Outcomes Estimation Tools Training Webinar Series

Michelle Perez, PhD
Water Initiative Director

Aysha Tapp Ross
Water & Soil Health Scientist

Jen Tillman
Research Scientist

Featuring: Retrospective Soil Health Economic Calculator (R-SHEC)

December 6, 2023
Noon to 1:30 pm eastern

American Farmland Trust

Agenda

- Welcome, Poll (5 min)
- R-SHEC Presentation (35 min)
- R-SHEC Demonstration (30 min)
- Q&A (20 min)

EPA

WALTON FAMILY FOUNDATION

Mosaic

American Farmland Trust

Zoom Webinar Reminders

- Use Q&A Box - last 20 minutes (Vote up!)
- Use Zoom Direct Message feature to Jen if having technical difficulties
- Email with resources to follow each webinar
- Recordings posted on the webinar series site the following Monday
- **Evaluation survey in the Chat Box**
  - **Complete to be entered to win a $25 gift card!!**

American Farmland Trust

Time for 3 polls!

American Farmland Trust

Tools in 2023 Trainings*

May 3: Webinar Launch & PCOC (recording)

June 7: Model My Watershed (recording)

July 12: Nutrient Tracking Tool (NTT) (recording)

August 2: NRCS Cover Crop Economics Tool (economic) (recording)

September 6: FieldPrint Platform (recording)

October 4: EPA PLET (water quality) (recording)

November 1: PTMApp Web Tool (water quality) (recording)

December 6: AFT Retrospective-Soil Health Economics (R-SHEC) Tool (economic)

Tools in 2024 Trainings*

January 10: SIPES Method/SIDMA Tool (social)

February 7: Fast-GHG (climate)

March 6: Cool Farm Tool (climate)

April 3: TBD

May 1: COMET-Farm & COMET-Planner (climate)

June 5: CAST Tool (water quality)

July 3: TBD

*Subject to change

American Farmland Trust

Photo by: Bob Waring featuring his cover crop mix (for upcoming VA Soil Health Case Study)

The Retrospective – Soil Health Economic Calculator (SHEC) Tool

Ellen Yeatman, Ag Economist
AFT Water Initiative

American Farmland Trust

Hi, I'm Ellen!

Ellen Yeatman

Ag Economist & Water Research Manager

Home: Driggs, WYdaho

Education:

MSc Agricultural & Applied Economics, University of Wyoming

BSc Chemistry & Environmental Science, Washington and Lee University in Virginia

Professional skills:

Field-level ag production economics, decision support tool development, case study production, & writing

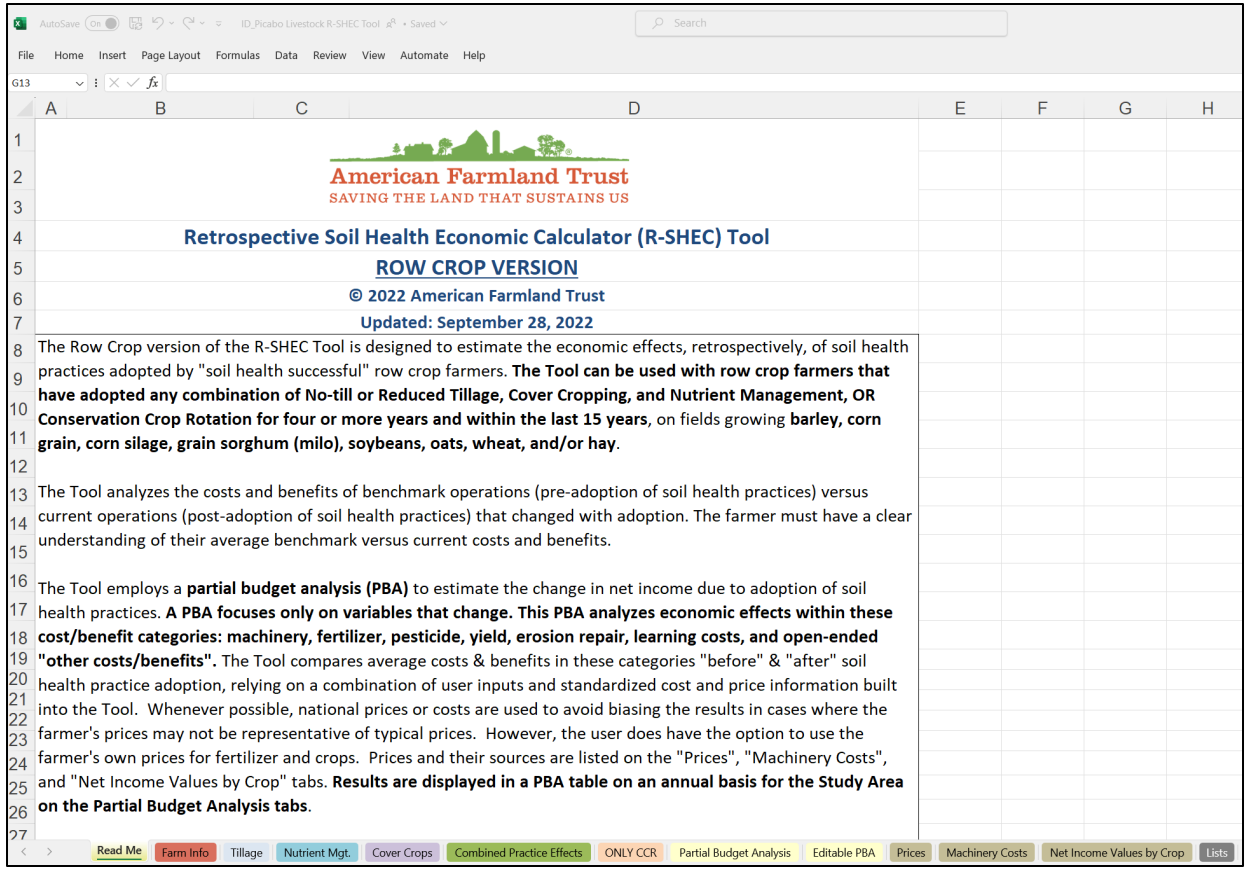
Other AFT projects: Almond Advanced Irrigation Cost Calculator, on-farm demonstration trials, water quality outcomes estimation, & more

For fun: I love spending time outdoors, especially in the mountains, where I backcountry ski & climb

American Farmland Trust

Agenda

- Overview
- Project Background
- Methods & resources overview
- Demo with Picabo Livestock of Idaho data
- Strengths & Limitations
- Upcoming changes



American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

Retrospective Soil Health Economic Calculator (R-SHEC) Tool

ROW CROP VERSION

© 2022 American Farmland Trust

Updated: September 28, 2022

The Row Crop version of the R-SHEC Tool is designed to estimate the economic effects, retrospectively, of soil health practices adopted by "soil health successful" row crop farmers. **The Tool can be used with row crop farmers that have adopted any combination of No-till or Reduced Tillage, Cover Cropping, and Nutrient Management, OR Conservation Crop Rotation for four or more years and within the last 15 years**, on fields growing **barley, corn grain, corn silage, grain sorghum (milo), soybeans, oats, wheat, and/or hay**.

The Tool analyzes the costs and benefits of benchmark operations (pre-adoption of soil health practices) versus current operations (post-adoption of soil health practices) that changed with adoption. The farmer must have a clear understanding of their average benchmark versus current costs and benefits.

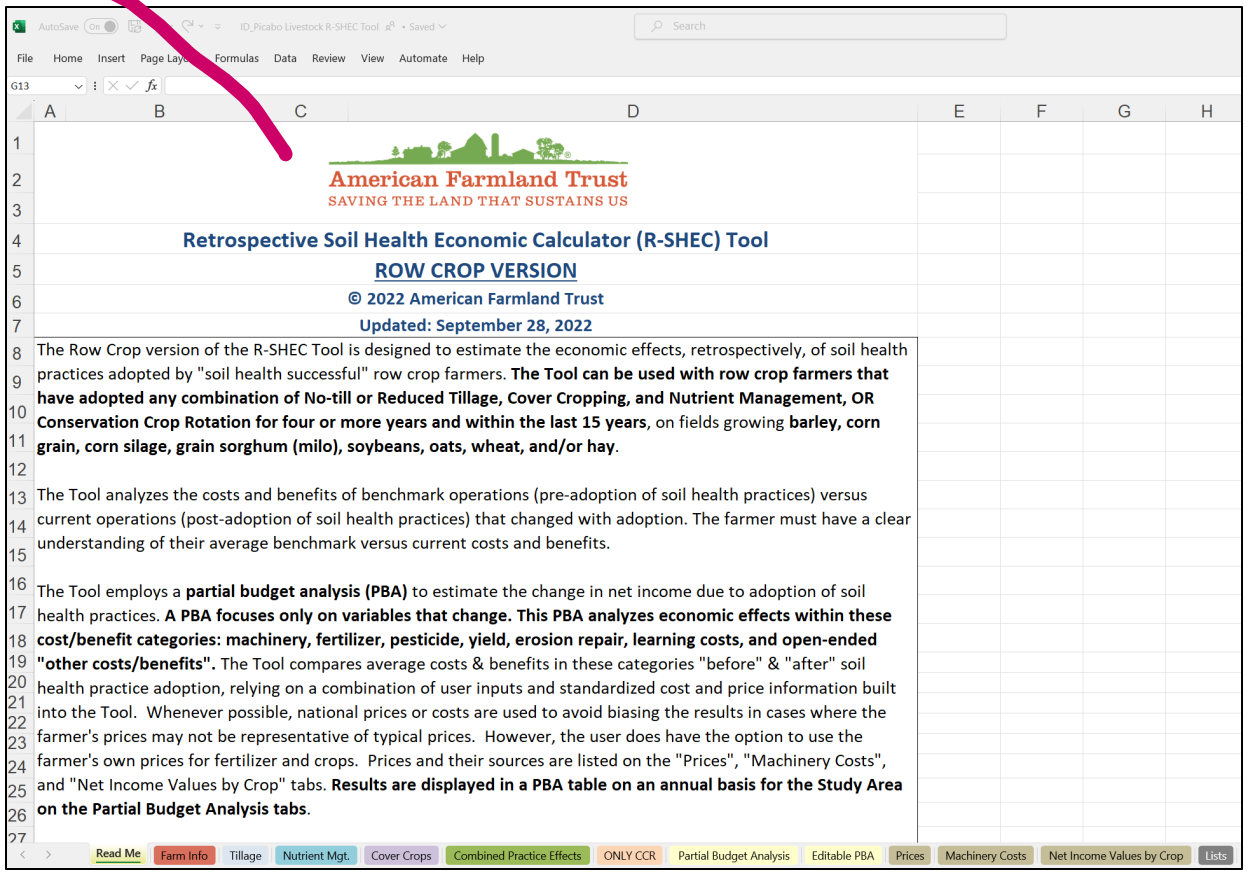
The Tool employs a **partial budget analysis (PBA)** to estimate the change in net income due to adoption of soil health practices. **A PBA focuses only on variables that change. This PBA analyzes economic effects within these cost/benefit categories: machinery, fertilizer, pesticide, yield, erosion repair, learning costs, and open-ended "other costs/benefits".** The Tool compares average costs & benefits in these categories "before" & "after" soil health practice adoption, relying on a combination of user inputs and standardized cost and price information built into the Tool. Whenever possible, national prices or costs are used to avoid biasing the results in cases where the farmer's prices may not be representative of typical prices. However, the user does have the option to use the farmer's own prices for fertilizer and crops. Prices and their sources are listed on the "Prices", "Machinery Costs", and "Net Income Values by Crop" tabs. **Results are displayed in a PBA table on an annual basis for the Study Area on the Partial Budget Analysis tabs**.

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combined Practice Effects | ONLY CCR | Partial Budget Analysis | Editable PBA | Prices | Machinery Costs | Net Income Values by Crop | Lists

American Farmland Trust

Overview of the R-SHEC Tool

Quantifying experienced changes in avg. costs & benefits in the field with switch from conventional to soil health management (AKA: *a partial budget analysis*)



American Farmland Trust

R-SHEC Tool Overview

Features	Retrospective Soil Health Economic Calculator (R-SHEC) Tool
Scale & level of specificity	• **Study area / farm-level** • **Level of specificity:** not site-specific (does not consider weather or soil data)
Outcomes	• **Partial budget analysis table** that quantifies changes due to switching from conventional management to a soil health management system • **Change in $/ac by category:** machinery type/use, volume of pesticide & fertilizer, cover crop costs, soil erosion, yield, learning costs, and other farmer-provided estimates • **Total change in net income as $/ac, $/yr, and % return on investment (ROI)**
Conservation practices	**Row Crop R-SHEC Tool:** Reduced tillage, no-till, nutrient management, cover crops, conservation crop rotation (diversification of rotation) **Almond R-SHEC Tool:** cover crops, conservation cover, nutrient management, mulching, compost

American Farmland Trust

R-SHEC Tool Overview

Features	Retrospective Soil Health Economic Calculator (R-SHEC) Tool
Land uses & production systems	• **Land uses:** cropland • **Production systems**: row crops (*barley, corn grain, corn silage, grain sorghum, hay, soybeans, oats, &/or wheat*) or almonds; organic or non-organic
States & territories	**CONUS –** currently works best for midwestern states and California (almonds)
How much time, data, & skills needed to generate an outcome estimate	**1)** Perform extensive "before vs after" interview with farmer to collect study area-specific field operations data to complete the R-SHEC Questionnaire (up to 10 hours); **2)** Enter data into Excel-based R-SHEC Tool to build "before" & "after" management scenarios; **3)** Finalize the partial budget analysis table in the Tool (requires manually deleting un-used rows) • Familiarity with Excel - ideally intermediate skill-level • Familiarity with field operations to build those management scenarios

American Farmland Trust

Photo by: Abigail Brewer featuring Tim Lyden (on left) with his grandson for Lyden Farm Case Study (OH)

Project Background

American Farmland Trust

I…018…

Silver Creek running through the ranch

John Deere 1890 no-till air seeder

Soil Health Case Study

The Purdy Family, Picabo Livestock, ID

JUNE 2023

Farm at a Glance

COUNTY: Blaine, ID

WATERSHED: Silver Creek & Big Wood River

CROPS: Alfalfa hay & malt barley

FARM SIZE: 4,800 acres (1,800-acre study area)

Nicholas and Nick Purdy; Pat Purdy

Introduction

Three generations of the Purdy family—Nick (age 83), Pat (60), and Nicholas (36)—operate the 135-year-old Picabo Livestock ranch, a 700-head cow-calf operation. They also grow alfalfa hay, malt barley, mustard seed, and potatoes across 4,800 acres of heavy silt loam and rocky clay riverbed in Blaine County, Idaho. Although they've adopted soil health practices on their entire acreage, this study focuses on their 1,800-acre rotation that includes 2 years of barley and 4 years of alfalfa where the Purdys practice no-till, cover cropping, and nutrient management. The ranch is 100% irrigated and is protected from development by a conservation easement.

