Effect of Irrigation Levels on Peanut Production and Profitability

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The Ogallala Aquifer has been depleting rapidly, and this poses a significant long-range challenge to agriculture in the southern High Plains area of Texas. Peanut is one of the most important crops in this region but requires more water relative to some crops. Therefore, it is important to develop peanut varieties that are profitable in production under water deficit. This research was designed to test for 24 accessions under three different irrigation levels: 75% ET replacement, 50%, and long-range dryland modeling irrigation, which can be considered as “full”, “limiting”, and “drought” treatments, respectively. It has been known that when peanut plants are under water deficit stress, pod yield decreases, and the number of immature seeds increases. However, some accessions may have good yield with less irrigation, and might be profitable under water deficit irrigation. In this research, yield from each plot was calculated for economic analysis. After three years of tests, results showed that the accessions and irrigation treatments were both significant. This indicates not only that yield is influenced significantly by irrigation treatments, but also some accessions can have higher yield than others under drought stress. Seed quality was also graded based on industry standards for estimating profitability. Revenue ($/ac) was calculated based on yield (tons of pods/ac) times the value per ton for each plot, and it shows a significant interaction between irrigation treatment and genotypes. One of the breeding lines had the highest revenue among all genotypes including some current varieties when under water deficit stress. This has a potential to be released or used as breeding material for developing drought tolerant peanut varieties.