

## **The Evaluation of Vegetation Indices to Assess Yield and Crop Quality Parameters in Peanut.**

**S.P. STUDSTILL\***, W.S. MONFORT, C. PILON, and R.S. TUBBS, Department of Crop and Soil Sciences, University of Georgia, Tifton, GA 31793.

Growers and industry could greatly benefit from a decision aid tool that estimates crop yield quality across a field. This information can be used by buying points to prepare for post-harvest storage decisions for peanuts. With this idea in mind, an objective was created to evaluate vegetation indices (VI) using aerial imagery to determine correlations to yield (kg/ha) and crop quality parameters such as total sound mature kernels (TSMK), loose sound kernels (LSK), other kernels (OK), sound splits (SS), and foreign material (FM). Aerial images, consisting of red (R), green (G), and near infrared (NIR) wavelength bands, were taken of 3 peanut fields in 2018 and 12 fields in 2019. Fields were separated into zones using the NIR image based on previous research in Australia and zones were harvested independently of each other. Yield and crop quality parameters were recorded for each of the 22 zones in 2018 and 46 zones in 2019. Images were then processed in ArcMap 10.5 to create 10 different VIs and mean pixel values for each zone were recorded for each VI. All zone data were compiled, and correlations were run to compare yield, TSMK, LSK, OK, SS, and FM to mean pixel values for R, G, and NIR images as well as derived VIs. Results showed that yield was correlated to TSMK, LSK, and FM with correlation coefficients of 0.73, 0.74, and 0.80 respectively. Yield and LSK had the strongest correlations with the green ratio VI with a correlation coefficient of 0.73 and 0.98, respectively. TSMK and OK had the strongest correlations with the normalized R VI with correlation coefficients of -0.93 and -0.70, respectively. SS had the strongest correlation with the normalized G VI with a correlation coefficient of 0.54, and FM had the strongest correlation with the difference VI with a correlation coefficient of 0.64. Using the VIs with strong correlations to yield and crop quality parameters, a model can be created that can estimate peanut yield and quality before the crop has been harvested.