The Missing Piece: Estimating Unreported Irrigation for Sustainable Water Management

Laljeet Sangha[12], C. Prakash Khedun[12]

[1]Department of Agricultural Sciences, Clemson University, Clemson, SC 29634
[2]South Carolina Water Resources Center, Clemson University, Pendleton, SC 29670

Irrigation is the predominant consumptive use of water in the United States, accounting for 62% of total consumption. This significant reliance on irrigation underscores the necessity for accurate water management strategies, which are currently based on user-reported data. Current regulations exempt small-scale farms/operations from reporting their withdrawal data. This leads to discrepancies in water accounting and represents a challenge in accurately assessing water use and its impacts on water supply and availability. Therefore, it is important to quantitatively determine the considerable volume of irrigation water unaccounted for in the existing regulatory frameworks. We leverage data from the United States Department of Agriculture (USDA), the USDA Irrigation and Water Management Survey (IWMS), and meteorological data from NOAA to estimate irrigation water withdrawals in South Carolina. A distinctive feature of our methodology is that it distinguishes between unreported withdrawals from small and large farms, which enables a detailed spatial analysis of counties where cumulative withdrawals from small farms are significant yet traditionally underrepresented. It offers a necessary framework for accurately assessing irrigation withdrawals, which is crucial for the practical management of water used for supplemental irrigation. Our findings underscore the importance of incorporating reported and unreported data into developing irrigation water management plans and permits. Further, it reaffirms the necessity of addressing the critical issue of underreported water use in agricultural planning and policy formulation, thereby facilitating a more informed and sustainable approach to water resource management across diverse agrarian landscapes.