

Finding the real potential of no-till farming for sequestering carbon

The potential of no-tillage (NT) soils for increasing the soil organic carbon (SOC) pool must be critically and objectively assessed. Most of the previous studies about SOC accrual in NT soils have primarily focused on the surface layer (

Humberto Blanco and Rattan Lal at The Ohio State University have investigated the impacts of long-term NT-based cropping systems on SOC sequestration on a regional scale in the eastern Corn Belt region under the Midwest Regional Carbon Sequestration Partnership (MRCSP) initiative funded by the U.S. Department of Energy's Carbon Sequestration Program.

For this particular study, they measured the SOC pool for the 0- to 60-cm soil depth under paired NT and plow tillage (PT) based cropping systems across 11 soils in Kentucky, Ohio, and Pennsylvania during spring 2007. The paired on-farm fields were sited on a similar soil and slope and under similar cropping systems with corn (*Zea mays* L.)-soybean (*Glycine max* L.) as the dominant rotation.

The results of this regional study, published in the May-June 2008 issue of Soil Science Society of America Journal, revealed that NT farming impacts on SOC sequestration depended on soil type and sampling depth. The SOC pools in NT exceeded those of PT in five out of 11 soils, but only within the surface layer (0- to 10-cm depth). Below the 10-cm depth, NT soils had equal to or even lower SOC than PT soils. The total SOC pool to 60-cm depth in NT was similar to those of PT soils. In some cases, the total SOC pool in PT soil was about 30% higher than in NT soils. The higher SOC pool under PT fields may be attributed to incorporation of crop residues in the subsoil and deeper root growth. Because the data for this study were obtained under on-farm conditions, results may be influenced by differences in soil profile, land use history, and cropping intensity.

The data from the 11 soils show that NT farming increases SOC concentration in the upper layers of some soils but does not store SOC more than PT soils for the entire soil profile. Blanco and Lal stated, "if the SOC pool was measured only within the surface soil (

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