete with protein, healthy fats, fiber, vitamins and micronutrients. There is no requirement that water footprint be only expressed in terms of volume per unit weight. Other denominators, such as economic benefit, protein (g), or total food benefit are likely to provide a better representation of the benefits of almonds relative to the water footprint.

Almond water footprints show a great deal of variability around the state based on yield, ET_o rates, and recently updated crop coefficients (K_c). While current estimates of an average almond water footprint may be only slightly revised by this research, we find almonds to have economic and health productivity advantages over other crops commonly grown in the region. Further, we see potential for management actions that reduce water footprints synergistically with greenhouse gas and other ecological footprint indicators.

Project Cooperators and Personnel: Julian Fulton, UC Davis (as of Jan 1, 2016 CSU Sacramento)

For More Details, Visit

- Poster location 71, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at Almonds.com/ResearchDatabase
- Related project: 15-HORT22-Shackel; 15-HORT17-Shackel; 13-AIR8-Kendall