

Renewable Energy Assessment Project (REAP)

Research Unit: A Multi-Location project coordinated jointly by Drs. Karlen and Wilhelm from Ames, IA and Lincoln, NE, respectively

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Research Project: Impact of Residue Removal for Biofuel Production – Renewable Energy Assessment Project (REAP)

Objectives:

1. Determine the amount of crop residue (e.g. corn stover, wheat straw, cover crop, etc.) that must remain on the land to maintain soil organic carbon (SOC) and sustain production.
2. Estimate the trade-off between the short-term economic return to growers who harvest crop residues as biofuel or biomass product feedstock versus the long-term benefits to soil, water, and air resources associated with retaining crop residues to build soil organic matter and sequester carbon.
3. Develop robust algorithm(s) (computer models and/or decision aids) to guide the amount of crop residue that can be sustainably harvested as feedstock for biomass ethanol and bio-based products without degrading the soil resource, environmental quality, or productivity.
4. Develop management strategies (e.g. no-tillage, cover crops, etc.) that will support sustainable harvest of crop residues.

Accomplishments to Date:

1. Several long-term field studies are being used (or initiated) across the U.S. to provide immediate answers regarding the sustainability of harvesting crop residues for bio-energy production.
2. Research report published on amount of source carbon needed to maintain SOC levels (Johnson et al. 2006 Agron. J. 98:622-636).
3. Commentary article on amount of stover needed to replenish soil carbon (Johnson et al. 2006. J. Soil Water Cons 61:120A-125A).

4. Research report published on characteristics of stover harvested with a proto-type one-pass harvester (Hoskinson et al. 2007. Biomass Bioenergy 31:12-6-136).
5. Research Report entitled “Corn Stover to Sustain Soil Organic Carbon Further Constrains Biomass Supply” was prepared and accepted for publication in the Agronomy Journal

Other Expertise or Capabilities:

1. Effective multi-location team has been assembled with participants willing to work cooperatively and to share ideas and data rapidly among team members
2. Several REAP team members have made presentations to technical and non-technical audiences to increase awareness regarding the importance of maintaining soil carbon levels