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Smart irrigation: Agricultural water savings with improved irrigation scheduling

Smart irrigation apps were developed by a working group of faculties from the University of Florida and University of Georgia. The apps provide real-time irrigation schedules for selected crops (i.e., avocado, citrus, cotton, peanut, strawberry, and vegetables). Irrigation schedules in the smartphone apps are based on evapotranspiration or a water balance methodology using real-time weather data from the Florida Automated Weather Network and the Georgia Environmental Monitoring Network. The FAO Penman-Monteith method is used for calculating reference ET, and crop coefficients (Kc) are applied based on time after planting, calendar month, or a crop's phenological stage. The functionality of each app was customized for each user group considering the most common irrigation systems used. Custom features include water conservation options, splitting irrigation events, spreadsheet output emails, and notifications. App inputs vary by crop (primarily due to the irrigation system used); however, all apps require root depth, irrigation rate, and soil type except the strawberry app. App outputs also vary and include estimated reference ET, days between irrigation events, irrigation depth and duration, accumulated rain for previous seven days, and growing degree days. National Weather Service forecast data are also provided in the apps. The apps are available in Android and iOS stores. A limitation to the app irrigation schedules is the spatial variation in rainfall, given the finite set of weather stations. Future efforts will focus on more accurate inclusion of rainfall into the irrigation schedules generated by the Smart irrigation apps. Validation of the apps in multiple season replicated plots at grower fields resulted in water savings for citrus, tomato and lawn of 24%, 33%, and 57% respectively. Cotton app improved yield with similar recommended water amounts.

Biography

Kelly T Morgan and his research program has collected data and developed products that have led to substantial nutrient and water savings in Florida, with emphasis on citrus, vegetable and sugarcane production in central and south Florida, resulting in improved water quality. The sandy soils of Florida require substantial amounts of both nutrients and irrigation for maximum production. The emphasis of his research program has been field-scale nutrient and water use, which go together to improve water quality. He provides extension presentations state-wide to grower groups on improvement of nutrient use efficiency to improve yields as well as reduce impacts on water quality. He has used his research activates to develop crop models on both state-wide and local scales. As a result, he has led or co-led several modeling efforts to reduce water use and the impact of agriculture on water quality. These efforts are key to future sustainable agriculture.

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