The Purdy's initial motivation for transitioning away from conventional management, especially intensive tillage, was the severe wind erosion often experienced in this region of Idaho. Constantly dredging precious silty topsoil to maintain the world-class trout stream that the ranch abuts was incredibly expensive, and seeing how much topsoil had run off the fields was "heartbreaking." In 2014, they began their no-till journey on both barley and alfalfa, then expanding across all their acreage as they acquired the necessary equipment, a process which took about four years.

Prior to their adoption of cover crops in 2015, the ranch's fields would sit bare over the winter, which Pat calls "the kiss of death for soil health and maintaining topsoil." Now, the Purdys plant a fall forage mix, which includes peas, lentils, vetch, turnips, and a pea/vetch/lentil inoculant, on roughly half of their barley acres. This mix plus the volunteer barley growth provides excellent grazing for their cattle in the fall before it frost-kills over the winter.

Around the same time that the ranch began no-tilling, the Purdys began reworking their nutrient management program, which they continue to refine every year. In general, on alfalfa fields, they switched from dry then liquid synthetic fertilizer to custom-applied 100% manure compost; and on barley fields, they transitioned from a single application of a dry blend to a split application of a liquid blend. They also began to adopt different soil sampling methods, moving away from relying exclusively

Soil Health, Eco… Quality, and Clim…

Partial budgeting analy… mate the marginal ben… cover-cropping, and nu… health practices at Pica… was limited to only the… ables affected by the ad… The table on page 2 pro… economic effects revea… soil health practices, P… income increased by $6… on the 1,800-acre study… return on investment.

The largest per-acre inc… attributed to the forage… estimated to be $74/ac/… outweighs the $69/ac/y… and planting.

The second largest per … income is due to barley… increases of 5 bu/ac an… that the Purdys attribut… organic matter (SOM) …

USDA United States Department of Agriculture Natural Resources Conservation Service

The Nature Conservancy Idaho

Amer…

The Purdy Family, Picabo Livestock, ID

health practice adoption, providing an additional $71/ac/yr. On average, the Study Area fields have seen an increase in SOM from 2.4% before 2015 to 3% after 2015, with some soil samples showing SOM as high as 5.8%.

The Purdys have experienced two decreases in cost. First, by switching to no-till, they eliminated two tillage passes for barley and three passes for alfalfa, reducing their annual machinery costs by $49/ac/yr.[1] Second, they've eliminated the use of insecticides on alfalfa altogether since their change in nutrient management, limiting applications of excess nitrate, which Pat calls a "bug magnet," netting the ranch a savings of $8/ac/yr or $9,600/yr.

Overall, the largest cost increases that Picabo Livestock has incurred are due to changes in nutrient management practices. Incorporating newer soil sampling methods is more costly, an additional $2/ac/yr.

Manure compost for alfalfa is significantly more expensive than conventional fertilizer, costing the farm an additional $42/ac/yr. Finally, custom-hiring manure application on alfalfa and the additional pass required for split application of liquid fertilizer on their barley accounts for an additional $5/ac/yr. In 2021, the Purdys began doing plant sap analysis, which is dramatically changing their nutrient management. As this is a new practice, it has not been included in this analysis.

Finally, Picabo Livestock employees spend about 75 hrs/yr combined on learning activities related to their soil health practices, placing special emphasis on finding reliable mentors.

The Purdys have seen significant improvements in earthworm populations, soil tilth, and water infiltration as a result of their efforts. Says Pat, "We just don't see standing water on our soils, so my pivots don't get stuck anymore. I can irrigate as much as I want, and I don't see runoff." The USDA's COMET-Planner Tool estimates that Picabo Livestock's soil health practices resulted in a reduction of 302 metric tons of CO_2-equivalent/yr, corresponding to taking 67 cars off the road for one year.

Closing Thoughts

The Purdys credit the success of their soil health journey to starting small, experimenting where they could afford to fail, and acknowledging that mistakes are part of the process. For them, the biggest challenge has been changing their mindset. This has meant going from viewing their soil as dirt to respecting it as a living, biological organism of which they are stewards. Says Pat, "If you view your soil as a living biological system, it really does challenge you ethically to change your behavior."

Writers: Lia Rax & Ellen Yeatman, American Farmland Trust

Economic Effects of Soil Health Practice on Picabo Livestock Co, ID (2021 Prices)[2]

Increases in Net Income

Increase in Income

ITEM	PER ACRE	ACRES	TOTAL
Grazing cover crop benefit (+0.33 ton/ac)	$74	300	$22,275
Increased yields for barley (+5 bu/ac) and alfalfa (+0.5 ton/ac) due to soil health practices	$71	1,800	$127,050
Total Increased Income			**$4,650**

Decrease in Cost

ITEM	PER ACRE	ACRES	TOTAL
Machinery cost savings due to no-till	$49	900	$44,325
No longer applying insecticides to alfalfa	$8	1,200	$9,600
Total Decreased Cost			**$53,925**
Annual Total Increased Net Income			**$203,250**
Total Acres in this Study Area			**1,800**
Annual Per Acre Increased Net Income			**$113**

Decreases in Net Income

Decrease in Income

ITEM	PER ACRE	ACRES	TOTAL
None identified			$0
Total Decreased Income			**$0**

Increase in Cost

ITEM	PER ACRE	ACRES	TOTAL
Cover crop seed and planting costs	$69	300	$20,580
Additional cost for new soil sampling methods	$2	1,800	$3,600
Alfalfa nutrient cost increase with switch to manure compost from synthetic fertilizer	$42	1,200	$50,880
Machinery cost increase due to changes in nutrient management	$5	1,800	$9,090
Combined practices learning activities			$1,964
Total Increased Cost			**$86,114**
Annual Total Decreased Net Income			**$86,114**
Total Acres in this Study Area			**1,800**
Annual Per Acre Decreased Net Income			**$48**

Annual Change in Total Net Income = $117,137

Annual Change in Net Income Per Acre = $65

Return on Investment = 136%

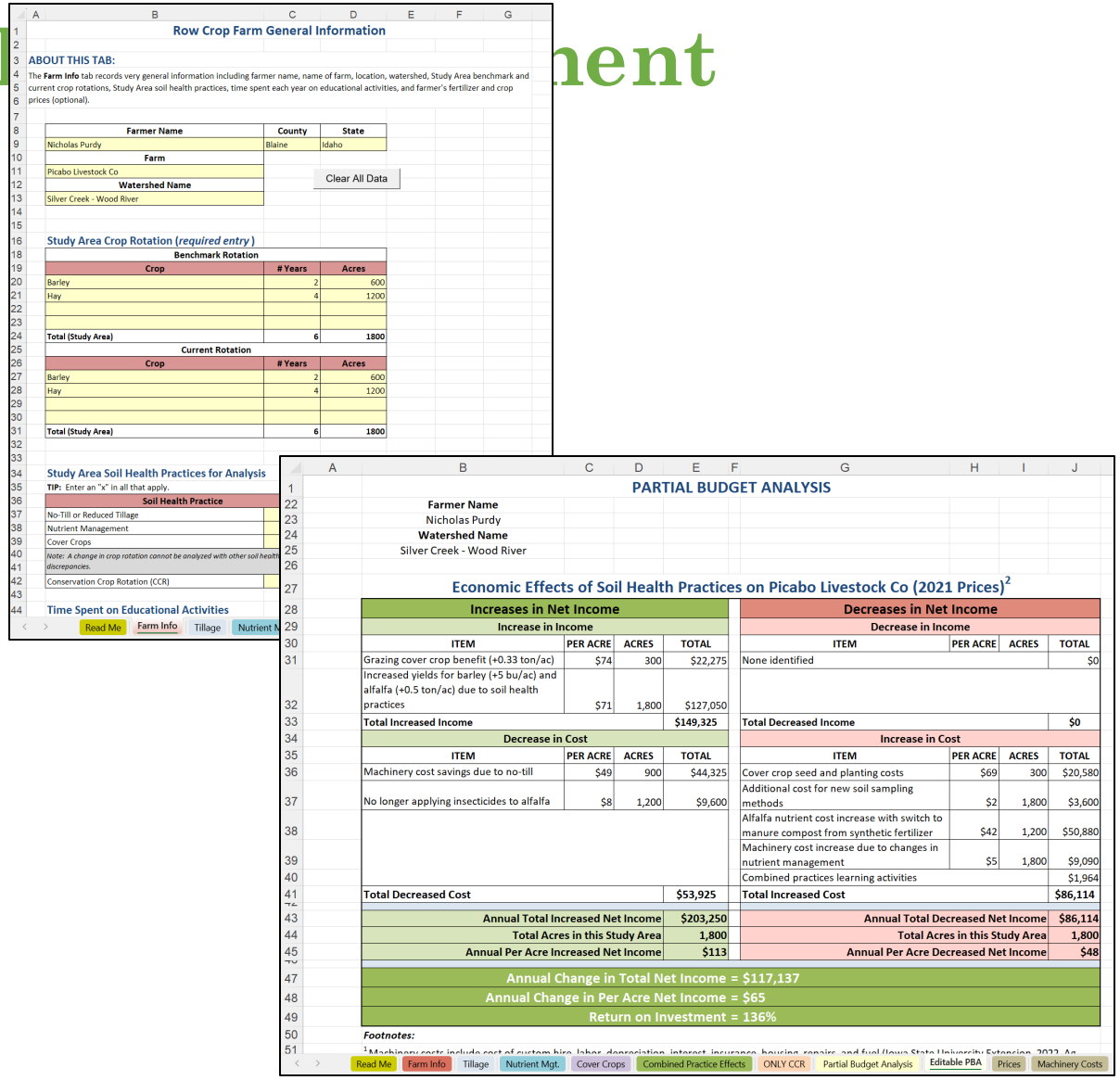
[1] Machinery costs include the cost of custom hire, labor, depreciation, interest, insurance, housing, repairs, and fuel (Iowa State University Extension, 2022, Ag Decision Maker: Iowa Farm Custom Rate Survey; University of Illinois at Urbana-Champaign, 2021, Farm Business Management Machinery Cost Estimates: Field Operations). [2] Rounding of per acre values may result in minor discrepancies in totals. • This table represents estimated average costs and benefits attributed to adopting no-till, cover crops, and nutrient management over a 1,800-acre study area where barley and alfalfa are grown, as reported by the Purdys. • All values are in 2021 dollars unless provided by the farmer. • Prices used in the analysis: Barley: $5.15/bu, Hay: $186/ton (Source: USDA NASS, 2021); Nitrogen: $.72/Lb, Phosphate: $.62/Lb, Potash: $.56/Lb (Source: Iowa State University Extension, 2022, Ag Decision Maker: Estimated Costs of Crop Production in Iowa). • For information about (1) study methodology, see farmland.org/soilhealthcasestudies; (2) USDA's COMET-Planner Tool, see comet-planner.com. • This material is based on work supported by USDA NRCS Cooperative Agreement #NR223A750010C003.

For more information about this study or to discuss soil health practices, please contact
Ellen Yeatman, American Farmland Trust, Ag Economist, eyeatman@farmland.org
David Anderson, American Farmland Trust, Idaho Program Manager, danderson@farmland.org
Jesse Fullmer, Conservationist, NRCS Arco Service Center, 125 South Water Street, Arco, ID, 83213, jesse.fullmer@usda.gov, 208-527-8268 x 105

To read more case studies, visit farmland.org/soilhealthcasestudies

- 2018-2021 USDA Conservation Innovation Grant (CIG) & 2022-2024 NRCS Cooperative Agreement
  - *Thanks to Michelle Perez, Water Initiative Director, & NRCS!*
- **Problem:** Scientific evidence exists that soil health practices improve soil health, reduce runoff, & sequester carbon, BUT there is not enough publicly available information out there about economic benefits associated with better soil health; and the ag community voiced that they want to know the "bottom line"
- **Solution:** Develop a tool to quantify the economic outcomes of adopting soil health practices and packaging results in 2-page compelling case studies; and empowering fellow conservationists to produce their own case studies featuring local, "soil health successful" producers
- ✓ **Theory of change:** The more local evidence there is, the "faster" we get more farmers to "yes" on more acres

T[illegible]nent



Row Crop Farm General Information

ABOUT THIS TAB:

The **Farm Info** tab records very general information including farmer name, name of farm, location, watershed, Study Area benchmark and current crop rotations, Study Area soil health practices, time spent each year on educational activities, and farmer's fertilizer and crop prices (optional).

Farmer Name	County	State
Nicholas Purdy	Blaine	Idaho

Farm: Picabo Livestock Co

Clear All Data

Watershed Name: Silver Creek - Wood River

Study Area Crop Rotation (*required entry*)

Benchmark Rotation		
Crop	**# Years**	**Acres**
Barley	2	600
Hay	4	1200
Total (Study Area)	**6**	**1800**

Current Rotation		
Crop	**# Years**	**Acres**
Barley	2	600
Hay	4	1200
Total (Study Area)	**6**	**1800**

Study Area Soil Health Practices for Analysis

TIP: Enter an "x" in all that apply.

