



**Tuesday, 14 November 2006**  
**198-6**

## **Towards the Carbon Credit and Trading Schemes: Estimation of Soil Carbon Storage as Influenced by Alternative Cropping Systems Using the EPIC Model.**

**Hillarius Kludze** and Dave Archer. North Central Soil Conservation Res, 803 Iowa Ave, Morris, MN 56267

Model-based approaches to quantifying, monitoring, and verifying soil carbon sequestration (SCS) have the advantages of being low-cost and convenient, and the ability to provide information on long-term soil C dynamics resulting from different management practices. Using the EPIC Model, we examined the differences in the capabilities of five different within-field soil series to sequester carbon under a wide range of cropping system treatments including two types of systems: conventional and organic, two tillage treatments: conventional and strip tillage, two crop rotations: corn-soybean and corn-soybean-spring wheat/alfalfa-alfalfa, and two levels of fertility management: fertilizer/manure and no fertilizer/manure. At 0.2 m sampling depth, EPIC Model results for the field treatments show that carbon sequestration would be maximized either in an organic cropping system by using strip tillage and the corn-soybean rotation with a rye cover crop and using manure for fertility, or in a conventional system by using strip tillage and the four-year rotation. At 1.5 m sampling depth, the organic cropping system with strip tillage, four-year rotation, and manure fertilized treatments became dominant in sequestering soil C. The 'business as usual' conventional system of using conventional tillage and two-year corn-soybean rotation with chemical fertilizer enhanced C losses. Sequestration occurred mostly within 10-15 years and declined thereafter. At the farm scale, adoption of a single cropping system for potential maximum SCS, irrespective of within-field soil heterogeneity, still appears feasible. This could be important to many stakeholders in implementing site-specific management for optimum SCS, and in helping to determine how much C is sequestered to warrant payments in carbon credit and trading schemes.

[Back to Tillage and Soil Management: Effects on Soil C and GHG Emissions](#)  
[Back to S06 Soil & Water Management & Conservation](#)

[Back to The ASA-CSSA-SSSA International Annual Meetings \(November 12-16, 2006\)](#)