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Long-term tillage induced differential C and N responses

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Graduate student Binaya Parajuli analyzing active carbon concentrations in soil extracts. Photo by Pratima Poudel.

Continuous intensive soil tillage often leads to degraded soil health, impairing the sustainability and productivity of agricultural soils. Conservation tillage is widely recommended to reverse such degradation with a major focus on increasing organic carbon content and nutrient availability in soils. However, long-term effects of conservation management practices are not well defined.

In the *Soil Science Society of America Journal*, researchers report a 40-year field study on sandy soils in which the long-term outcomes of conservation tillage were evaluated against conventional tillage. The team found that conservation tillage increased soil carbon concentrations but only at the 0- the 5-cm depth while conventional tillage improved nitrogen availability but only in soils from 5 to 15 cm. Both practices induced higher microbial biomass and activities at those respective soil depths.

While the results reinforced the concept that carbon and nutrient availability regulate microbial biomass, the contrasting conservation versus conventional tillage impacts suggested a potential decoupling of carbon and nitrogen cycling in soils after long-term soil management, distinguished by tillage types.

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Parajuli, B., Ye, R., Luo, M., Ducey, T.F., Park, D., Smith, M., & Sigua, G. (2021). Contrasting carbon and nitrogen responses to tillage at different soil depths: An observation after 40-year of tillage management. *Soil Science Society of America Journal*, *85*, 1256–1268. **https://doi.org/10.1002/saj2.20277**

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