Soil Health Practice	
No-Till or Reduced Tillage	
Nutrient Management	
Cover Crops	

Note: A change in crop rotation cannot be analyzed with other soil health discrepancies.

Conservation Crop Rotation (CCR)	

Time Spent on Educational Activities

Read Me | Farm Info | Tillage | Nutrient M

PARTIAL BUDGET ANALYSIS

Farmer Name: Nicholas Purdy

Watershed Name: Silver Creek - Wood River

Economic Effects of Soil Health Practices on Picabo Livestock Co (2021 Prices)[2]

Increases in Net Income

Increase in Income

ITEM	PER ACRE	ACRES	TOTAL
Grazing cover crop benefit (+0.33 ton/ac)	$74	300	$22,275
Increased yields for barley (+5 bu/ac) and alfalfa (+0.5 ton/ac) due to soil health practices	$71	1,800	$127,050
Total Increased Income			**$149,325**

Decrease in Cost

ITEM	PER ACRE	ACRES	TOTAL
Machinery cost savings due to no-till	$49	900	$44,325
No longer applying insecticides to alfalfa	$8	1,200	$9,600
Total Decreased Cost			**$53,925**

Decreases in Net Income

Decrease in Income

ITEM	PER ACRE	ACRES	TOTAL
None identified			$0
Total Decreased Income			**$0**

Increase in Cost

ITEM	PER ACRE	ACRES	TOTAL
Cover crop seed and planting costs	$69	300	$20,580
Additional cost for new soil sampling methods	$2	1,800	$3,600
Alfalfa nutrient cost increase with switch to manure compost from synthetic fertilizer	$42	1,200	$50,880
Machinery cost increase due to changes in nutrient management	$5	1,800	$9,090
Combined practices learning activities			$1,964
Total Increased Cost			**$86,114**

Annual Total Increased Net Income	**$203,250**	**Annual Total Decreased Net Income**	**$86,114**
Total Acres in this Study Area	**1,800**	**Total Acres in this Study Area**	**1,800**
Annual Per Acre Increased Net Income	**$113**	**Annual Per Acre Decreased Net Income**	**$48**

Annual Change in Total Net Income = $117,137

Annual Change in Per Acre Net Income = $65

Return on Investment = 136%

Footnotes:

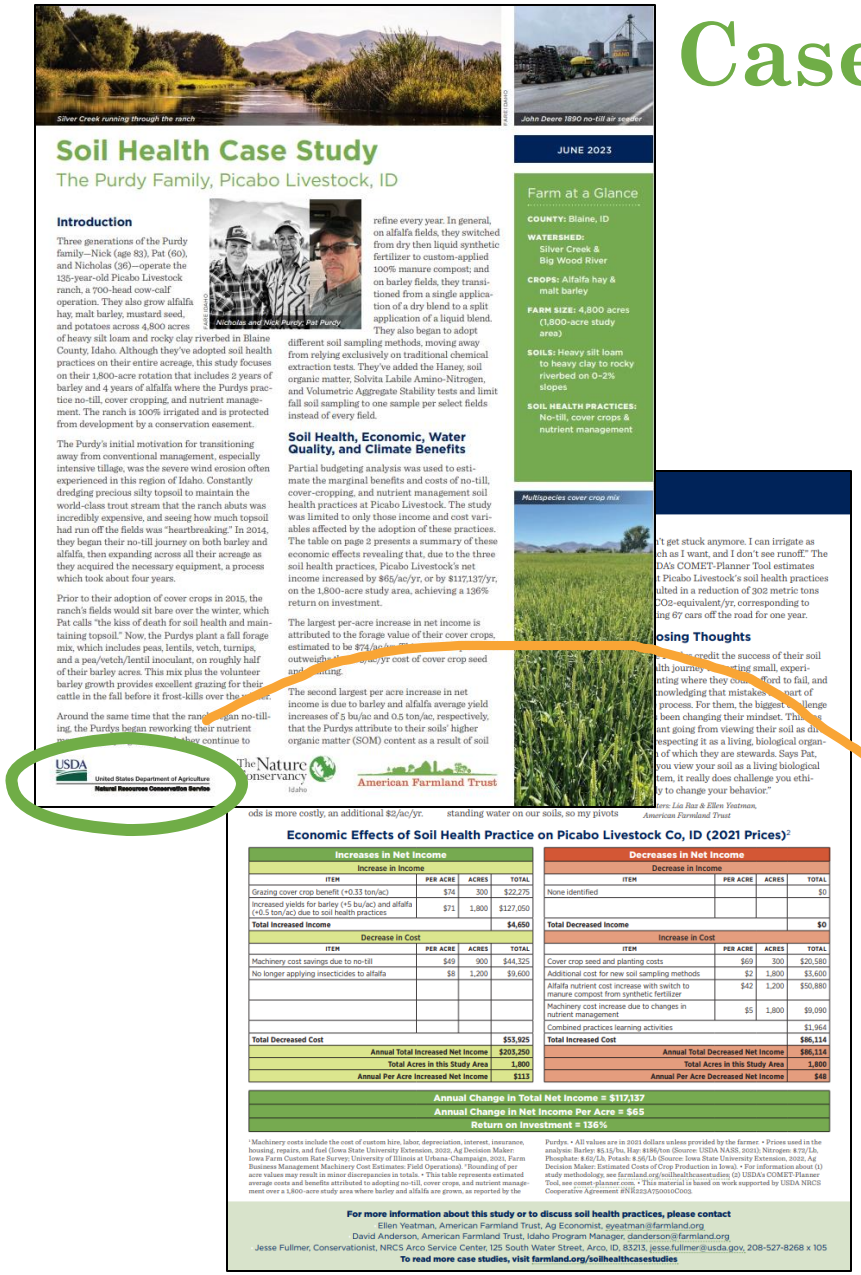
[1] Machinery costs include cost of custom hire, labor, depreciation, interest, insurance, housing, repairs, and fuel (Iowa State University Extension, 2022. Ag

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combined Practice Effects | ONLY CCR | Partial Budget Analysis | Editable PBA | Prices | Machinery Costs

- **Initial co-developers: Michelle Perez**, Water Initiative Director, & **Flo Swartz**, retired NRCS Economist
- **Based on NRCS' Cover Crop Tool** by Lauren Cartwright and Bryon Kirwan
  - Went further by integrating a similar analysis for reduced/no-till, nutrient management, and conservation crop rotation
- **Published the R-SHEC Tool for public-use in 2020** (along with the associated questionnaire and other guidance materials, known as the **Soil Health Case Study Tool Kit**)
- Ellen Yeatman & Ben Wiercinski hired as AFT's first full-time Ag Economists in 2021 and Flo got to finally retire!
- Our team has grown to include two more ag economists and two full-time case study authors

American Farmland Trust

Case Study development



Soil Health Case Study

The Purdy Family, Picabo Livestock, ID

JUNE 2023

Farm at a Glance

COUNTY: Blaine, ID

WATERSHED: Silver Creek & Big Wood River

CROPS: Alfalfa hay & malt barley

FARM SIZE: 4,800 acres (1,800-acre study area)

SOILS: Heavy silt loam to heavy clay to rocky riverbed on 0–2% slopes

SOIL HEALTH PRACTICES: No-till, cover crops & nutrient management

Introduction

Soil Health, Economic, Water Quality, and Climate Benefits

Economic Effects of Soil Health Practice on Picabo Livestock Co, ID (2021 Prices)[2]

Increases in Net Income			
Increase in Income			
ITEM	PER ACRE	ACRES	TOTAL
Grazing cover crop benefit (+0.33 ton/ac)	$74	300	$22,275
Increased yields for barley (+5 bu/ac) and alfalfa (+0.5 ton/ac) due to soil health practices	$71	1,800	$127,050
Total Increased Income			$4,650
Decrease in Cost			
ITEM	PER ACRE	ACRES	TOTAL
Machinery cost savings due to no-till	$49	900	$44,325
No longer applying insecticides to alfalfa	$8	1,200	$9,600
Total Decreased Cost			$53,925
Annual Total Increased Net Income			$203,250
Total Acres in this Study Area			1,800
Annual Per Acre Increased Net Income			$113

Decreases in Net Income			
Decrease in Income			
ITEM	PER ACRE	ACRES	TOTAL
None identified			$0
Total Decreased Income			$0
Increase in Cost			
ITEM	PER ACRE	ACRES	TOTAL
Cover crop seed and planting costs	$69	300	$20,580
Additional cost for new soil sampling methods	$2	1,800	$3,600
Alfalfa nutrient cost increase with switch to manure compost from synthetic fertilizer	$42	1,200	$50,880
Machinery cost increase due to changes in nutrient management	$5	1,800	$9,090
Combined practices learning activities			$1,964
Total Increased Cost			$86,114
Annual Total Decreased Net Income			$86,114
Total Acres in this Study Area			1,800
Annual Per Acre Decreased Net Income			$48

Annual Change in Total Net Income = $117,137

Annual Change in Net Income Per Acre = $65

Return on Investment = 136%

For more information about this study or to discuss soil health practices, please contact

Ellen Yeatman, American Farmland Trust, Ag Economist, eyeatman@farmland.org

David Anderson, American Farmland Trust, Idaho Program Manager, danderson@farmland.org

Jesse Fullmer, Conservationist, NRCS Arco Service Center, 125 South Water Street, Arco, ID, 83213, jesse.fullmer@usda.gov, 208-527-8268 x 105

To read more case studies, visit farmland.org/soilhealthcasestudies

- Since 2020, we've produced **18 case studies**!
  - 15 row crop & 3 almond
- **9 in-process** row crop case studies from ID, MD, VA, WI, & KY – to be published by Summer 2024
- **NRCS co-brands** the case studies after they go through external review with NRCS economics & soil health scientists
  - NRCS lead: Bryon Kirwan, National Economist

USDA United States Department of Agriculture Natural Resources Conservation Service

American Farmland Trust

18 AFT-NRCS Soil Health Case Studies (as of 10/13/22)

3 CA almond

5 NY diverse row crop

3 OH corn-soybeans

2 IL corn-soybeans

2 OK row crop

2 PA row crops

1 ID hay & barley

Want us to produce a case study for you? Or have us guide you through the process?

Email eyeatman@farmland.org

American Farmland Trust

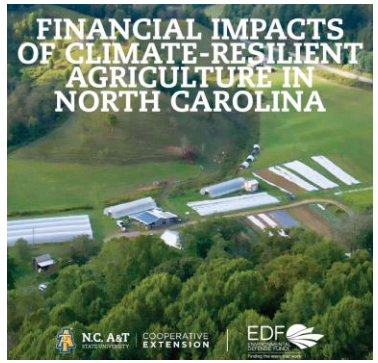
Thank you to the external reviewers!

- NRCS Economists
  - **Bryon Kirwan**, Central Region (formerly Illinois State Economist)
  - **Lynn Knight**, East Region & co-director of Northeast Climate Hub
  - **Julie Suhr-Pierce**, FPAC National Economist
  - **Mary Marks**, Pennsylvania
  - **Dana Pietrusiak**, Maryland
  - **Matthew Monroe**, FPAC
  - **Lakeitha Ruffin**, Oregon State
  - **Richard Iovanna**, FPAC
  - **Sophia Glenn**, former FPAC Economist
  - **Sarah Cline**, former FPAC Economist
- NRCS Soil Health Specialists
  - **Laura Starr,** NW Regional SH Specialist
  - **Zahangir Kabir,** West Regional SH Specialist
  - **Mark Kopecky,** Southern Regional SH specialist
- NRCS Soil Health Specialists (continued)
  - **James Hoorman,** former NE Regional **Candy Thomas**, National
  - **Justin Morris**, National
  - **Barry Fisher**, National
- University Economists
  - **John Hanchar,** Cornell Cooperative Extension
  - **Gary Schnitkey,** University of Illinois
  - **Brent Sohngen,** Ohio State University
  - **Dr. Lixia Lambert,** Oklahoma State University
- NTT Reviewers
  - **Mindy Selman**, USDA Office of Ecosystem Markets
  - **Ali Saleh, PhD**, Tarleton State University
  - **Oscar Gallego, PhD,** Tarleton State University
- COMET-Farm & COMET-Planner Reviewers
  - **Matthew Stermer, Mark Easter, & Haley Nagle,** Colorado State University

American Farmland Trust

Users of our R-SHEC Tool & Tool Kit

- Almond Board of California
  - Christine Gemperle, Faith Home Orchard
- Oklahoma Conservation Commission
  - Mark Nault, 2N2E Farms
  - Scotty Herriman, Herriman Farms
- The Nature Conservancy & Pennsylvania No-till Alliance co-branded and disseminate our ID & PA case studies
- Environmental Defense Fund modified RSHEC Tool to produce 3 soil health economic case studies
- In November, we conducted a survey of downloaders of our Soil Health Case Study Tool Kit:
  - 91 respondents and 58 said they used the Tool Kit in some way



