

# Need to Develop Soil-Quality-Index to Understand Distribution and Amount of Soil Organic Carbon in Texas

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Land-cover change (LUCC) affects soil quality and soil organic carbon (SOC) distribution. SOC sequestration is dependent on climate. Studies in Texas were interested in SOC distribution, how it is influenced by long-term management practices, and understanding their effects on total carbon (C) distribution. There is a need to develop a SOC distribution and LUCC intersecting index for Texas.

The study investigated the impact of residue management on SOC distribution and total C mass across north-west to southeast Texas. Long-term research plots were sampled at three locations. SOC was measured to evaluate distribution and mass. Results indicated that no-tillage management increased SOC concentration and mass in the surface by 0.07 m compared other methods. Fertilization showed minimal impact on SOC sequestration across sites. SOC sequestration is feasible under Texas's climatic conditions, but the potential amounts appear limited. The results determined SOC sequestration is feasible under Texas climatic conditions, and the need to optimize residue and tillage practices for sustainable carbon management in warm regions. Compared to a study that developed a Soil Quality Index (SQI) to compare six types of land use, SQI was interpolated at landscape scale. A quality model merging both studies' methods, assessing types of land use and impacts of residue management related to SOC could show clear differences in SOC and SQI values for various landscape covers.

**Author:** Ms WENTLING, Kelsey (Environmental Science)

**Presenter:** Ms WENTLING, Kelsey (Environmental Science)

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