FIELD EVALUATION OF A REMOTE SENSING BASED IRRIGATION SCHEDULING TOOL

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Abstract

The standard crop coefficient approach to estimating crop water demand has found wide application to irrigation scheduling over the past few decades. Standard crop coefficients are designed to estimate evapotranspiration (ET) under “standard conditions” which, according to FAO-56, represent “the upper envelope of crop ET where no limitations are placed on crop growth due to water shortage, crop density, or disease, weed, insect, or salinity pressures”. Thus, the standard crop coefficient approach can tell you how much water a crop would be using if it were growing under “standard” conditions. To produce objective estimates of the water used by crops in specific fields, an approach has been developed in which the crop coefficient is determined directly from the observed growth of the crop. In this "spectral crop coefficient" approach, the value of the crop coefficient on any day during the growing season is numerically equivalent to the crop ground cover. Thus, the spectral crop coefficient has a physical interpretation in terms of the growth of the crop in a field, as opposed to the purely empirical nature of the standard crop coefficient. GC for fields in an agricultural region can be easily evaluated from periodic remote sensing data. Whereas the standard crop coefficient is multiplied by reference ET to produce an estimate of crop ET, the spectral crop coefficient is multiplied by the potential ET for the specific crop in the field to produce a field-specific estimate of crop water use. Like reference ET, crop PET can be calculated from regional weather observations. In this presentation, we will describe the theoretical background behind the development of the spectral crop coefficient approach. We will also present data from a field study conducted in the Texas Rolling Plains comparing the remote sensing based irrigation to the standard crop coefficient based irrigation.