Site-specific farming research at Florence, SC, began in 1984 with a topographic survey and subsequent detailed soil mapping by local USDA-SCS staff. An area that was representative of the coastal plain soil types was planted to corn in 1985. Since then, five crops of corn (*Zea mays*), three of wheat (*Triticum aestivum*), three of soybean (*Glycine max*), and one of grain sorghum (*Sorghum bicolor*) have been grown. Harvested plots were located using surveying techniques, and the plot outlines were overlaid onto the soil map to determine the corresponding soil map unit. To date, over 3000 plots have been measured. Analysis of variance indicated that differences in mean yields were significant, but inspection suggested that intra-map unit variance was nearly as large as inter-map unit variance. Attempts to explain variation in yield using both statistical regression and mechanistic modeling were not successful. Geostatistical analysis produced the expected patterns of high and low yield, but yr-to-yr variation in mean yield masked underlying patterns. A method developed to normalize annual variability in mean yield, while accounting for shifts in location of sampled yields, produced composite maps of relative yield. These maps should be useful for setting target yields of various soil types, thus allowing calculation of fertilizer requirements. This research has provided much new knowledge about inherent variation expected for these soils, as well as having started a baseline from which to judge annual variability of yield for regional soils and crops. Interpretation of these results and extension of the information to make fertility and irrigation recommendations depends on the successful quantitative description of the causes of variation among soil types under regional climate. Despite problems encountered during this work, mechanistic simulation models appear to be the most likely tool to achieve this objective.