THE INTENSITY OF NORTH CAROLINA CROPLAND USE

The intensity of cropland use significantly affects the environmental outcomes of crop production. In large part, yearly vegetative cover determines the propensity of soils to erode by water and wind and to accumulate soil organic carbon. The study to be presented aims to gain insights into the extent, spatial variability, persistence, and economic drivers of cropland use intensity in North Carolina. We categorize cropland use in four broad categories, with progressively longer time period of soil coverage: fallow (land is bare all year long); single season crop (land is covered from the spring through the fall); double cropped land (land is covered for the majority of the year); and hay and pasture (land is covered year-long). We use the 2008 - 2018, GIS-based Cropland Data Layer (CDL), which provides remotely sensed data on crop type on an annual basis, for the state’s three major crop production regions: Northern Coastal, Central Coastal, and Southern Coastal crop reporting districts. We overlay the CDL data for multiple, consecutive years to estimate Markov chain models, in which the probabilities of year-to-year transitions of cropland between alternative land use intensity are postulated to be the functions of crop prices, climatic factors, and soil properties.

We find that the single season crop use has the highest probability of remaining in the same intensity a year after, over 0.9. The probabilities of land remaining double cropped, fallow, and pastured for two consecutive years average 0.1, 0.4, and 0.7, respectively. We also find that the changes in crop prices are good predictors of the changes in land use intensity. The improved understanding of the extent and the persistence of alternative intensities of cropland use will help in understanding the ensuing environmental outcomes of crop production in the region.