AFT-NRCS Economic and Environmental Case Studies: Providing Evidence for Soil Health Investment

Speakers
1. Dr. Michelle Perez – AFT Water Initiative Director & Project Leader
2. Florence Swartz – Consulting Economist & former NRCS-NY Economist for Brian Brant, AFT Ag Conservation Innovations Director & Author, Ohio Case Studies
3. Aaron Ristow – AFT NY Stewardship Program Manager & Author, New York Case Studies
4. Ben Wiercinski – AFT Agricultural Economist & Author, Pennsylvania Case Study
Session Objectives

• Familiarize participants with AFT-NRCS Soil Health Economic and Environmental Case Studies, which provide calculated estimates of the
  • costs,
  • benefits, and
  • return on investment (ROI) experienced by “soil health successful farmers,” and
  • estimates of water quality and
  • climate benefits
• Discuss ways these materials can be used with landowners and producers to encourage soil health practice adoption
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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter/Location</th>
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</thead>
<tbody>
<tr>
<td>1 – 1:15 pm</td>
<td>Objectives, Findings, Options for Use</td>
<td>Michelle Perez (15 min)</td>
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<tr>
<td>1:15 – 1:25</td>
<td>Ohio Case Studies</td>
<td>Florence Swartz for Brian Brandt (10 min)</td>
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<td>1:25 – 1:35</td>
<td>New York Case Studies</td>
<td>Aaron Ristow (10 min)</td>
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<td>1:35 – 1:45</td>
<td>Illinois Predictive Assessment</td>
<td>Sarah Blount (10 min)</td>
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<td>1:45 – 1:55</td>
<td>Pennsylvania Case Study</td>
<td>Ben Wiercinski (10 min)</td>
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<td>1:55 – 2:05</td>
<td>Farmer Guest: Morgan Bond, B &amp; R Farms, PA</td>
<td>Farmer Guest: Morgan Bond, B &amp; R Farms, PA</td>
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<td>2:05 to 2:25</td>
<td>Q&amp;A + Discussion</td>
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<td>2:25 to 2:30</td>
<td>R-SHEC &amp; P-SHEC Tool Kits</td>
<td>Michelle (5 min)</td>
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<td>2:30 to 2:40</td>
<td>Online Economic Tool Demo</td>
<td>Flo (10 min)</td>
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PROJECT BACKGROUND
Why quantify soil health outcomes?

- Scientific evidence exists that no-till or reduced tillage, cover crops, nutrient management, & conservation crop rotations improve soil health, reduce runoff, lower climate emissions, & sequester carbon

- Not enough information about economic benefits associated with better soil health

- Ag community (growers, landowners, ag retailers, bankers, corporations with sustainability goals, etc.) want to know the “bottom line”
AFT’s 2018 USDA Conservation Innovation Grant (CIG) Project Goals

Drive adoption of soil health practices by:

✓ Estimating the net economic & environmental benefits associated with adoption of soil health practices by developing two new economic tools (R-SHEC & P-SHEC) & using available water quality & climate tools (NTT & COMET)

✓ Packaging results in 2-page compelling case studies

✓ Empowering fellow conservationists to produce their own case studies featuring local, “soil health successful” producers or predictive assessments featuring “soil health curious” producers

✓ Theory of change: The more local evidence there is, the “faster” we get more farmers to “yes” on more acres
Meet the AFT CIG Project Team

Michelle Perez, PhD
Project Leader
Water Initiative Director

Florence Swartz
Project Economist
Retired NRCS NY Economist

Sat Darshan Khalsa, PhD
AFT Almond Consultant
Assistant Project Scientist
UC Davis
Terrific economic case studies that preceded those by AFT

