

# Pennsylvania Department of Environmental Protection



# Initiatives to combat GHG

- Energy Harvest Grant Program
- Small Business Advantage Grants
- Alternative Energy Portfolio Standard
- PA Energy Development Authority

Which one is the carbon sink?



# Soil Carbon Collateral Benefits

- **Less greenhouse gas emission**
  - Uses 37% less energy than conventional corn / soybean production inputs
- **Overall yield not different but...**
  - Organic yields more in drought years ( 28 – 34% higher)
  - Organic builds soil (30% in 24 years)
  - Greater yield under heavy precipitation
  - Nutrients conserved

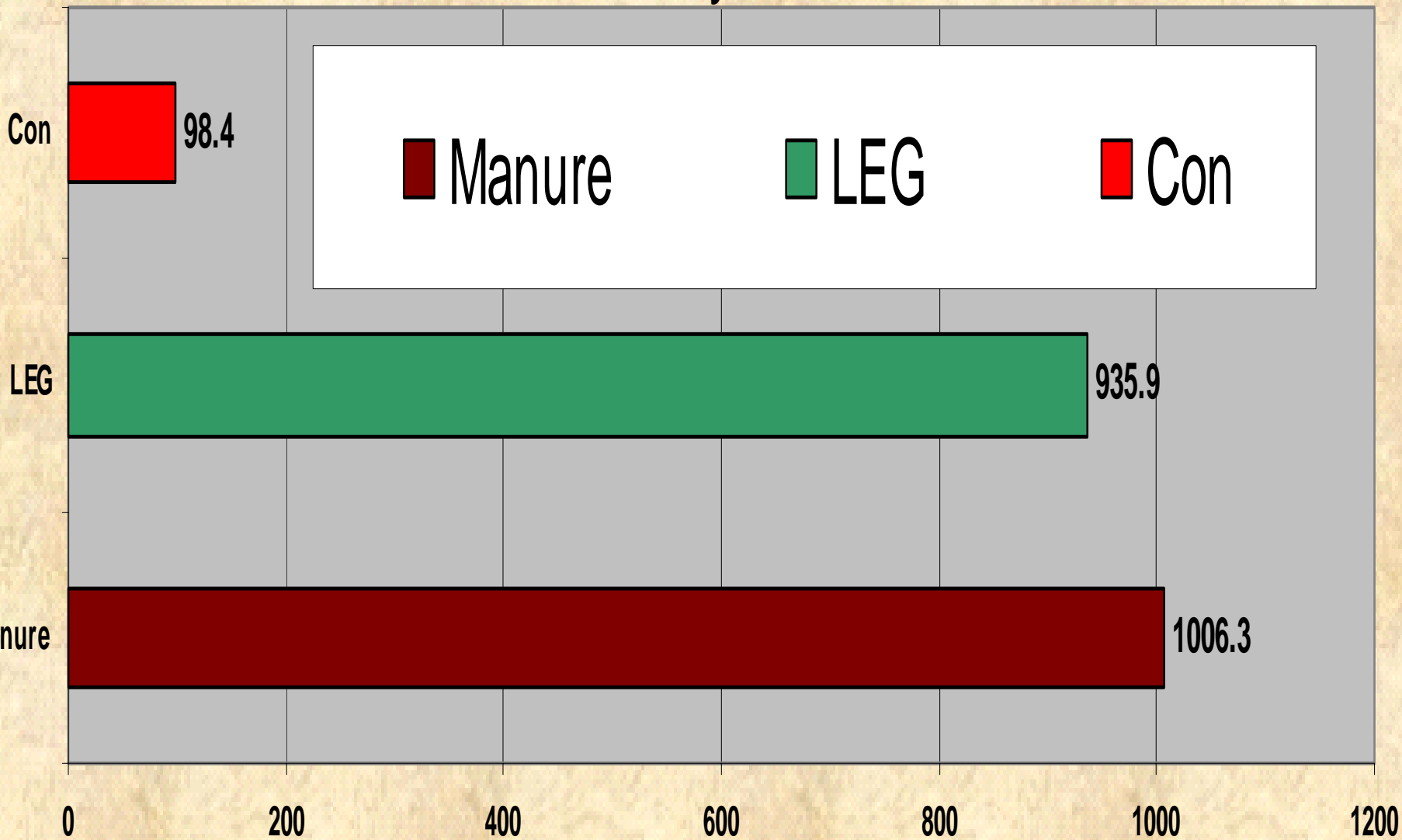
Heavy Precipitation + soil carbon  
deficit = loss of water and soil  
nutrients



