INFLUENCE OF IRRIGATION AND DRAINAGE PRACTICES ON WATER RESOURCES

Lily-2425
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Zoom link: https://purdue-edu.zoom.us/j/4382088668?pwd=dlBGWVVNaUF3VlhtTVpyODc4ajM3dz09

Sadia A. Jame

A graduate student in ESE, Sadia's home department is Agricultural and Biological Engineering. In addition to her Bachelor's degree in environmental sciences from Bangladesh, she holds a Master's degree in Environmental Studies from Lamar University in Texas. Sadia received PGSG and Summer research grants from Purdue University, as well as the Bilsland and Joseph P. Chu fellowships. She studies the effects of agricultural practices such as irrigation and drainage systems on water resources and how groundwater rights contribute to groundwater use. cycle. She is also interested in identifying groundwater and surface water stress variability in critical areas. Among the journals in which she has published her work are Water Resources Management, Environmental Research Letters, and Journal of Applied Engineering in ASABE. Sadia has participated in many local and global community services and wishes to continue doing so. Additionally, she enjoys hiking and is an avid nature lover.

ABSTRACT

Climate change, misallocations, and overuse have resulted in water stress, a condition where available water resources are not enough to meet needs, in many parts of the US. At the same time, increasing seasonal precipitation, and more intensive management practices mean subsurface drainage is expanding in the Midwest, changing the hydrologic balance of river basins. In this work, watershed-scale measures of surface water and groundwater stress were calculated to explore the spatial and temporal variability of stress in the US. In much of the Western US, which has been in a water stress situation for 35 years (1985-2015), both groundwater stress and surface water stress are continuing to rise. Groundwater doctrines such as absolute ownership, correlative rights, and reasonable use encourage groundwater withdrawals during times of stress. The fraction of irrigation coming from groundwater is growing, suggesting a potential shift in the preferred water source. Subsurface drainage is a common practice across vast areas of the US Corn Belt. Subsurface drainage can provide a better crop-growing environment. However, by lowering the water table, drainage can reduce groundwater recharge. To better understand the mechanism of how agricultural drainage practices influence aquifer recharge, the VIC model was utilized to represent subsurface drainage and groundwater storage in the Upper Wabash River basin. When using controlled drainage, recharge rates increased compared to free drainage. The mean annual difference between free drainage and controlled drainage was 16 mm/year for the 30-year study period (1983 to 2012).