2 NRCS-NY
2 pages each
Partial Budget Analysis

5 NRCS-MO
2 pages each
Partial Budget Analysis

4 NACD-Datu
16 pages each
Partial Budget Analysis

3 EDF-K-Coe ISOM
4 pages each
Farm Enterprise Analysis
Tailored our case studies after Flo’s NRCS-NY case studies

**Angel Rose Dairy Partial Budgeting Analysis**

<table>
<thead>
<tr>
<th>Increases in Net Income</th>
<th>Decreases in Net Income</th>
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<tbody>
<tr>
<td><strong>Item</strong></td>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>Yield Increase, Corn</td>
<td>$61</td>
</tr>
<tr>
<td>Total Increased Income</td>
<td>$6,100</td>
</tr>
<tr>
<td><strong>Decrease in Cost</strong></td>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>Nitrogen Reduction</td>
<td>$23</td>
</tr>
<tr>
<td>Planting Cost Savings, Corn</td>
<td>$29</td>
</tr>
<tr>
<td>Planting Cost Savings, Hay</td>
<td>$74</td>
</tr>
<tr>
<td>Reduced Erosion, Corn &amp; Hay²</td>
<td>$21</td>
</tr>
<tr>
<td>Reduced Nurse Crop Cost, Hay</td>
<td>$40</td>
</tr>
<tr>
<td>Total Decreased Cost</td>
<td>$14,050</td>
</tr>
<tr>
<td>Total Increased Net Income</td>
<td>$20,150</td>
</tr>
<tr>
<td>Total Acres Farmed</td>
<td>350</td>
</tr>
<tr>
<td>Per Acre Increased Net Income</td>
<td>$588</td>
</tr>
<tr>
<td>Total Net Benefit</td>
<td>$8,150</td>
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ECONOMIC METHODS
To teach a partial budget analysis, Flo developed a calculator based on the NRCS Cover Crops Tool.
Partial Budget Analysis Overview

• Partial budget analysis:
  • Estimates the economic effect (benefits and costs) of variables affected by a change in a farming operation
  • For this study, PBA compares costs & benefits “before” & “after” soil health practice implementation
  • Developed a 21-page Questionnaire (Word) & an 11-tab Economic Calculator (Excel) to conduct the PBA
  • Uses national datasets for crop, machinery, fertilizer, etc. prices rather than farmer-specific prices

▪ Primary effects evaluated:
  1. Machinery
  2. Fertilizer
  3. Pesticide
  4. Yield
  5. Erosion repair
  6. Learning costs
  7. Other
Meet the Authors of the AFT Case Studies

Justin Bodell
CA Stewardship Manager

Paul Lum
CA Project Manager

Brian Brandt
Ag Innovations Director, OH

Emily Bruner, PhD
Midwest Science Director, IL

Aaron Ristow
NY Ag Stewardship Program Manager
Newest additions to the AFT Case Studies and Predictive Assessment Team

Ellen Yeatman
Reviewing Economist
Water Resources Specialist

Ben Wiercinski
Author of FRPP Case Studies & Predictive Assessments
Ag Economist

Sarah Blount
Author of Illinois Predictive Assessment
Midwest Conservation Technician
METHODS FOR ENVIRONMENTAL ANALYSIS
Nutrient Tracking Tool – Water Quality
COMET-Farm Tool – GHGs

What is COMET-Farm?

COMET-Farm is a whole farm and ranch carbon and greenhouse gas accounting system. The tool guides you through describing your farm and ranch management practices including alternative future management scenarios. Once complete, a report is generated comparing the carbon changes and greenhouse gas emissions between your current management practices and future scenarios.

Start Using COMET-Farm
Thank you to the External Reviewers of the Case Studies!

- **NRCS Economists**
  - Lynn Knight, Economist, East Region
  - Bryon Kirwan, Illinois State Economist
  - Lakeitha Ruffin, Oregon State Economist
  - Richard Iovanna, FPAC Economist
  - Sophia Glenn, FPAC Economist
  - Sarah Cline, FPAC Economist

- **NRCS Soil Health Specialists**
  - Zahangir Kabir, West Regional SH Specialist
  - James Hoorman, NE Regional SH Specialist
  - Candy Thomas, NRCS SH Specialist
  - Justin Morris, NRCS SH Specialist
  - Barry Fisher, NRCS SH Specialist

- **University Economists**
  - John Hanchar, Cornell Cooperative Extension
  - Gary Schnitkey, University of Illinois
  - Brent Sohngen, Ohio State University

- **NTT Reviewer**
  - Mindy Selman, USDA Office of Ecosystem Markets

- **COMET-Farm Reviewers**
  - Matthew Stermer, Mark Easter, & Haley Nagle, Colorado State University

Thank you to Bianca Moebius-Clune, NRCS Soil Health Division Director, for putting NRCS’ logo on the case studies to increase their use by conservationists with farmers!
NRCS agreed to co-brand the case studies!
9 AFT-NRCS SOIL HEALTH ECONOMIC & ENVIRONMENTAL CASE STUDIES
9 Soil Health Case Studies (front)

2 CA almond

2 IL corn-soybeans

2 OH corn-soybeans

3 NY diversified row crop systems
9 Soil Health Case Studies (back)

2 CA almond
2 IL corn-soybeans
2 OH corn-soybeans
3 NY diversified row crop systems
OVERARCHING FINDINGS
Yield & Income Benefits of Soil Health Practices Across Seven “Soil Health Successful” Row Crop Farms

• **Improved Yield:**
  - 2 farms reported no yield change
  - 5 reported yield increases
  - Range: 2% to 22% for at least one crop grown