California almonds
Almond Board of California

OKLAHOMA CONSERVATION COMMISSION

The Nature Conservancy
Idaho

PENNSYLVANIA
SINCE 2005
NO-TILL ALLIANCE
Farmers Improving Soil Health

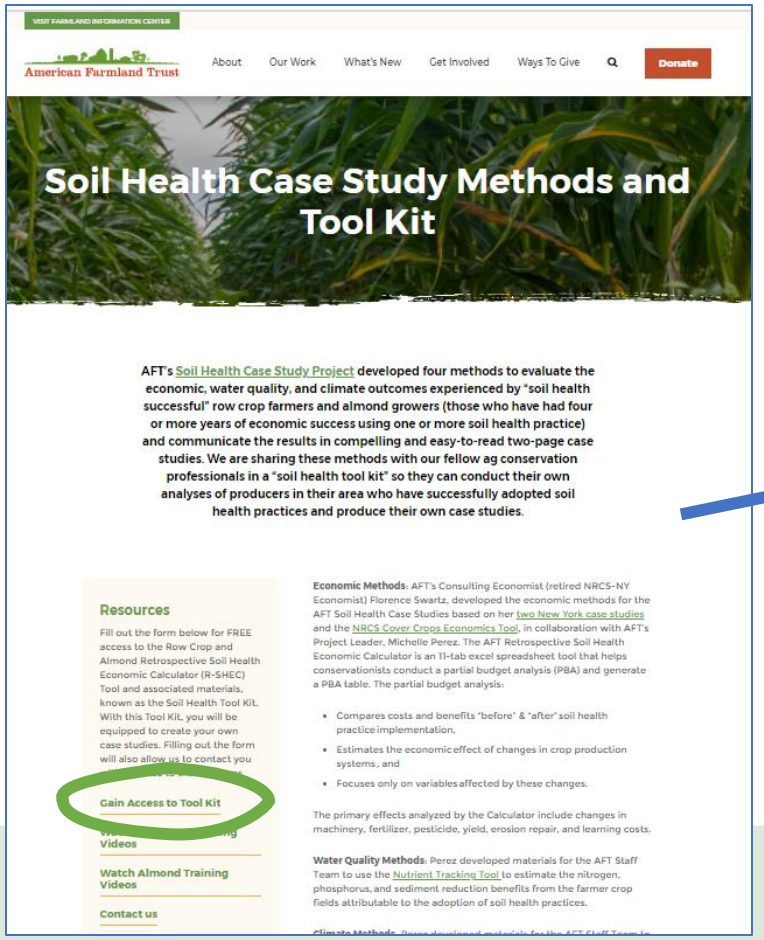
American Farmland Trust

Method Overview

American Farmland Trust

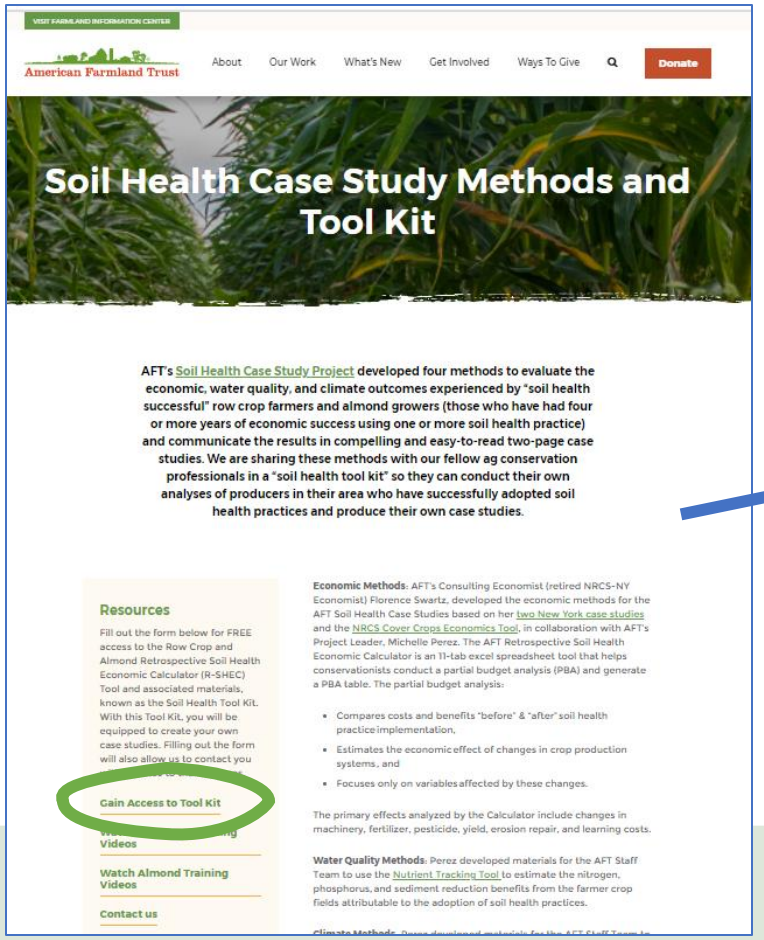
Steps to producing a PBA table using the R-SHEC Tool

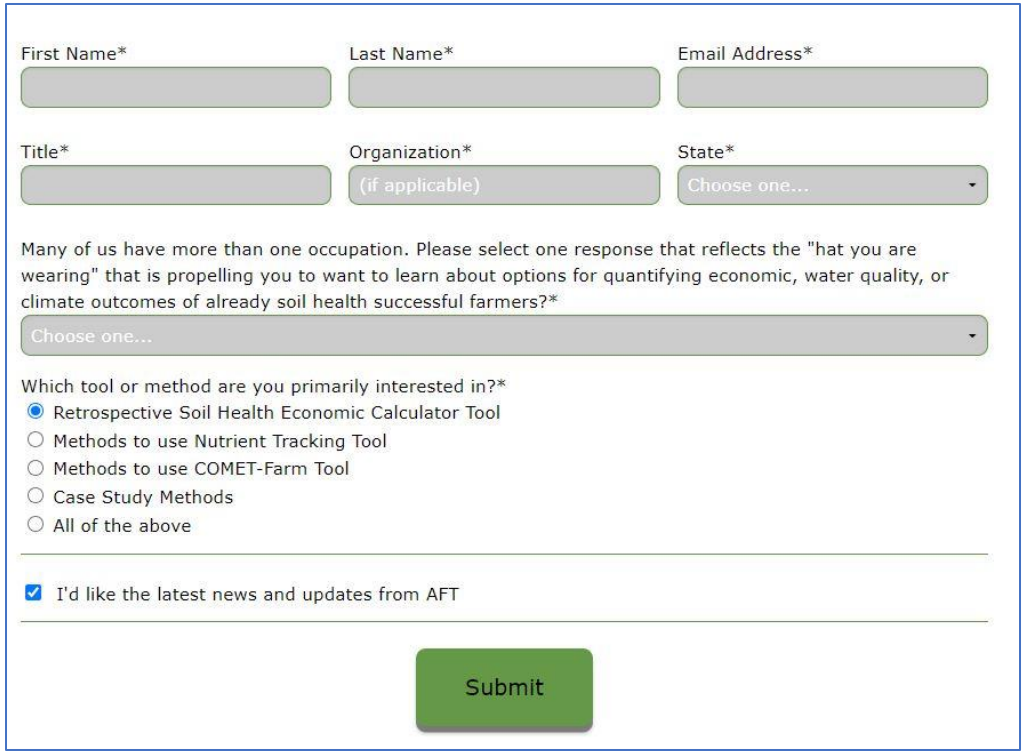
- **Step 1: Download & digest Tool Kit**



Steps to producing a PBA table using the R-SHEC Tool

- **Step 1: Download & digest Tool Kit**

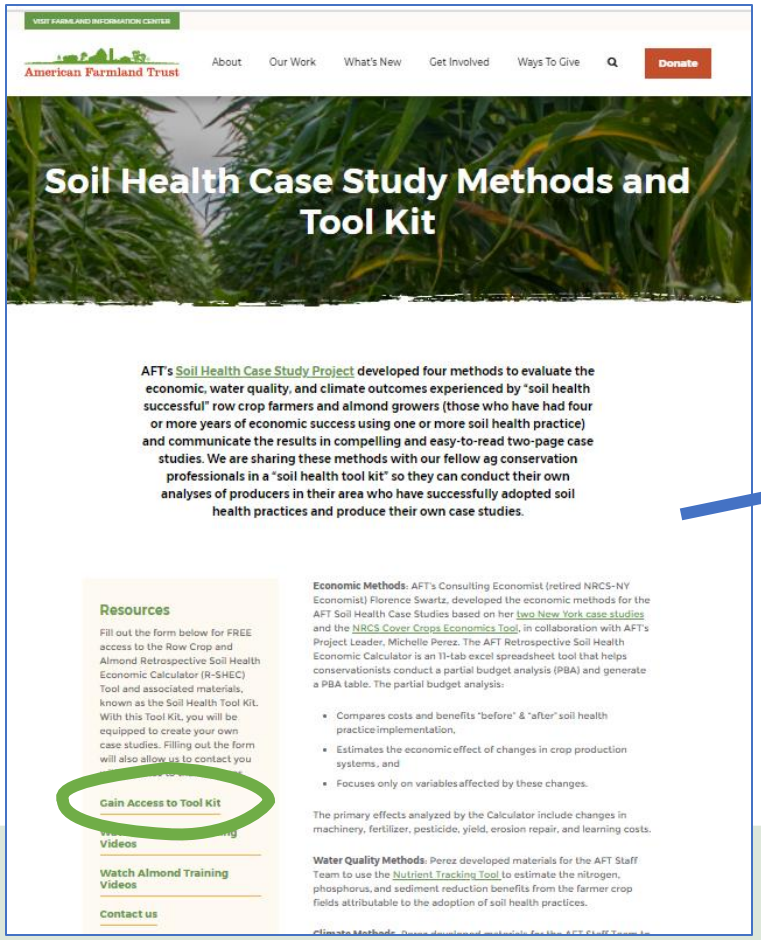


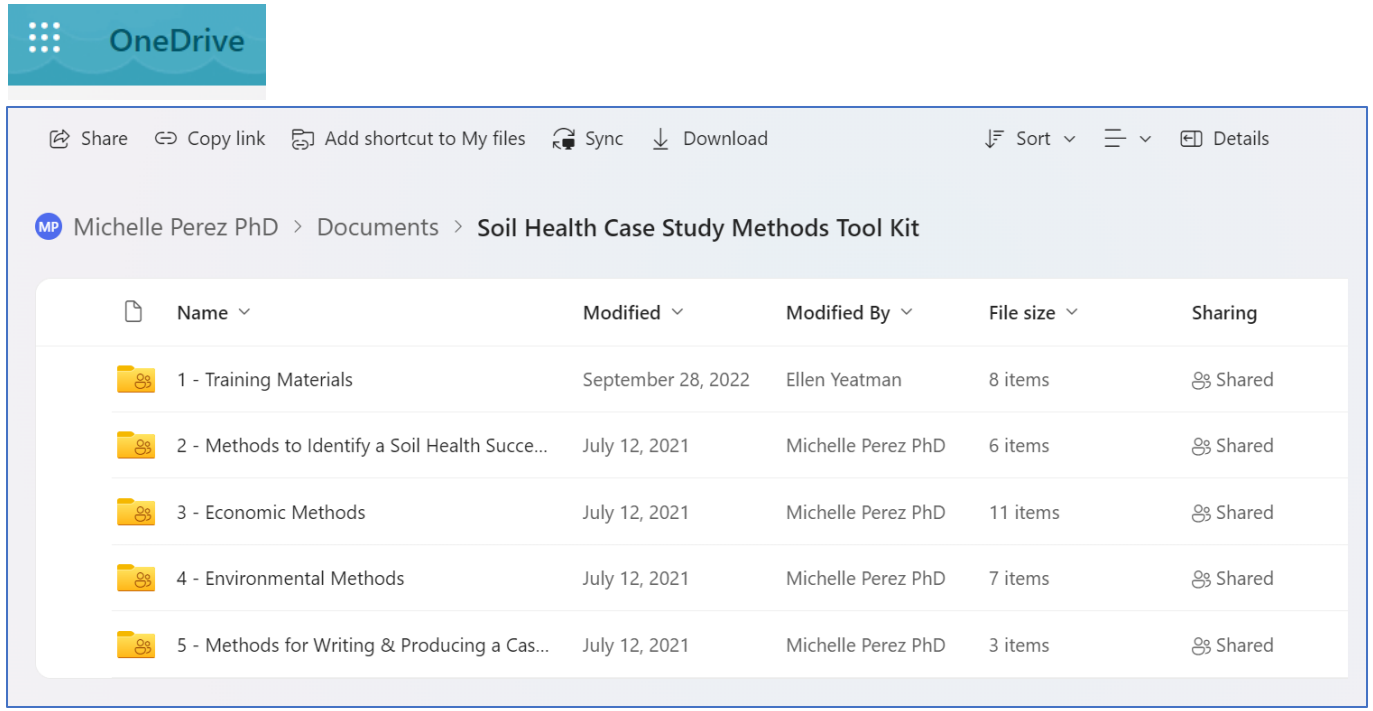


Keyword search:
"AFT soil health tool kit"
to visit
farmland.org/soil-health-case-studies-methods/

Steps to producing a PBA table using the R-SHEC Tool

- **Step 1: Download & digest Tool Kit**





Keyword search:
"AFT soil health tool kit"
to visit
farmland.org/soil-health-case-studies-methods/

Step 2:
Find "soil health successful" farmer

Step 2: Identify farmer following specific criteria

- *Adopted practices **4-15 years ago***
  - *Given "before versus after" approach, farmers initiating practice more than **15 years** of adoption are not ideal*
- *Data to share (historical and current)*

Jay Swede, featured in our NY Swede Farm Case Study, checking on his corn growing through a cover crop

