For much of the world: It is all about the water.

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Dry areas are characterized by persistent water scarcity and commonly suffer from land degradation. Yet, dry areas occupy about 40 percent of the Earth's land area and are home to 2.5 billion people, roughly 35 percent of the world population. Although challenging, agricultural production can, and must, be increased in these areas to help meet the projected 70 percent increase in food by 2050 to meet the demands of a growing and more prosperous world population. Conservation agriculture (CA), a system based on the principles of permanent soil cover, minimum soil disturbance, and crop rotation, has potential to improve crop yields while improving the long-term environmental and financial sustainability of farming. However, implementing the principles of CA becomes increasingly difficult moving from cool and humid regions to hot and dry regions. The yields (Y) of grain and fiber crops depend on the amount of water used for evapotranspiration (ET), the portion of ET used as transpiration (T), the units of T required to produce a unit of aboveground biomass (TR), and the harvest index (HI) which is the weight of the harvested product divided by the aboveground biomass of the crop. These factors can be mathematically expressed as Y = ET x T/ET x 1/TR x HI. Changing any one of the factors usually results in a change in the others. The amount of ET is the most important factor and the one that CA can affect, and increasing ET generally increases all the other factors in a positive manner so yields increase significantly. For example, it is common to see a doubling of ET result in a four-fold increase in yield. These factors will be discussed and examples will be presented regarding how the equation can be used to estimate the benefits of management strategies.