

Boost Water Productivity with Tree Nutrition and Soil Health

When irrigation water supplies are limited, every almond farmer looks for ways to get the most value from each added gallon. The concept of getting the greatest agronomic benefit from water is called “irrigation water productivity.” This measurement has become an important indicator of both crop production and water use efficiency since it accounts for how well the trees perform and how irrigation water is managed. In common terms, improving water productivity is called “more crop per drop”.

Irrigation water productivity is influenced by many factors. Some are beyond the control of farmers, such as unexpected weather extremes. Other factors can be carefully managed to boost water productivity in the field. For example, diseased trees, poorly nourished trees, or trees with insect-damaged nuts all use about the same amount of water during the growing season, but have very little yield to show for the water consumed.

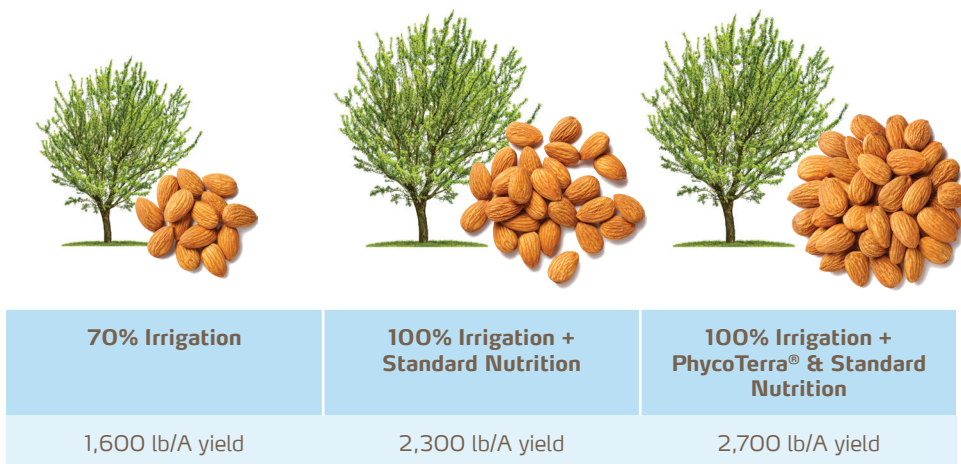
Soil properties and water productivity

There are many physical, biological, and chemical properties of soil that influence irrigation water productivity. For example, soil management is an important contributor to maximizing water productivity. Modifying certain soil properties allows the rootzone to hold more water and improve infiltration. Attention to practices that restore soil properties will also improve root health and enhance recovery of the water stored in the soil.

The soil density (hardness) and aggregation both play a role in determining water retention and water infiltration. Compact soils with a high bulk density cause stunted plants and roots. The dense soil also will reduce aeration and microbial activity. Soils with more organic matter have a lower bulk density than soils depleted of organic matter.

When soils are properly aggregated, their density (hardness) decreases, and roots can take up more water and nutrients. This translates into greater tree growth, yield, and water productivity.

Enhancing Soil Health Boosts Water Productivity of Almonds



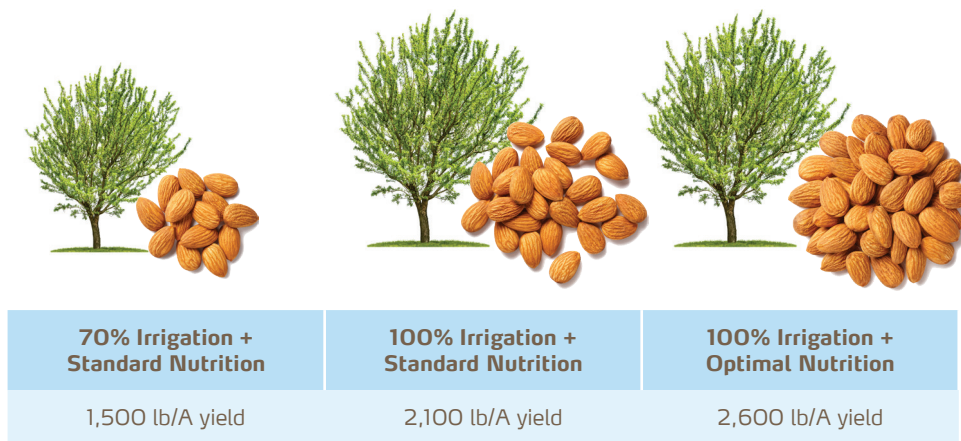
Atwater, CA; Yield with deficit irrigation estimated with Univ California coefficients

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Plant nutrition and water productivity

The link between plant nutrition and water productivity has been known for many years. Irrigation water productivity is optimized with healthy plant growth and the greater yields that result from optimal nutrition. Based on studies from around the world, it is clear that appropriate application of balanced nutrition will increase crop water productivity. The water efficiency gained from proper nitrogen fertilization has been the most studied, but the benefit of all eliminating yield-robbing nutritional factors is true for every nutrient. Of course, it is important that all the 4R's of nutrient stewardship factors (Right Source, Rate, Time & Place) are implemented to get the most benefit of improved water productivity.

Proper Almond Nutrition Boosts Water Productivity



Modesto, CA; Yield with deficit irrigation estimated with Univ California coefficients

Achieving Improved Irrigation Water Productivity

There are two paths forward for improving irrigation water productivity.

One option is to slash the amount of irrigation water delivered to almond farmers. The University of California estimates a 1:1 reduction in almond yield as water is reduced. For example, a 30% reduction in applied water will lead to a 30% yield reduction. This approach is counterproductive for improving the efficiency of the applied irrigation water and is detrimental to farmers and to resource conservation.

The second option is to enhance the efficiency of water use by boosting yields above what is currently achieved, while using the same amount of water. Achieving this increased efficiency will require improvements in water management and irrigation practices, tree health, and soil-building practices.

Yara and the BetterSoil Alliance are pleased to provide crop solutions to these pressing water efficiency issues. YaraLiva fertilizers supply almonds with a soluble source of non-acidifying nutrients in the nitrate form preferred by almonds. YaraLiva's excellent compatibility with drip irrigation makes it convenient to apply at just the right time to meet the key periods of almond growth.

The PhycoTerra® provides an additional soil management tool to stimulate the microorganisms responsible for building soil aggregation, boosting the water-holding capacity, and improving the root environment.

The information provided is accurate to the best of Better Soil Alliance members' knowledge and belief. Any recommendations are meant as a guide and must be adapted to suit local conditions.