ECONOMIC ANALYSIS OF IRRIGATION SCHEDULING METHOD ON COTTON PRODUCTION IN GEORGIA AND NORTH CAROLINA

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Abstract

The southeastern United States has been historically a sufficient water area, with enough surface and groundwater resources to meet demand. However, the expansion of irrigated crop area coupled with new demand due to economic and population growth has put increasing pressure on the water resources of the region. In Georgia, cotton is the largest row crop in terms of the value of production and planted acres. Even though Cotton is a relatively drought-tolerant crop, an increasing amount of irrigation is applied to cotton production with the goal of improving productivity. Various studies have demonstrated that irrigation can improve cotton yield. However, the limited analysis is available to investigate the economic benefit and cost of irrigation on cotton production.

A study was conducted in 2016 and 2017 to compare cotton yield and quality in dryland and irrigated plots using UGA Checkbook Method in Georgia and North Carolina. The UGA checkbook irrigation method, developed at the University of Georgia, schedules irrigation according to the cotton water requirement during the growing season. It serves as a guideline for farmers to determine when and how much to irrigate to keep the crop in a well-watered state. Both dryland and Checkbook Methods were used in Georgia for 2016 and 2017. For North Carolina, only dryland production was planted in 2016. Economic profitability was analyzed by considering the cost of irrigation, cotton yield and quality, harvesting and ginning cost, and the prices for cotton lint and seed.

Results indicated that in 2016, where there was adequate rainfall, irrigating according to the checkbook approach somewhat negatively impacted yields and net returns in Georgia. In 2017, where there was adequate rainfall and irrigation did not affect yield, irrigating according to the checkbook significantly decreased net returns in Georgia. In North Carolina in 2016, where there was an extreme drought and low yield environment, cultivars differed significantly in yield and net returns. These results indicated that the checkbook method utilized is overly simplistic, and can decrease net returns if broadly applied, especially in environments where rainfall is sufficient or excessive. Some changes to the Checkbook approach have been made since this work was done, and there are Real-Time, Evapotranspiration (ET)-based approaches which should improve water use efficiency and profitability.