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On-farm evaluation of soil health in different agricultural production systems in Tennessee.

Abstract: Conventional annual systems need frequent tillage operations which increases soil erosion and other soil health issues compared to cover crop and perennial systems. Previous research showed that the soil health was enhanced through the use of seasonal cover crops and perennial forages compared to conventional annual systems. Thus, the use of seasonal cover crops and perennial forages would have a positive effect on soil health compared to conventional corn-soybean rotations. The main objective of this study is to evaluate soil health among conventional annual systems with fallow rotation, annual systems with seasonal cover crops, and perennial forage systems. We evaluated various soil health indicators in farmers' fields in Franklin County Tennessee. We found higher soil organic carbon in perennial hay fields compared to annual systems with cover crop fields and conventional annual systems. We also found higher nitrate nitrogen in conventional annual and perennial systems compared to annual systems with cover crops. Enhanced SOC and permanganate oxidizable carbon (POX-C) in perennial systems indicate that such systems are promising for soil health. The higher nitrate N in conventional annual and perennial systems could be a consequence of lower moisture in such systems compared to cover crop annual systems. The same producer fields continue to be monitored for slow-changing soil health indicators.