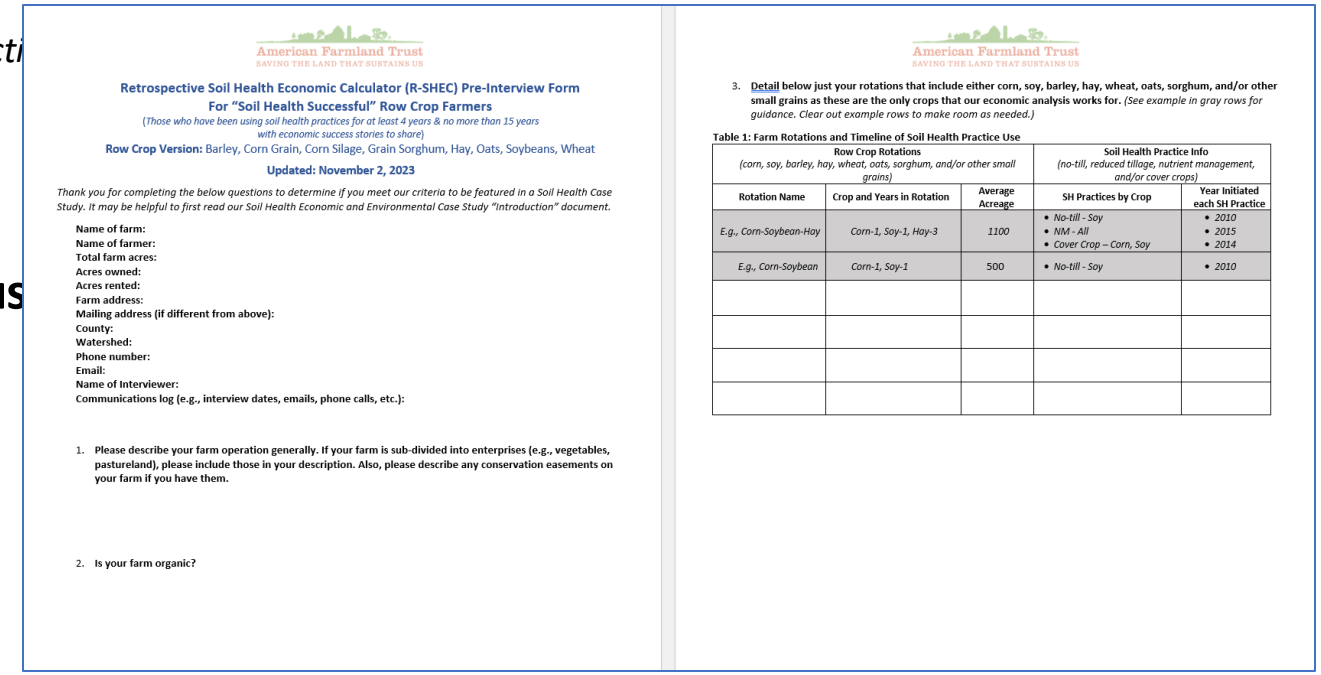
American Farmland Trust

Step 3:
Select a "soil health successful" farmer

Step 2: Identify farmer following specific criteria

- *Adopted practices **4-15 years ago***
  - *Given "before versus after" approach, farmers initiating practi more than **15 years** of adoption are not ideal*
- *Data to share (historical and current)*

Step 3: Pre-interview farmer to ensure they qualify us our "Pre-interview Form"



American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

Retrospective Soil Health Economic Calculator (R-SHEC) Pre-Interview Form
For "Soil Health Successful" Row Crop Farmers
(Those who have been using soil health practices for at least 4 years & no more than 15 years with economic success stories to share)
Row Crop Version: Barley, Corn Grain, Corn Silage, Grain Sorghum, Hay, Oats, Soybeans, Wheat
Updated: November 2, 2023

Thank you for completing the below questions to determine if you meet our criteria to be featured in a Soil Health Case Study. It may be helpful to first read our Soil Health Economic and Environmental Case Study "Introduction" document.

Name of farm:
Name of farmer:
Total farm acres:
Acres owned:
Acres rented:
Farm address:
Mailing address (if different from above):
County:
Watershed:
Phone number:
Email:
Name of Interviewer:
Communications log (e.g., interview dates, emails, phone calls, etc.):

1. **Please describe your farm operation generally. If your farm is sub-divided into enterprises (e.g., vegetables, pastureland), please include those in your description. Also, please describe any conservation easements on your farm if you have them.**

2. **Is your farm organic?**

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

3. **Detail below just your rotations that include either corn, soy, barley, hay, wheat, oats, sorghum, and/or other small grains as these are the only crops that our economic analysis works for.** *(See example in gray rows for guidance. Clear out example rows to make room as needed.)*

Table 1: Farm Rotations and Timeline of Soil Health Practice Use

Row Crop Rotations (corn, soy, barley, hay, wheat, oats, sorghum, and/or other small grains)			Soil Health Practice Info (no-till, reduced tillage, nutrient management, and/or cover crops)	
Rotation Name	**Crop and Years in Rotation**	**Average Acreage**	**SH Practices by Crop**	**Year Initiated each SH Practice**
E.g., Corn-Soybean-Hay	*Corn-1, Soy-1, Hay-3*	*1100*	• *No-till - Soy* • *NM - All* • *Cover Crop – Corn, Soy*	• *2010* • *2015* • *2014*
E.g., Corn-Soybean	*Corn-1, Soy-1*	500	• *No-till - Soy*	• *2010*

American Farmland Trust

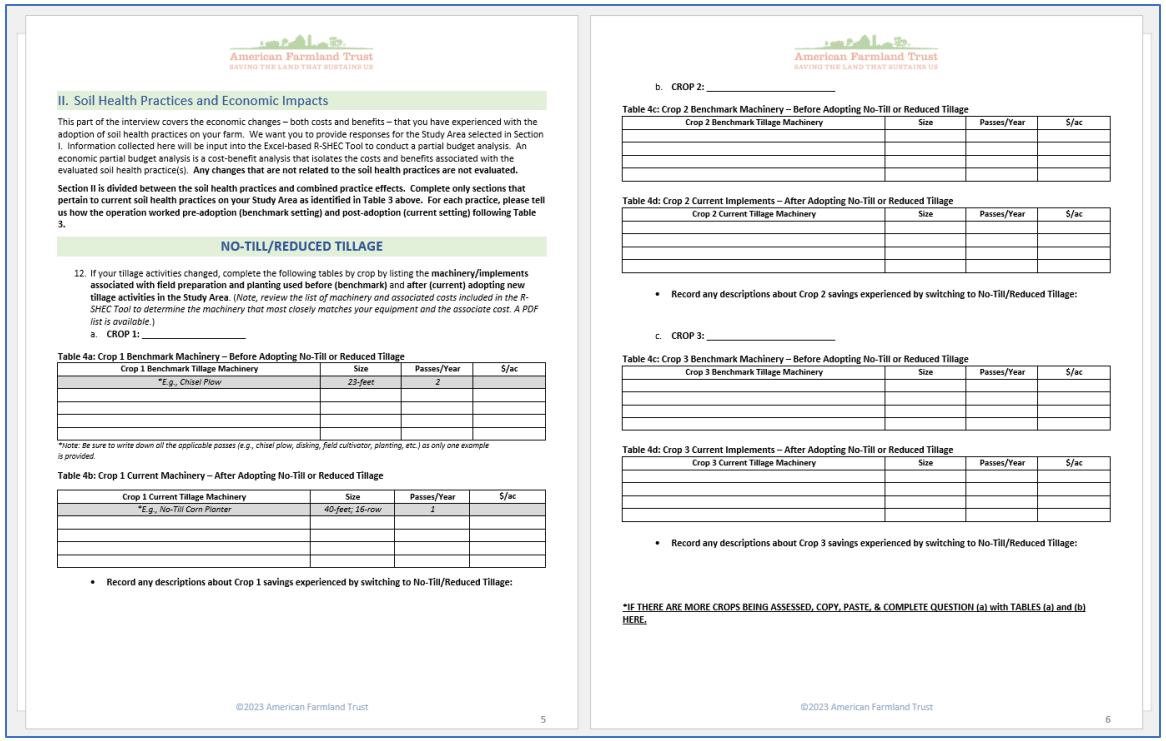
Step 4:
Interview a "soil health successful" farmer

Step 2: Identify farmer following specific criteria

- *Adopted practices **4-15 years ago***
  - *Given "before versus after" approach, farmers initiating practice more than **15 years** of adoption are not ideal*
- *Data to share (historical and current)*

Step 3: Pre-interview farmer to ensure they qualify using our "Pre-interview Form"

Step 4: Once selected, interview farmer using our row crop or almond R-SHEC Questionnaire



American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

II. Soil Health Practices and Economic Impacts

This part of the interview covers the economic changes – both costs and benefits – that you have experienced with the adoption of soil health practices on your farm. We want you to provide responses for the Study Area selected in Section I. Information collected here will be input into the Excel-based R-SHEC Tool to conduct a partial budget analysis. An economic partial budget analysis is a cost-benefit analysis that isolates the costs and benefits associated with the evaluated soil health practice(s). **Any changes that are not related to the soil health practices are not evaluated.**

Section II is divided between the soil health practices and combined practice effects. Complete only sections that pertain to current soil health practices on your Study Area as identified in Table 3 above. For each practice, please tell us how the operation worked pre-adoption (benchmark setting) and post-adoption (current setting) following Table 3.

NO-TILL/REDUCED TILLAGE

12. If your tillage activities changed, complete the following tables by crop by listing the **machinery/implements associated with field preparation and planting used before (benchmark) and after (current) adopting new tillage activities in the Study Area**. (*Note, review the list of machinery and associated costs included in the R-SHEC Tool to determine the machinery that most closely matches your equipment and the associate cost. A PDF list is available.*)
    a. **CROP 1:** _____

Table 4a: Crop 1 Benchmark Machinery – Before Adopting No-Till or Reduced Tillage

Crop 1 Benchmark Tillage Machinery	Size	Passes/Year	$/ac
**E.g., Chisel Plow*	*23-feet*	*2*	

**Note: Be sure to write down all the applicable passes (e.g., chisel plow, disking, field cultivator, planting, etc.) as only one example is provided.*

Table 4b: Crop 1 Current Machinery – After Adopting No-Till or Reduced Tillage

Crop 1 Current Tillage Machinery	Size	Passes/Year	$/ac
**E.g., No-Till Corn Planter*	*40-feet; 16-row*	*1*	

- **Record any descriptions about Crop 1 savings experienced by switching to No-Till/Reduced Tillage:**

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

b. **CROP 2:** _____

Table 4c: Crop 2 Benchmark Machinery – Before Adopting No-Till or Reduced Tillage

Crop 2 Benchmark Tillage Machinery	Size	Passes/Year	$/ac

Table 4d: Crop 2 Current Implements – After Adopting No-Till or Reduced Tillage

Crop 2 Current Tillage Machinery	Size	Passes/Year	$/ac

- **Record any descriptions about Crop 2 savings experienced by switching to No-Till/Reduced Tillage:**

c. **CROP 3:** _____

Table 4c: Crop 3 Benchmark Machinery – Before Adopting No-Till or Reduced Tillage

Crop 3 Benchmark Tillage Machinery	Size	Passes/Year	$/ac

Table 4d: Crop 3 Current Implements – After Adopting No-Till or Reduced Tillage

Crop 3 Current Tillage Machinery	Size	Passes/Year	$/ac

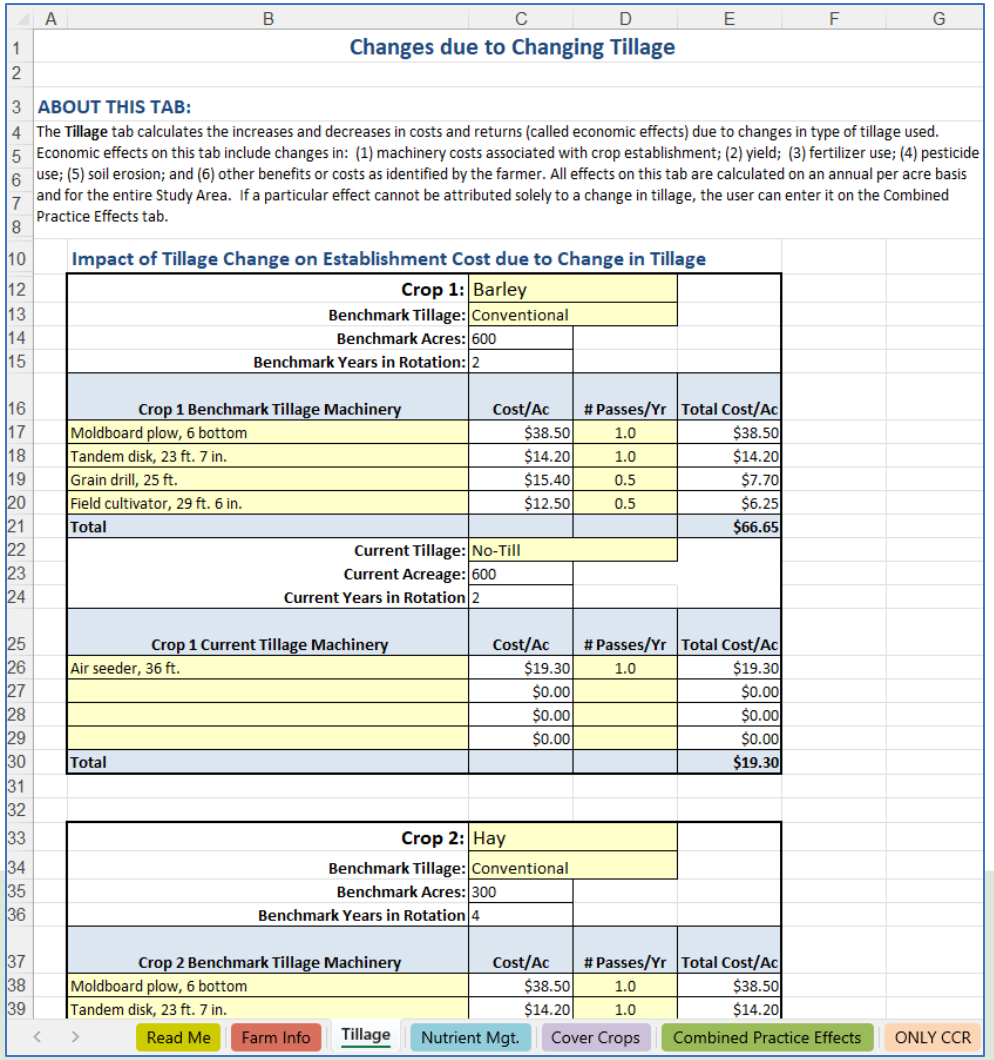
- **Record any descriptions about Crop 3 savings experienced by switching to No-Till/Reduced Tillage:**

***IF THERE ARE MORE CROPS BEING ASSESSED, COPY, PASTE, & COMPLETE QUESTION (a) with TABLES (a) and (b) HERE.**

American Farmland Trust

Steps 5-7: Input data

- **Step 5: Input data into the R-SHEC Tool**
- **Step 6: We strongly encourage having your results reviewed by an ag economist**
- **Step 7: Follow-up with farmer as needed and review results for their approval**



Changes due to Changing Tillage

ABOUT THIS TAB:

The **Tillage** tab calculates the increases and decreases in costs and returns (called economic effects) due to changes in type of tillage used. Economic effects on this tab include changes in: (1) machinery costs associated with crop establishment; (2) yield; (3) fertilizer use; (4) pesticide use; (5) soil erosion; and (6) other benefits or costs as identified by the farmer. All effects on this tab are calculated on an annual per acre basis and for the entire Study Area. If a particular effect cannot be attributed solely to a change in tillage, the user can enter it on the Combined Practice Effects tab.

