



Agronomic Principles to Help During Drought Periods

By Robert Smith, Agronomist, Ultra Gro

California's Central and Coastal Valleys are the state's agriculture hub, producing over 400+ agricultural crops. From almonds to strawberries, avocados to wine grapes, or artichokes to walnuts, California is the sole producer of more than 20 fruits, vegetables, and nuts and accounts for over 73% of the total production including citrus. Years of man-made drought coupled with this year's lack of rainfall have increased food prices and threatened supplies around the nation. This situation has occurred before, the latest was 2015, and few preparations have been rendered to alleviate the extreme water shortage at this time.

Drought is defined as "a period of abnormally dry weather, sufficiently prolonged for the lack of water to cause serious hydrologic imbalance in the affected area" (Huschke, 1959, p. 180). Agriculturally, this means that the amount of water available can no longer meet the needs of the crops that are being grown.

California growers are well-versed in the art of water conservation. Navigating a dry season and drought conditions means it is essential to make every drop of water count. A well-planned plant driven nutrition plan and managing plant stress during peak heat/drought stress will help.

High temperatures will lead to high amounts of evapotranspiration, requiring the need for more irrigation for crop use. If enough moisture is not available during such hot days, the crop becomes more stressed, and this can lead to yield reductions.

Since a drought situation is not "business as usual," there is a need for a carefully planned strategy on how best to utilize the water that is available. An important consideration is to analyze the economics of the situation since it is different from normal years. The focus should be to optimize your economic returns with the water that is available. It is critical that you know exactly how much water you can apply at any one time and over the duration of the growing season. This may involve a re-evaluation of your irrigation system (e.g., well capacity and emitter flow) and proper upkeep to maintain optimal system performance.

Because available water is scarce during a drought, there is a tendency to irrigate without also thinking about leaching the accumulated salts from the soil surface. It is important to note that a build-up of salts can occur on the farm if insufficient water is applied to leach out the excess salts. Salt accumulation will affect yields and crop quality.

To avoid soil salinity issues, you should know the quality of your water and calculate the leaching requirement along with the crop demands for water. Agricultural irrigation water testing can help. Your water should be tested for the following factors: Sodium (Na), Calcium (Ca), Magnesium (Mg), Potassium (K), Nitrate (NO₃), Chloride (Cl), Sulfate (SO₄), Boron (B) 17. Residual Carbonate (RSC), Carbonate (CO₃) 18. Sodium Adsorption Ratio (SAR), Hardness, Alkalinity, Total Dissolved Solids (TDS), Electrical Conductivity (EC), Percent Sodium (Na%), Bicarbonate (HCO₃). The most important factors to consider in irrigation water quality are:



total salt content as measured by electrical conductivity (EC) or total dissolved solids (TDS) and sodium hazard as measured by sodium adsorption ratio (SAR) or sodium percent sodium (Na%); and (3) boron.

Testing soil salinity should include Comprehensive Salinity (saturated paste extraction) Sodium (Na), Carbonate (CO_3), Calcium (Ca), Bicarbonate (HCO_3), Magnesium (Mg), Chloride (Cl), Potassium (K), Nitrate-nitrogen ($\text{NO}_3\text{-N}$), Boron (B), Sulfate (SO_4), pH, Electrical conductivity (EC), Total soluble salts (TSS), Sodium adsorption ratio (SAR), and Exchangeable sodium percentage (ESP).

California's climate is normally hot and dry during the summer months, but drought conditions and higher-than-average temperatures make farming even more challenging. The establishment of these strategies can be used to ensure that your farm remains productive during drought.