A Soil’s View

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• The Plan:
  – Remove corn and native prairie grass stover and convert the C to ethanol
• Items to consider:
  – Effects of biomass removal on soil organic matter and ultimately soil quality/sustainability
  – What are we going to do with remaining material (probably high in N and lignin)
• Soil sustainability evolves around the C cycle
Figure 2.1. Overview of the C cycle in cropland ecosystems, showing the major fluxes of organic C. Drawing courtesy of A. Swan, Colorado State University.
C sequestration and Harvesting Biomass

• North Dakota Farmer’s Union is now approved to aggregate C in no-till and lands seeded to grass

• Can we have it both ways?

http://www.sage.wisc.edu/in_depth/kucharik/crp/switchgrass1LG.jpg
45 yr Continuous Corn (Modelled Data)

C sequ. rate (t/ha/yr)

Fraction of stover removed

Retta and Rice, Kansas State University
Other Issues of Interest

• Soil fertility
  – 1859---soil fertility research started
  – Requirements for native grasses (N,P,K, micros)?
    • Best guess---107 lbs N/acre*year ($37/acre*year using ammonium sulfate)
      – More or less for optimum return???
  – Is there a place for legume cover crops?

• Land application of by-products to increase soil C levels, decrease bulk density, increase water holding capacity, and ultimately decrease erosion potentials
  – Distillers grains, glycerol, oilseed crushing