Impact of Tillage Change on Establishment Cost due to Change in Tillage

Crop 1:	Barley
Benchmark Tillage:	Conventional
Benchmark Acres:	600
Benchmark Years in Rotation:	2

Crop 1 Benchmark Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac
Moldboard plow, 6 bottom	$38.50	1.0	$38.50
Tandem disk, 23 ft. 7 in.	$14.20	1.0	$14.20
Grain drill, 25 ft.	$15.40	0.5	$7.70
Field cultivator, 29 ft. 6 in.	$12.50	0.5	$6.25
Total			**$66.65**

Current Tillage:	No-Till
Current Acreage:	600
Current Years in Rotation	2

Crop 1 Current Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac
Air seeder, 36 ft.	$19.30	1.0	$19.30
	$0.00		$0.00
	$0.00		$0.00
	$0.00		$0.00
Total			**$19.30**

Crop 2:	Hay
Benchmark Tillage:	Conventional
Benchmark Acres:	300
Benchmark Years in Rotation	4

Crop 2 Benchmark Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac
Moldboard plow, 6 bottom	$38.50	1.0	$38.50
Tandem disk, 23 ft. 7 in.	$14.20	1.0	$14.20

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combined Practice Effects | ONLY CCR

Step 8: Review and finalize PBA table

- **Step 8: Finalize PBA table**

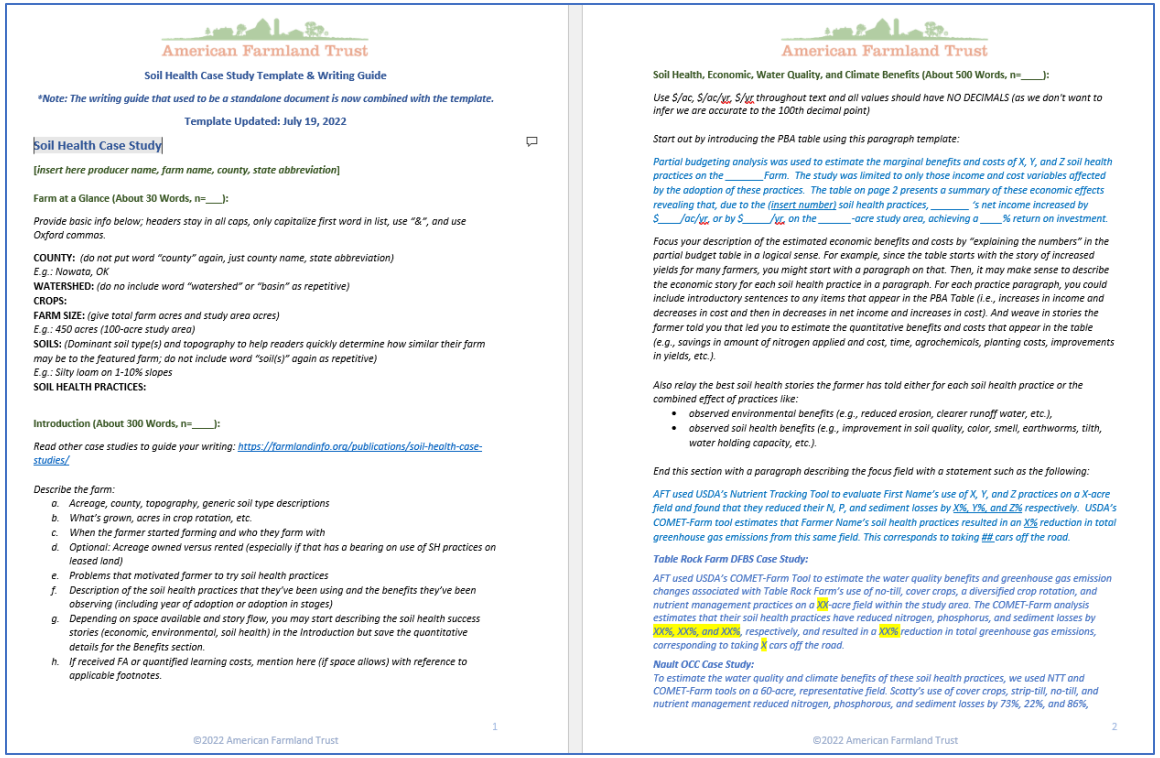
Economic Effects of Soil Health Practices for Thorndyke (2021)

Increases in Net Income			
Increase in Income			
Item	**Per Acre**	**Acres**	**Total**
Yield Impacts due to Cover Crops	$16.36	700	$11,455
Total Increased Income			**$11,455**
Decrease in Cost			
Item	**Per Acre**	**Acres**	**Total**
Machinery Cost Savings due to Reduced Tillage (3 less passes over the field)	$17.81	1,400	$24,933
Machinery Cost Savings due to Change in Nutrient Mgt.	$2.98	1,400	$4,165
Fertilizer Savings due to Change in Nutrient Mgt.	$69.00	700	$48,300
Total Decreased Cost			**$77,398**
Annual Total Increased Net Income			**$88,853**
Total Acres in this Study Area			**1,400**
Annual Per Acre Increased Net Income			**$63**

Decreases in Net Income			
Decrease in Income			
Item	**Per Acre**	**Acres**	**Total**
None identified			
Total Decreased Income			**$0**
Increase in Cost			
Item	**Per Acre**	**Acres**	**Total**
Increased Herbicide Cost due to Reduced Tillage	$5.00	1,400	$7,000
Cover Crop Costs	$39.00	700	$27,300
Cover Crops Learning Activities	$1.87	700	$1,308
Nutrient Mgt. Learning Activities	$0.93	1,400	$1,308
Total Increased Cost			**$36,916**
Annual Total Decreased Net Income			**$36,916**
Total Acres in this Study Area			**1,400**
Annual Per Acre Decreased Net Income			**$26**

Annual Change in Total Net Income	**= $51,937**
Annual Change in Net Income Per Acre	**= $37**
Return on Investment	**= 141%**

Step 9: Write a case study



American Farmland Trust

Soil Health Case Study Template & Writing Guide

*Note: The writing guide that used to be a standalone document is now combined with the template.

Template Updated: July 19, 2022

Soil Health Case Study

[insert here producer name, farm name, county, state abbreviation]

Farm at a Glance (About 30 Words, n=___):

Provide basic info below; headers stay in all caps, only capitalize first word in list, use "&", and use Oxford commas.

COUNTY: (do not put word "county" again, just county name, state abbreviation)
E.g.: Nowata, OK
WATERSHED: (do no include word "watershed" or "basin" as repetitive)
CROPS:
FARM SIZE: (give total farm acres and study area acres)
E.g.: 450 acres (100-acre study area)
SOILS: (Dominant soil type(s) and topography to help readers quickly determine how similar their farm may be to the featured farm; do not include word "soil(s)" again as repetitive)
E.g.: Silty loam on 1-10% slopes
SOIL HEALTH PRACTICES:

Introduction (About 300 Words, n=____):

Read other case studies to guide your writing: https://farmlandinfo.org/publications/soil-health-case-studies/

Describe the farm:

a. Acreage, county, topography, generic soil type descriptions
b. What's grown, acres in crop rotation, etc.
c. When the farmer started farming and who they farm with
d. Optional: Acreage owned versus rented (especially if that has a bearing on use of SH practices on leased land)
e. Problems that motivated farmer to try soil health practices
f. Description of the soil health practices that they've been using and the benefits they've been observing (including year of adoption or adoption in stages)
g. Depending on space available and story flow, you may start describing the soil health success stories (economic, environmental, soil health) in the Introduction but save the quantitative details for the Benefits section.
h. If received FA or quantified learning costs, mention here (if space allows) with reference to applicable footnotes.

©2022 American Farmland Trust 1

American Farmland Trust

Soil Health, Economic, Water Quality, and Climate Benefits (About 500 Words, n=____):

Use $/ac, $/ac/yr, $/yr throughout text and all values should have NO DECIMALS (as we don't want to infer we are accurate to the 100th decimal point)

Start out by introducing the PBA table using this paragraph template:

Partial budgeting analysis was used to estimate the marginal benefits and costs of X, Y, and Z soil health practices on the _____Farm. The study was limited to only those income and cost variables affected by the adoption of these practices. The table on page 2 presents a summary of these economic effects revealing that, due to the (insert number) soil health practices, _____ 's net income increased by $____/ac/yr, or by $_____/yr, on the _____-acre study area, achieving a ____% return on investment.

Focus your description of the estimated economic benefits and costs by "explaining the numbers" in the partial budget table in a logical sense. For example, since the table starts with the story of increased yields for many farmers, you might start with a paragraph on that. Then, it may make sense to describe the economic story for each soil health practice in a paragraph. For each practice paragraph, you could include introductory sentences to any items that appear in the PBA Table (i.e., increases in income and decreases in cost and then in decreases in net income and increases in cost). And weave in stories the farmer told you that led you to estimate the quantitative benefits and costs that appear in the table (e.g., savings in amount of nitrogen applied and cost, time, agrochemicals, planting costs, improvements in yields, etc.).

Also relay the best soil health stories the farmer has told either for each soil health practice or the combined effect of practices like:

- observed environmental benefits (e.g., reduced erosion, clearer runoff water, etc.),
- observed soil health benefits (e.g., improvement in soil quality, color, smell, earthworms, tilth, water holding capacity, etc.).

End this section with a paragraph describing the focus field with a statement such as the following:

AFT used USDA's Nutrient Tracking Tool to evaluate First Name's use of X, Y, and Z practices on a X-acre field and found that they reduced their N, P, and sediment losses by X%, Y%, and Z% respectively. USDA's COMET-Farm tool estimates that Farmer Name's soil health practices resulted in an X% reduction in total greenhouse gas emissions from this same field. This corresponds to taking ## cars off the road.

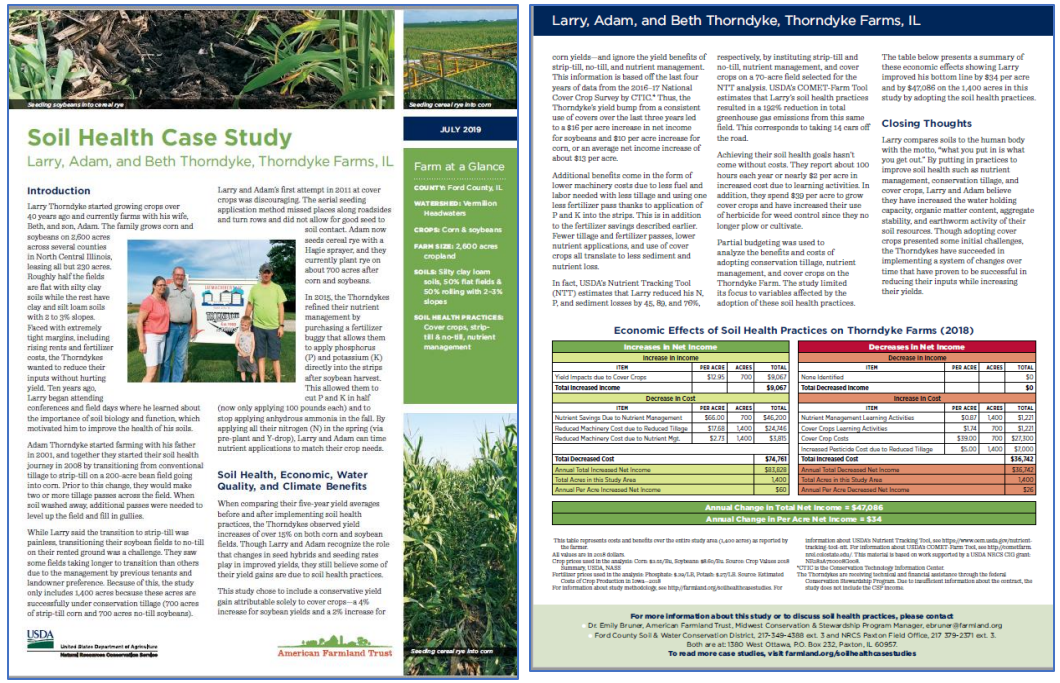
Table Rock Farm DFBS Case Study:

AFT used USDA's COMET-Farm Tool to estimate the water quality benefits and greenhouse gas emission changes associated with Table Rock Farm's use of no-till, cover crops, a diversified crop rotation, and nutrient management practices on a XX-acre field within the study area. The COMET-Farm analysis estimates that their soil health practices have reduced nitrogen, phosphorus, and sediment losses by XX%, XX%, and XX%, respectively, and resulted in a XX% reduction in total greenhouse gas emissions, corresponding to taking X cars off the road.