# Atmospheric Carbon Sequestration in Soils: *lost in conventional wisdom*

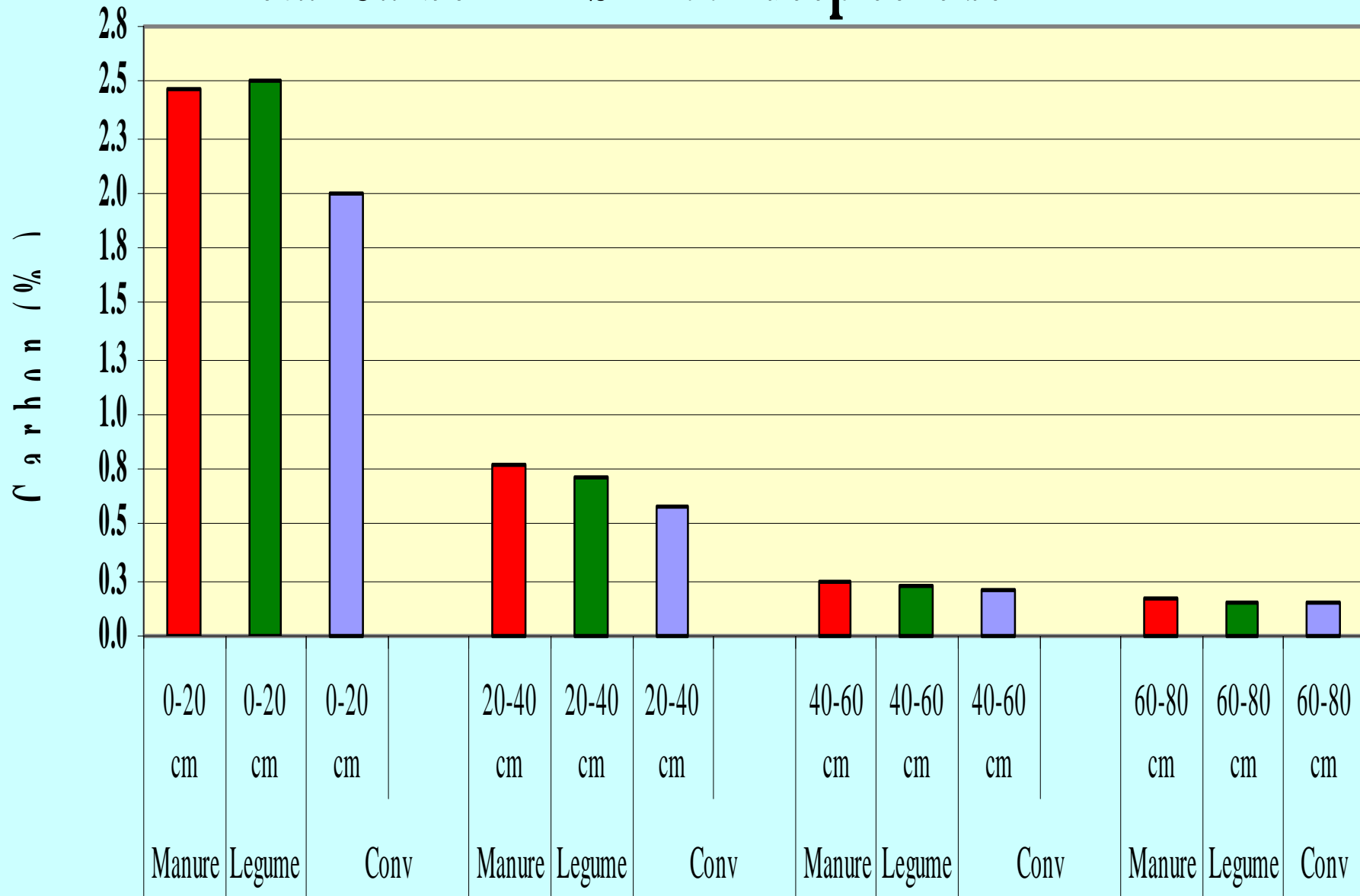
- *Organic manure and legume systems increased soil carbon (15 to 28%) and nitrogen (7 to 15%) over 22 years.*
- *Conventional corn / soybean rotations do not increase soil Carbon or Nitrogen.*

# Carbon Sequestration in Pounds of Carbon per Acre from 2004 Analysis



Carbon per Acre-Year Sequestered 1981 to 2004

# Total Carbon in FST 2004 deep core soil



# C4 Plants and atmospheric carbon

- Attributes of C4 grasses
- Very deep root zones > 10 feet
- Could use marginal lands for long term deep carbon banks
- Very promising energy fuel with potential for carbon cycle capture

# Switchgrass field in harvest



# Erosion in the field next door



# Next Steps

- 2005 Field Trials to deploy advanced soil management technologies
- Westmoreland Switchgrass project
- Interconnect & Net Metering protocol for methane digesters and other distributed power systems.
- Soil Carbon accounting (lysimeters)
- Broaden the base of participants