



Healthy Land  
Clean Water  
For Life

# Restoring Soil Resources

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# Continuous Improvement Agricultural Production



- Human Resources
- Seed Genetics
- Fertility
- Crop Protection Products
- Equipment
- Soil Resources

# Human Resources

- University Education/Research
- ARS Research
- Science Based Conferences
- Webinars
- Journals and Publications
- Certified Crop Advisors

# Seed - Genetics

- Plant genome mapping
- Plant Breeding, GMOs
- Testing
  - Germination
  - Yield
- Field Days

# Fertility

- Soil Testing
- Nutrient Management Planning
- Four Rs
  - Source
  - Rate
  - Timing
  - Placement
- Manure Utilization

# Crop Protection Products

- Pesticides
  - GMOs
  - Modes of Action
  - Scouting and IPM
  - Product Labels
    - Effective
    - Safety
    - Environmental protection

# Equipment



# Equipment





# Equipment



# Soil Resources

We can't make the same claim that  
over the last

10, 20, 50 150 years

Can we see improvement in our soil  
resources

## Clarion Soil

- A1: 7-12 inches  
very dark brown loam
- A2: 12-18 inches  
dark brown loam
- Bw1: 18-26 inches  
dark yellowish brown loam
- Bw2: 26-36 inches  
dark yellowish brown loam



# Clarion Soil



# Soil Resources

- We measure erosion phases
- Color changes – reduced soil carbon
- Soil accumulation – down gradient
- Tolerable soil loss

# Soil Resources

If we are honest with ourselves:

- 150 years of cultivation has taken a toll on Iowa's soil resources
- The original soil characteristics of Iowa soils are undeniably more productive than current conditions

# Soil Resources

- Conservation practices have offered some measure of protection

# Soil Resources

- Conservation practices have offered some measure of protection
- To meet future demands for food, fuel, fiber, and forage – we need to ~~protect~~ restore Iowa soils



# Cover Crops

- Prevent erosion – as a part of a conservation plan
  - Keep it green
  - Maintain more residue following harvest, through planting
- Without taking our cropland out of production

# Cover Crops

- Restore soil properties - roots
  - Build soil organic matter
  - Improve soil structure
    - Permeability
    - Moisture holding capacity
    - Reduce compaction
    - Soil biology
- Increase soil/crop resilience

# Cover Crop Cropping System

- Not without challenges
  - Weather limitations
  - Labor/equipment
  - Support services
    - Growing agribusiness products/services
  - Learning curve
    - Field days
    - Farmer to farmer
  - Cost/economics

# Continuous Improvement

We have to manage our soil resource as if it is the most important crop production asset we have

Restore soil properties

# Continuous Improvement Agricultural Production



- Human Resources
- Seed Genetics
- Fertility
- Crop Protection Products
- Equipment
- Soil Resources

# Soil Science



- Develop 5-year Research Plan
  - Address the problem of depleted soils
  - National effort to restore soils
- Cover Crops Research Initiative
  - Varieties/cultivars
  - Long term change in soil properties
  - Economics
- Look for a Better Way