Nault OCC Case Study:

To estimate the water quality and climate benefits of these soil health practices, we used NTT and COMET-Farm tools on a 60-acre, representative field. Scotty's use of cover crops, strip-till, no-till, and nutrient management reduced nitrogen, phosphorous, and sediment losses by 73%, 22%, and 86%,

©2022 American Farmland Trust 2



Seeding soybeans into cereal rye

Seeding cereal rye into corn

JULY 2019

Soil Health Case Study

Larry, Adam, and Beth Thorndyke, Thorndyke Farms, IL

Introduction

Larry Thorndyke started growing crops over 40 years ago and currently farms with his wife, Beth, and son, Adam. The family grows corn and soybeans on 2,600 acres across several counties in North Central Illinois, leasing all but 230 acres. Roughly half the fields are flat with silty clay soils while the rest have clay and silt loam soils with 2 to 3% slopes. Faced with extremely tight margins, including rising rents and fertilizer costs, the Thorndykes wanted to reduce their inputs without hurting yield. Ten years ago, Larry began attending conferences and field days where he learned about the importance of soil biology and function, which motivated him to improve the health of his soils.

Adam Thorndyke started farming with his father in 2001, and together they started their soil health journey in 2008 by transitioning from conventional tillage to strip-till on a 200-acre bean field going into corn. Prior to this change, they would make two or more tillage passes across the field. When soil washed away, additional passes were needed to level up the field and fill in gullies.

While Larry said the transition to strip-till was painless, transitioning their soybean fields to no-till on their rented ground was a challenge. They saw some fields taking longer to transition than others due to the management by previous tenants and landowner preference. Because of this, the study only includes 1,400 acres because these acres are successfully under conservation tillage (700 acres of strip-till corn and 700 acres no-till soybeans).

Larry and Adam's first attempt in 2011 at cover crops was discouraging. The aerial seeding application method missed places along roadsides and turn rows and did not allow for good seed to soil contact. Adam now seeds cereal rye with a Hagie sprayer, and they currently plant rye on about 700 acres after corn and soybeans.

In 2015, the Thorndykes refined their nutrient management by purchasing a fertilizer buggy that allows them to apply phosphorus (P) and potassium (K) directly into the strips after soybean harvest. This allowed them to cut P and K in half (now only applying 100 pounds each) and to stop applying anhydrous ammonia in the fall. By applying all their nitrogen (N) in the spring (via pre-plant and Y-drop), Larry and Adam can time nutrient applications to match their crop needs.

Soil Health, Economic, Water Quality, and Climate Benefits

When comparing their five-year yield averages before and after implementing soil health practices, the Thorndykes observed yield increases of over 15% on both corn and soybean fields. Though Larry and Adam recognize the role that changes in seed hybrids and seeding rates play in improved yields, they still believe some of their yield gains are due to soil health practices.

This study chose to include a conservative yield gain attributable solely to cover crops—a 4% increase for soybean yields and a 2% increase for

Farm at a Glance

COUNTY: Ford County, IL

WATERSHED: Vermilion Headwaters

CROPS: Corn & soybeans

FARM SIZE: 2,600 acres cropland

SOILS: Silty clay loam soils, 50% flat fields & 50% rolling with 2-3% slopes

SOIL HEALTH PRACTICES: Cover crops, strip-till & no-till, nutrient management

USDA United States Department of Agriculture Natural Resources Conservation Service

American Farmland Trust

Seeding cereal rye into corn

Larry, Adam, and Beth Thorndyke, Thorndyke Farms, IL

corn yields—and ignore the yield benefits of strip-till, no-till, and nutrient management. This information is based off the last four years of data from the 2016–17 National Cover Crop Survey by CTIC.* Thus, the Thorndyke's yield bump from a consistent use of covers over the last three years led to a $16 per acre increase in net income for soybeans and $10 per acre increase for corn, or an average net income increase of about $13 per acre.

Additional benefits come in the form of lower machinery costs due to less fuel and labor needed with less tillage and using one less fertilizer pass thanks to application of P and K into the strips. This is in addition to the fertilizer savings described earlier. Fewer tillage and fertilizer passes, lower nutrient applications, and use of cover crops all translate to less sediment and nutrient loss.

In fact, USDA's Nutrient Tracking Tool (NTT) estimates that Larry reduced his N, P, and sediment losses by 45, 89, and 76%, respectively, by instituting strip-till and no-till, nutrient management, and cover crops on a 70-acre field selected for the NTT analysis. USDA's COMET-Farm Tool estimates that Larry's soil health practices resulted in a 192% reduction in total greenhouse gas emissions from this same field. This corresponds to taking 14 cars off the road.

Achieving their soil health goals hasn't come without costs. They report about 100 hours each year or nearly $2 per acre in increased cost due to learning activities. In addition, they spend $39 per acre to grow cover crops and have increased their use of herbicide for weed control since they no longer plow or cultivate.

Partial budgeting was used to analyze the benefits and costs of adopting conservation tillage, nutrient management, and cover crops on the Thorndyke Farm. The study limited its focus to variables affected by the adoption of these soil health practices.

The table below presents a summary of these economic effects showing Larry improved his bottom line by $34 per acre and by $47,086 on the 1,400 acres in this study by adopting the soil health practices.

Closing Thoughts

Larry compares soils to the human body with the motto, "what you put in is what you get out." By putting in practices to improve soil health such as nutrient management, conservation tillage, and cover crops, Larry and Adam believe they have increased the water holding capacity, organic matter content, aggregate stability, and earthworm activity of their soil resources. Though adopting cover crops presented some initial challenges, the Thorndykes have succeeded in implementing a system of changes over time that have proven to be successful in reducing their inputs while increasing their yields.

Economic Effects of Soil Health Practices on Thorndyke Farms (2018)

Increases in Net Income			
Increase in Income			
ITEM	PER ACRE	ACRES	TOTAL
Yield Impacts due to Cover Crops	$12.95	700	$9,067
Total Increased Income			$9,067
Decrease in Cost			
ITEM	PER ACRE	ACRES	TOTAL
Nutrient Savings Due to Nutrient Management	$66.00	700	$46,200
Reduced Machinery Cost due to Reduced Tillage	$17.68	1,400	$24,746
Reduced Machinery Cost due to Nutrient Mgt.	$2.71	1,400	$3,815
Total Decreased Cost			$74,761
Annual Total Increased Net Income			$83,828
Total Acres in this Study Area			1,400
Annual Per Acre Increased Net Income			$60

Decreases in Net Income			
Decrease in Income			
ITEM	PER ACRE	ACRES	TOTAL
None Identified			$0
Total Decreased Income			$0
Increase in Cost			
ITEM	PER ACRE	ACRES	TOTAL
Nutrient Management Learning Activities	$0.87	1,400	$1,221
Cover Crops Learning Activities	$1.74	700	$1,221
Cover Crop Costs	$39.00	700	$27,300
Increased Pesticide Cost due to Reduced Tillage	$5.00	1,400	$7,000
Total Increased Cost			$36,742
Annual Total Decreased Net Income			$36,742
Total Acres in this Study Area			1,400
Annual Per Acre Decreased Net Income			$26

Annual Change in Total Net Income = $47,086
Annual Change in Per Acre Net Income = $34

This table represents costs and benefits over the entire study area (1,400 acres) as reported by the farmer.
All values are in 2018 dollars.
Crop prices used in the analysis: Corn: $3.20/Bu, Soybeans: $8.60/Bu. Source: Crop Values 2018 Summary, USDA, NASS
Fertilizer prices used in the analysis: Phosphate: $.29/LB, Potash: $.27/LB. Source: Estimated Costs of Crop Production in Iowa - 2018
For information about study methodology, see http://farmland.org/soilhealthcasestudies. For information about USDA's Nutrient Tracking Tool, see https://www.nrcs.usda.gov/nutrient-tracking-tool-ntt. For information about USDA's COMET-Farm Tool, see http://comet.farm.nrel.colostate.edu/. This material is based on work supported by a USDA NRCS CIG grant: NR184A750001C006.
*CTIC is the Conservation Technology Information Center.
The Thorndykes are receiving technical and financial assistance through the federal Conservation Stewardship Program. Due to insufficient information about the contract, the study does not include the CSP income.

For more information about this study or to discuss soil health practices, please contact
Dr. Emily Bruner, American Farmland Trust, Midwest Conservation & Stewardship Program Manager, ebruner@farmland.org
Ford County Soil & Water Conservation District, 217-349-4398 ext. 3 and NRCS Paxton Field Office, 217 379-2371 ext. 3.
Both are at: 1380 West Ottawa, P.O. Box 232, Paxton, IL 60957
To read more case studies, visit farmland.org/soilhealthcasestudies

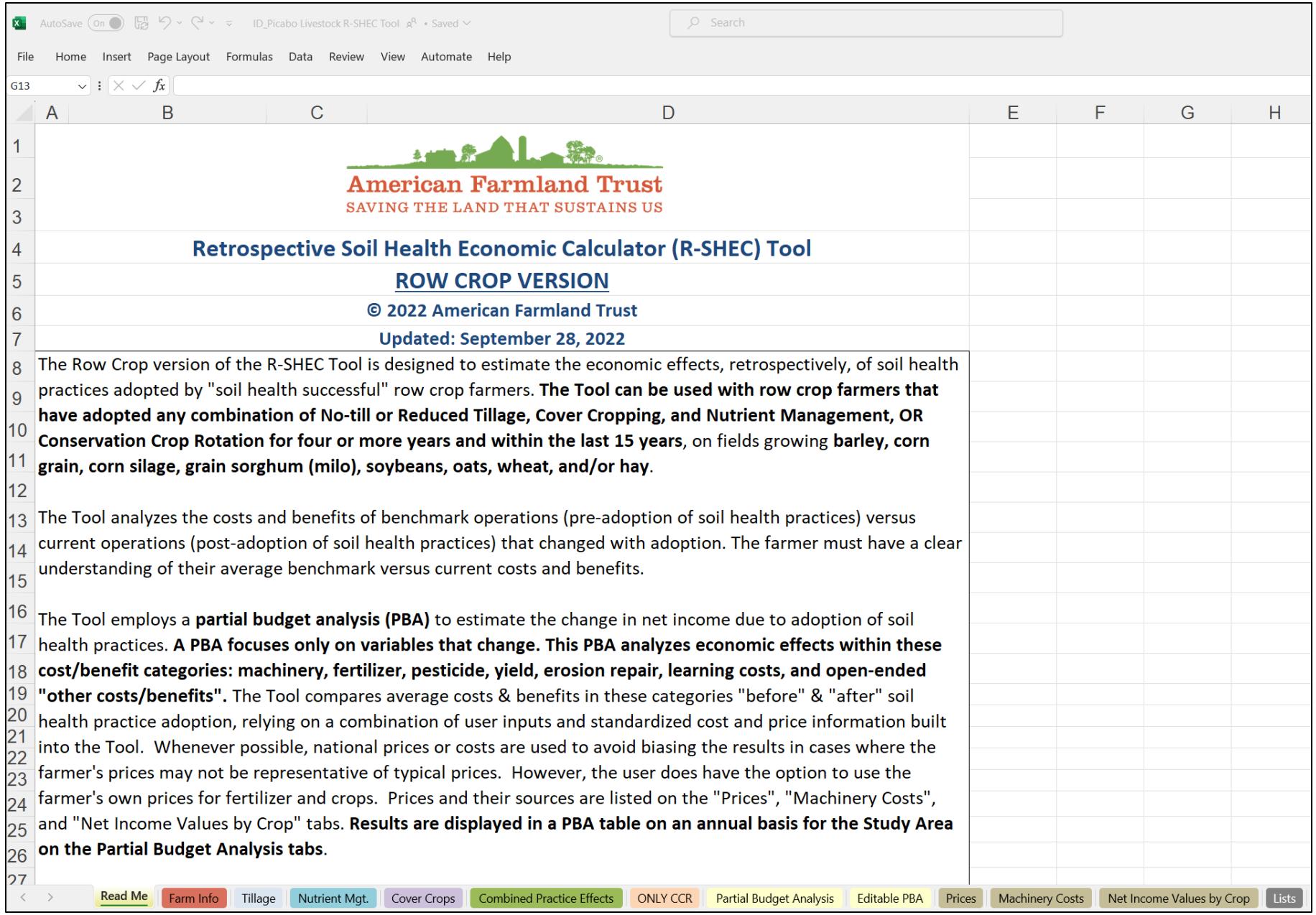
- **Step 9: Option to use our Case Study Writing template to write a case study presenting the PBA table**

R-SHEC Tool Live Demo

(for PDF, made screenshots of the Tool)

Photo by: Kevin Keenan featuring Steve Gould for the HaR-Go Dairy Farm Case Study (NY)

American Farmland Trust



American Farmland Trust

Row Crop Farm General Information

ABOUT THIS TAB:

The **Farm Info** tab records very general information including farmer name, name of farm, location, watershed, Study Area benchmark and current crop rotations, Study Area soil health practices, time spent each year on educational activities, and farmer's fertilizer and crop prices (optional).

Farmer Name	County	State
Nicholas Purdy	Blaine	Idaho

Farm
Picabo Livestock Co

Watershed Name
Silver Creek - Wood River

Clear All Data

Study Area Crop Rotation (*required entry*)

Benchmark Rotation		
Crop	**# Years**	**Acres**
Barley	2	600
Hay	4	1200
Total (Study Area)	**6**	**1800**

Current Rotation		
Crop	**# Years**	**Acres**
Barley	2	600
Hay	4	1200
Total (Study Area)	**6**	**1800**

Study Area Soil Health Practices for Analysis

TIP: Enter an "x" in all that apply.

