

Agronomic and Economic Effects of Irrigation and Rotation in Peanut

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Although the Southeast U.S. receives an average annual precipitation of 1300 mm, peanut (*Arachis hypogaea* L.) yield is often limited by erratic seasonal distributions. Studies were conducted from 2001 through 2016 at the USDA/ARS Multi-crop Irrigation Research Farm in Shellman, GA (84°36' W, 30°44' N) on a Greenville fine sandy loam (fine, kaolinitic, thermic Rhodic Kandiudults). Irrigation scheduling was managed by Irrigator Pro for Peanut (developed by USDA/ARS for irrigation scheduling in peanut). The objective of this long-term study is to evaluate the effects of irrigation and crop rotation sequencing on yield, sound mature kernels and sound splits (SMKSS), and net returns. When averaged across all years, irrigation increased pod yield (1,490 kg/ha: $p < 0.001$), SMKSS (5.1%: $p < 0.001$), and net returns over variable cost (\$385/ha: $p = 0.02$) compared to non-irrigated. Six different rotation sequences were addressed inclusive of continuous peanut, one year out of peanut with corn or cotton, and two years out of peanut with combinations of corn and cotton. In both irrigated and non-irrigated peanuts, the lowest and highest yields resulted in continuous peanut and the two year out rotations, respectively. No peanut yield difference resulted for corn or cotton within the rotation sequence but length of rotation influenced peanut yield and net returns. Profitability and optimal rotation sequencing within the entire cropping system will depend on yield, prices, and production costs for peanut, corn, and cotton.