• **Annual Change in Net Income:**
  - 7 farms reported increases in income
  - Range: $11 to $56/ac/yr

• **Return on Investment:**
  - 7 farms reported positive ROI
  - Range was 18% to 343%
Input Benefits & Costs of Soil Health Practices Across Seven Row Crop Farms

• Changes to Fertilizer Costs:
  - 1 farm increased costs
  - 4 farms reduced costs
  - 2 farms saw no change in costs
  - Range in savings: $18 to $66/ac/yr

• Changes to Machinery, Fuel, and Labor Costs due to Change in Tillage:
  - 1 farm reported no change
  - 6 farms reduced costs
  - Range: $14 to $72/ac/yr
Input Benefits & Costs of Soil Health Practices Across Seven Row Crop Farms

• **Pesticide Usage:**  
  *(Herbicide, Insecticide, and Fungicide)*  
  - 3 farms reported no change  
  - 4 reported changes  
    - 2 farms increased; Range: $5 to $11/ac/yr  
    - 2 farms decreased; Range: $15 to $19/ac/yr

• **Learning Costs:**  
  - Ranged from $415 to $12,940/yr or 44 cents to $10.35/ac/yr
Environmental Benefits of Soil Health Practices Across All Farms

• **Water Quality Improvement:**
  
  All 7 row crop farmers *observed* reduced soil and water runoff

  On selected fields for 7 row crop farms plus one almond grower, NTT estimated:
  
  • Average reduction in N losses was 61% (range was 23 to 72%)
  • Average reduction in P losses was 73% (range was 33 to 92%)
  • Average reduction in sediment losses was 81% (range was 37 to 99%)

• **Climate Improvement:**

  On selected fields of 7 row crop farmers and both almond growers, COMET-Farm estimated total GHG emissions were reduced an average of 158% (range was 16 to 560%)
WAYS TO USE THE CASE STUDIES
WITH YOUR FRPP LANDOWNERS & FARMERS
Options for Conversations & Handouts

• Reach out & establish a working relationship with conservation professionals to:
  1. Share the case studies & materials
  2. Introduce your landowners/farmers to for assistance on the next step in their SH journey

• Print Case Studies & use as Handouts

• Print the 4 Slides with Summary Results for 7 Row Crop Farmers (IL, OH, NY) as a Handout

• Print the “Stories via Multiple Slides” for 2 OH, 3 NY, and 1 PA case studies (and 1 IL predictive assessment)

• Print the 1 Individual Slides for 2 OH, 3 NY, and 1 PA case studies (and 1 IL predictive assessment)
ACCESSING THE CASE STUDIES
Download the case studies from AFT’s site

https://farmlandinfo.org/publications/soil-health-case-studies/

Keyword search:
“AFT soil health case studies”
“AFT economic case studies”
Download the case studies from 2 NRCS sites

NRCS / Home / Soils / Soil Health / Case Studies: Economic Benefits of Applying Soil Health Practices

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=NRCSEPRD1470394;

NRCS / Home / Technical Resources / Economics / Data & Analysis / Economic Case Studies

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/econ/data/?cid=nrcseprd1298423;

Keyword search: “NRCS economic case studies”
ACCESSING THE RETROSPECTIVE SOIL HEALTH ECONOMIC TOOL KIT TO DEVELOP YOUR OWN CASE STUDIES
Getting into the Retrospective Tool Kit (just updated July 13, 2021!)

- For background, start here: https://farmland.org/soil-health-case-studies-methods/

- Watch training videos from 2020 SWCS workshop

- To gain access, fill out form here: https://farmland.salsalabs.org/sh_casestudies_methods/index.html

Keyword search: “AFT soil health tool kit”
AFT’s Economic Tools

Retrospective Soil Health Economic Tool
- For use with “soil health successful” producers
- To conduct a retrospective partial budget analysis
- To produce 2-page case studies
- Updated July 2021

Predictive Soil Health Economic Tool
- For use with “soil health curious” producers
- To conduct a predictive short-term partial budget analysis & a long-term benefits analysis
- To produce 7-page predictive assessments
- Public release this Fall

Online Soil Health Economic Tool
- A simpler, easier-to-use version of both retrospective and predictive tools
- We hope to:
  - Test the new tool with Illinois & Ohio farmers
  - Launch the new tool in 2022
Over time, please let us know if you’re using the case studies to encourage FRPP landowners or farmers to adopt soil health practices. Contact: mperez@farmland.org

We look forward to your feedback on this Case Study Session #4! Find link in end-of-day email from Pathable.
Thank you for your feedback!