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Incidental Recharge in the Lower Flint River Basin: Agricultural Irrigation and Consumptive Use

The purpose of this study is to develop a method to estimate the consumptive irrigation use of water in the Lower Flint River Basin. Based on a derivative of the soil-water balance equation, it utilizes evapotranspiration rates, crop coefficients and effective precipitation and quantifies what volume of water applied for irrigation purposes is utilized by plants (irrigation consumptive use) and how much percolates below the root zone (deep percolation) and essentially returns to the system as incidental recharge. Our goal of is to estimate the net differences in irrigation use taking into account the actual consumptive use after controlling for soil profile, runoff , spray and drift losses and any contribution to the root zone from groundwater sources. The impetus for this study stems from the need of Georgia's water managers to find more effective ways to manage agricultural irrigation given that roughly a quarter of Georgia's economy is driven by agricultural activities, with crop production accounting for approximately 40% overall. More importantly, of the 1.2 million acres or so devoted to crop production, well over 50% lie within the confines of the Lower Flint River Basin. However, factors such as the spatial, temporal and uneven distribution of rainfall, the poor "moisture holding" capacity of the predominantly sandy soils in the Coastal plain and extensive relative periods of high temperature in the 90° F to 100° F range, have made irrigation management in southwest Georgia a uniquely complex and challenging enterprise. Consequently, this study will examine three of the predominantly cultivated crops in the Lower Flint River Basin (peanuts, corn and cotton), estimate their consumptive use and their incidental recharge over a growing season.

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