Soil Health Benchmark Study
6,468 Current PASA Members and Supporters
What is Sustainable Agriculture?

PASA Farmers Say:

• Financial Viability
  • Soil Health
  • Nutrient Density
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Soil Heath is also Fundamental to Adapting to Climate Change!
PASA Benchmark Soil Health Study:
How are we doing and how can we do better?

FIELD SOIL SAMPLES

FARM RECORDS
• Tillage and cultivation
• Planting dates
• Soil Amendments
PASA Benchmark Soil Health Study:
How are we doing and how can we do better?
Four Soil Health Principles

- Provide Continuous Living Roots
- Minimize Disturbance
- Maximize Biodiversity
- Maximize Soil Cover

Image by CCSI, 2014
SOIL HEALTH INDICATORS FROM FARM RECORDS

DAYS IN LIVING COVER

100% living cover

Tillage Index

Disc plow = 39.0

Tine Weeder = 7.9

50% living cover
Pennsylvania Association for Sustainable Agriculture

Farmers improve their soil

Soil Organic Matter
Organic matter feeds soil life and provides natural soil fertility.

Days of Living Cover
Living cover prevents erosion and protects water resources.

Pasa Farms

Typical Farms

Healthy Soils
Are the foundation of sustainable agriculture

Soil Health Score
Soil health testing integrates decades of research into a score on a 0-100 scale.

237 Days
156 Days
50
80
Cornell Soil Health Scores

No-Till Grain Farms

Organic Vegetable Farms

Cornell Soil Health Scores

50 60 70 80 90 100
PASA Organic Vegetable Farms

Cornell Soil Health Scores
SPIRAL PATH FARM SOIL HEALTH SPIRAL

**COMPOST SYSTEMS:**
To prime biological fertility.

**TRANSPLANT HEALTH:**
To set crops up to build soil as they grow.

**CROP HEALTH:**
To optimize crop soil building potential.

**CROP ROTATIONS:**
To keep soil in living cover.
Helping farmers put soil health numbers in context: Benchmark Study Farm Reports
Farmer-to-Farmer Collaborative Problem Solving:

- Minimize tillage; low/no-till
  - Frustration terminating catchcropping
  - Using winter kill cover crops
  - CR C and interplanted cover crops

- Values a real challenge
- T-plants using a cutting disc to make
  - Plastic strip for high wheel

- Not all motivation comes from
  - Soil health aspirations
  - Looking at non-traditional cover crops
  - Compromises over called crop
  - Some residue in weed weed in compost
  - Using a tarp/fabric farm cover
  - Moving species that need crop rotation

1. Maximizing fertility inputs (closing the loop)
   - Flexibility in crop rotation (based on what soil quotes in addition to what you need)
   - Livestock inc. conservational benefit the very crops
   - Supporting chickens (see organic) using 100-
   - Heavy use over for manure collection into managed compost

   - Being some of tools agencies such as Conservation Districts have avail to rent

2. Integrate livestock with veg production
   - Sheep to control anaerobic
   - Grazing control with livestock (period)
   - Feedlots with chickens for pasture incorporation
   - Diversity in grazed species
   - Lower feed for pasture uptake
   - Moving from spraying to chipping
   - Lower livestock rotation to take advantage of pasture enrichment, and transition stock

   - Challenges of housing/winter livestock areas (impacts on ground, aging problems, runoff)
PASA Indicators: Many Different Paths to Soil Health
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- **Tillage Index** vs. Cornell Soil Health Scores
- **Organic Matter Inputs (T/Ac)** vs. Cornell Soil Health Scores

The graphs illustrate the relationship between tillage index and organic matter inputs with Cornell Soil Health Scores.
PASA Indicators: Many Different Paths to Soil Health

TWO BROAD STRATEGIES FOR OPTIMAL SOIL HEALTH:

1. Healthy Crops, Healthy Soils:
   Intensive crop and cover crop schedules, carefully balanced amendments.

2. Rest and Recover:
   2-4 years of vegetable production, 1-2 years of pasture, hay, or fallow.