

Limited Irrigation of Maize and Cotton in Semi-arid Eastern Mediterranean – Part II: Water Use and Stress

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In the semi-arid eastern Mediterranean region, crop production occurs under water stress conditions, an expanding situation due to increasing shortages of water. Simple tools and methods are needed to quantify crop water stress and its impact on final yield. This is particularly important in managing limited or deficit irrigation systems to improve water productivity and optimize yield. The most commonly used water stress-yield relationship describes the fractional decrease in yield as a function of the fractional decrease in evapotranspiration (ET), or simply the ratio of actual to potential ET. Unfortunately, quantifying actual ET is difficult, particularly under stress conditions in which the traditional crop coefficient concept does not apply. Research shows that crop water stress measurements, i.e., porometry and infrared thermometry, can represent actual ET and may be used to predict subsequent changes in yield. The purpose of this study was to explore crop water stress indices under a range of irrigation regimes and their utility to describe yield variations. We will build on results presented in Part I, particularly presenting detail measurements of climate, soil, and crop including midday measurements of maize and cotton stomata resistances as a surrogate measure of actual ET. We will discuss the utility of midday measurement of crop water stress in managing deficit irrigation.