Soil Health through Conservation Cropping Systems

Jane Hardisty, Indiana State Conservationist
Shannon Zezula, Indiana State Resource Conservationist
Barry Fisher, Indiana State Agronomist
Ray Archuleta, Conservation Agronomist, Natl. Soil Health Team
Clear runoff from no-till field

Conventional-till field

Sediment runoff from conventional-till field

Is the Buffer working? 6/2007

Erosion from bare fields 5/2007

Ray Styer NC

Steve Groff PA

Ray McCormick IN

Gabe Brown ND

Dave Brandt OH
Stable, Sustainable Food Supply

“Insurance” against drought, floods, markets

System No System
Virginia

Un-Managed Pasture Pasture System
Missouri

System No System
Indiana
Synergistic Benefits of the Systems!

Purdue University

Dr. Eileen Kladivko

• Nutrient management, no-till, crop rotation and cover crops were implemented as a SYSTEM!

• Annual Nitrate concentrations in tile water dropped from over 30 mg/l to under 10 mg/l
BENEFITS OF SOIL HEALTH

Lake Erie = sediment and algae plumes 2011

Lubbock, Texas 2011 = particulate matter

Mississippi River Watershed Flood 2011 = flood damage, sediment and nutrients

Worldwide Energy Demand
Indiana’s **SUCCESS** = Measured by Cover Crops
Indiana led the nation in cover crop acres applied in FY11 with 68,141 acres!
From Indiana’s Tillage Transect, there were an estimated 180,000+ acres of cover crops planted for crop year 2011!
INDIANA APPLIED COVER CROP ACRES

TA and Program Focus

Focused Training and Partners

CCSI

Year | Acres
---|---
2004 | 2000
2005 | 2000
2006 | 2000
2007 | 2000
2008 | 2000
2009 | 2000
2010 | 2000
2011 | 2000

Year 2011 shows a significant increase in cover crop acres.
INDIANA’S ROAD TO SUCCESS:

• 2010 – present = Conservation Cropping Systems Initiative (CCSI)

  • CCSI = workshops, field days, and technical assistance to producers

  • To Date = over 130 workshops and presentations; over 7500 farmers and private providers

  • The Future = expand and engage the PRIVATE SECTOR and MONITOR/MEASURE benefits
Conservation Cropping Systems

PUBLIC COST SAVINGS

No System = Higher likelihood for environmental concerns

SOLUTION = Conservation Cropping Systems
60+ acres treated
$16,000 over 3 years
15 hours NRCS staff time over 3 years

Gully Erosion Repair = 1 acre treated
$16,000 to install
40+ hours NRCS staff time
KEY POINTS TO INDIANA’S SUCCESS:

• Soil Health sells conservation to farmers once they understand it
  • Farmers need educated and **High-Quality** technical assistance to successfully overcome the risks

• Conservation Cropping Systems are time-efficient systems that provide significant results

• A consistent commitment from all partners and engaging the private sector is essential
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WILDLIFE

No System = no cover, minimal biology

Solution = Conservation Cropping Systems

Healthy Soil Biota
Conservation Cropping Systems

AIR QUALITY

No System = particulate matters and emissions

SOLUTION = Conservation Cropping Systems

Lubbock, Texas 2011 = particulate matter
Conservation Cropping Systems

WATER QUANTITY

SOLUTION = Conservation Cropping Systems on a watershed scale

No System = more runoff & less water-holding capacity

Mississippi River Watershed Flood 2011 = flood damage, sediment and nutrients
Conservation Cropping Systems

ENERGY

SOLUTION = Conservation Cropping Systems

No System = multiple tillage passes = fuel

Worldwide Oil Demand
CONVENTIONAL Farming

Founded on Tillage:

• Degrades Air, Water, Wildlife…
• Requires multiple trips across the field = more fuel, bigger machinery, repetitive labor
• Excessive runoff, erosion, compaction & nutrient losses
• Releases Carbon and NO\textsubscript{x}
• Disrupts soil biology = Lost soil stability, decreased water-holding capacity & lost nutrient cycling
CONSERVATION Cropping Systems

Founded on No (Never)-Till / Strip-Till:

• IMPROVES Air, Water, Wildlife…
• Requires only 1 trip across the field = less fuel, less machinery, enables skilled labor
• Limits erosion, compaction & nutrient runoff
• Sequesters Carbon and retains NOx
• Improves soil biology = Stable soil + water-holding capacity & functional nutrient cycling
COVER CROPS in the System

Year-Round LIVING Cover:

• Improves Water Quality
• Protects the Soil
• Traps Nutrients
• Reduces compaction
• Increases infiltration

• Promotes Soil Biology
• Builds and Sequesters Carbon
NUTRIENT MANAGEMENT and PRECISION TECHNOLOGY in the System

• Apply right source and right amount, at the right time, in the right place based on soil function, biology and crop need

The Soil is NOT a chemistry set

• Minimizes soil disturbance, compaction and overlap

• Reduces nutrient losses and improves soil biological function
STRATEGIC BUFFERS in the System

• Strategic locations =
  • Low-Yielding Areas
  • Filtering Opportunities

• Reduces inputs, filters sediment and nutrients, provides habitat