Soil Health Practice		Year adopted
No-Till or Reduced Tillage	X	2014
Nutrient Management	X	2015
Cover Crops	X	2016
Note: A change in crop rotation cannot be analyzed with other soil health practices due to data discrepancies.		
Conservation Crop Rotation (CCR)		

Time Spent on Educational Activities

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combined Practice Effects | ONLY CCR

American Farmland Trust

Changes due to Changing Tillage

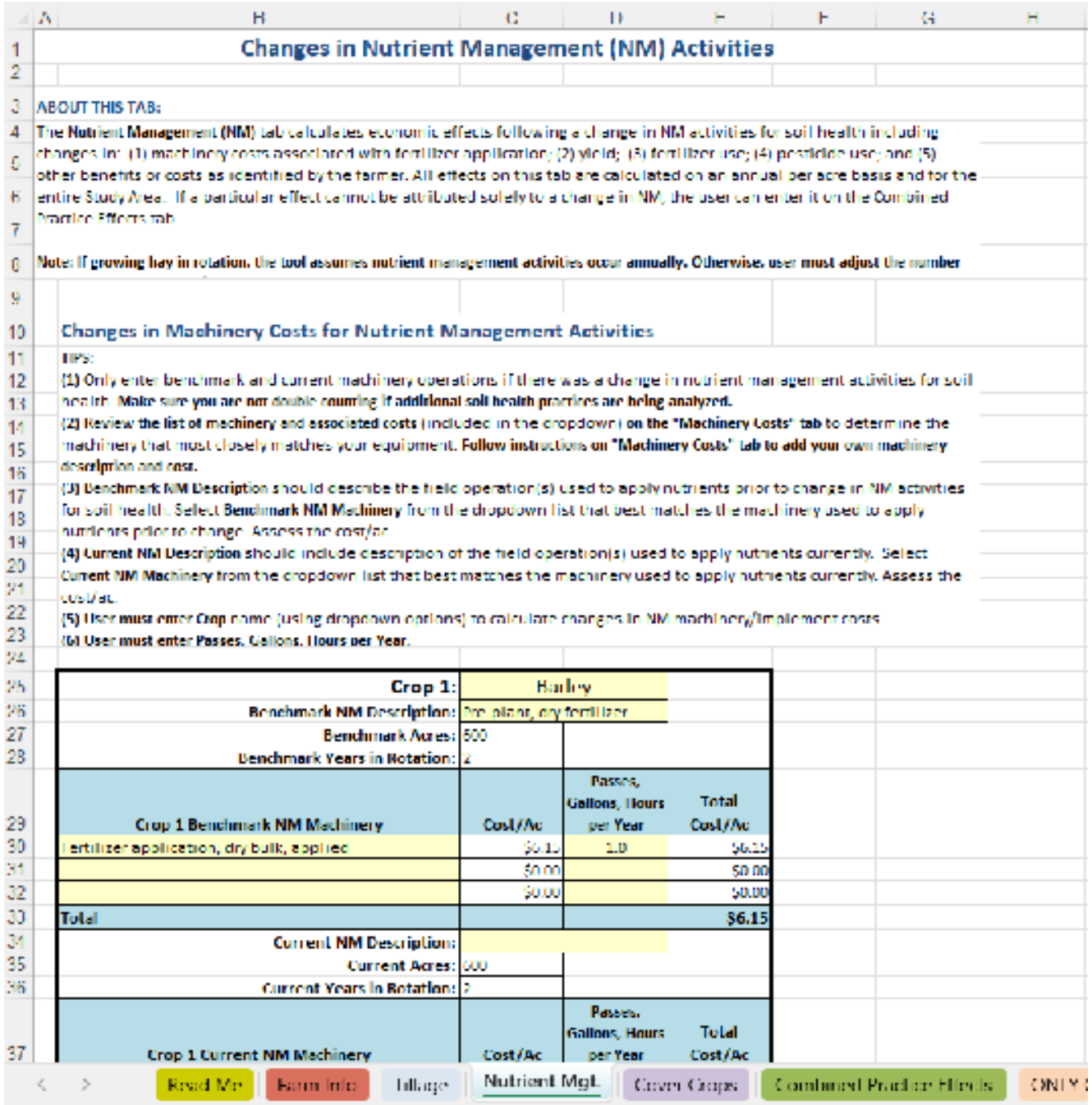
ABOUT THIS TAB:

The **Tillage** tab calculates the increases and decreases in costs and returns (called economic effects) due to changes in type of tillage used. Economic effects on this tab include changes in: (1) machinery costs associated with crop establishment; (2) yield; (3) fertilizer use; (4) pesticide use; (5) soil erosion; and (6) other benefits or costs as identified by the farmer. All effects on this tab are calculated on an annual per acre basis and for the entire Study Area. If a particular effect cannot be attributed solely to a change in tillage, the user can enter it on the Combined Practice Effects tab.

Impact of Tillage Change on Establishment Cost due to Change in Tillage

Crop 1:	Barley		
Benchmark Tillage:	Conventional		
Benchmark Acres:	600		
Benchmark Years in Rotation:	2		
Crop 1 Benchmark Tillage Machinery	**Cost/Ac**	**# Passes/Yr**	**Total Cost/Ac**
Moldboard plow, 6 bottom	$38.50	1.0	$38.50
Tandem disk, 23 ft. 7 in.	$14.20	1.0	$14.20
Grain drill, 25 ft.	$15.40	0.5	$7.70
Field cultivator, 29 ft. 6 in.	$12.50	0.5	$6.25
Total			**$66.65**
Current Tillage:	No-Till		
Current Acreage:	600		
Current Years in Rotation	2		
Crop 1 Current Tillage Machinery	**Cost/Ac**	**# Passes/Yr**	**Total Cost/Ac**
Air seeder, 36 ft.	$19.30	1.0	$19.30
	$0.00		$0.00
	$0.00		$0.00
	$0.00		$0.00
Total			**$19.30**

Crop 2:	Hay		
Benchmark Tillage:	Conventional		
Benchmark Acres:	300		
Benchmark Years in Rotation	4		
Crop 2 Benchmark Tillage Machinery	**Cost/Ac**	**# Passes/Yr**	**Total Cost/Ac**
Moldboard plow, 6 bottom	$38.50	1.0	$38.50
Tandem disk, 23 ft. 7 in.	$14.20	1.0	$14.20



Changes in Nutrient Management (NM) Activities

ABOUT THIS TAB:

The **Nutrient Management (NM)** tab calculates economic effects following a change in NM activities for soil health including changes in: (1) machinery costs associated with fertilizer application; (2) yield; (3) fertilizer use; (4) pesticide use; and (5) other benefits or costs as identified by the farmer. All effects on this tab are calculated on an annual per acre basis and for the entire Study Area. If a particular effect cannot be attributed solely to a change in NM, the user can enter it on the Combined Practice Effects tab.

Note: If growing hay in rotation, the tool assumes nutrient management activities occur annually. Otherwise, user must adjust the number

Changes in Machinery Costs for Nutrient Management Activities

TIPS:

(1) Only enter benchmark and current machinery operations if there was a change in nutrient management activities for soil health. Make sure you are not double counting if additional soil health practices are being analyzed.

(2) Review the list of machinery and associated costs (included in the dropdown) on the "Machinery Costs" tab to determine the machinery that most closely matches your equipment. Follow instructions on "Machinery Costs" tab to add your own machinery description and cost.

(3) Benchmark NM Description should describe the field operation(s) used to apply nutrients prior to change in NM activities for soil health. Select **Benchmark NM Machinery** from the dropdown list that best matches the machinery used to apply nutrients prior to change. Assess the cost/ac.

(4) Current NM Description should include description of the field operation(s) used to apply nutrients currently. Select **Current NM Machinery** from the dropdown list that best matches the machinery used to apply nutrients currently. Assess the cost/ac.

(5) User must enter Crop name (using dropdown options) to calculate changes in NM machinery/implement costs.

(6) User must enter Passes, Gallons, Hours per Year.

Crop 1:	Barley		
Benchmark NM Description:	Inc. plow, dry fertilizer		
Benchmark Acres:	600		
Benchmark Years in Rotation:	2		
Crop 1 Benchmark NM Machinery	**Cost/Ac**	**Passes, Gallons, Hours per Year**	**Total Cost/Ac**
Fertilizer application, dry bulk, applied	$6.15	1.0	$6.15
	$0.00		$0.00
	$0.00		$0.00
Total			**$6.15**
Current NM Description:			
Current Acres:	600		
Current Years in Rotation:	2		
Crop 1 Current NM Machinery	**Cost/Ac**	**Passes, Gallons, Hours per Year**	**Total Cost/Ac**

American Farmland Trust

Changes due to Adopting Cover Crops

ABOUT THIS TAB:

The **Cover Crop** tab calculates the economic effects attributed to adopting cover crops. Economic effects on this tab include (1) cover crop costs and changes in (2) cash crop yield, (3) fertilizer applied, (4) pesticides used, (5) soil erosion, and (6) other benefits or costs as identified by the farmer. Also, at the end of this tab, user can calculate the effects of grazing and/or harvesting their cover crop as hay (7). All effects on this tab are calculated on an annual per acre basis for the Study Area. If a particular effect cannot be attributed solely to introducing cover crops, the user can enter it on the Combined Practice Effects tab.

Note: This tab is setup to only analyze the switch from no cover crop to planting a cover crop. This tab does not analyze switching of cover crop species, changes in establishment methods, nor changes in termination methods, etc.

Cover Crop Costs

Cash Crop Following Cover	Barley				SHOW AUDIENCE HOW TO INPUT
Years in Rotation	2	0	0	0	
Cover Species or Mix Description	Dry Forage Mix				
Acres Planted	300				
Cover Crop Seed ($/Ac)	$30.00				
Establishment Cost ($/Ac)	$38.60				
Termination Cost ($/Ac)	$0.00				*Grazing specific CC section belc
Other Costs ($/Ac)					
Per Acre Cost by Crop ($/Ac)	$68.60	$0.00	$0.00	$0.00	
Total Cost by Crop ($)	$20,580	$0	$0	$0	
				Study Area Total Cost ($)	**$20,580**
				Study Area Per Acre Cost (Weighted Average, $/Ac)	**$69**

Yield Impacts due to Cover Crops

Is this an organic farm? (Y/N)

TIPS:

(1) We suggest only entering changes in yield below if Cover Cropping is the only soil health practice analyzed, otherwise enter yield impacts in the Combined Practice Effects tab.

(2) User must answer above question "Is this an organic farm?" or the table will not calculate correctly.

(3) User must enter their "Benchmark Average Yield" AND "% Yield Increase/Decrease" OR "Change in Ave. Yield". If user enters both of the latter, calculation will use % yield change value.

(4) Benchmark average yield should reflect the average yield under benchmark practices before soil health practice

Cash Crop Following Cover	**Barley**	**0**	**0**	**0**
Unit	Bushel	0	0	0
Benchmark Average Yield (Unit/Acre)				
AND				
% Yield Increase/Decrease Due To Cover Crop (+/- %)				
Calculated Change in Ave. Yield Due to Cover Crop				

Changes due to the Combination of Soil Health Practices

Use this page to calculate effects that cannot be attributed to just one practice.

ABOUT THIS TAB:

The **Combined Practice Effects** tab calculates economic effects that are attributed to a combination of soil health practices. Economic effects on this tab include changes in: (1) yield; (2) fertilizer use; (3) pesticide use; (4) soil erosion rate; and (5) other benefits or costs as identified by the farmer. **To avoid double counting, DO NOT enter any effect information that is already covered on the individual practice tabs.** All effects are calculated on an annual basis per acre and for the entire Study Area.

Yield Impacts Due to Soil Health Practices

Is this Study Area organic? (Y/N)	N

TIPS:

(1) User must answer above question "Is this an organic farm?" or the table will not calculate correctly.

(2) User must enter their "Benchmark Average Yield" AND "% Yield Increase/Decrease" OR "Change in Ave. Yield". If user enters both of the latter, calculation will use % yield change value.

(3) Benchmark average yield should reflect the average yield under benchmark practices before soil health practice

Cash Crop	Barley	Hay		
Unit	Bushel	Ton	0	0
Benchmark Average Yield (Unit/Acre)	105	4		
AND				
Practices (+/- %)				
Calculated Change in Ave. Yield due to Combined Practices (+/- Unit/Ac)	0.00	0.00	0.00	0.00
AND/OR				
Change in Ave. Yield due to Combined Practices (+/- Ur	5.00	0.50		
Standard Crop Price per Unit[1]	$5.15	$186.00	$0.00	$0.00
Farmer's Crop Price per Unit (Optional)	$0.00	$0.00	$0.00	$0.00
Total Change by Crop ($)	$15,450	$111,600	$0	$0
Per Acre Change by Crop ($/Ac)	$26	$93	$0	$0
			Study Area Total Change ($)	**$127,050**
			Study Area Per Acre Change (Weighted Average, $/Ac)	**$71**

[1] National average non-organic or organic price.

Click here for crop price data sources

Impact of Soil Health Practices on Primary Nutrients Used

TIP: Enter negative values to indicate savings and positive values to indicate an increase in cost.

Cash Crop	Barley	Hay		
Nitrogen (+/- Lbs/Ac)				

Changes due to Adopting Conservation Crop Rotation

ABOUT THIS TAB:

The **Conservation Crop Rotation (CCR)** tab estimates economic effects following a change in rotation for improvement in soil health. The change in net income is estimated using USDA Agricultural Resource Management Survey (ARMS) data on commodity costs and returns. These survey data represent average costs of production across the country and are **not linked to specific management systems, such as conventional tillage or no-till. Since these estimated economic effects of a change in crop rotation do not correspond to specific management systems, it is not appropriate to combine analysis of CCR with changes in tillage, nutrient managment, or cover crops practices.**

WARNING: Adoption of a Conservation Crop Rotation cannot be analyzed with other soil health practices due to data discrepancies. Users can only analyze a Conservation Crop Rotation as a sole soil health practice. Also, corn silage cannot be analyzed on this tab because there is no net income data for corn silage.

Economic effects on this tab include changes in: (1) net income; (2) yield; (3) fertilizer use; (4) pesticide use; (5) soil erosion rate; and (6) other benefits or costs as identified by the farmer. See the "Net Income Values by Crop" tab to learn more about how changes in net income is calculated. All effects are calculated on an annual per acre basis for the entire Study Area.

Changes inherent in switching between two crops, like the difference in volume of fertilizer applied to corn versus soybeans, are captured in the Net Income calculations. **Only quantify change(s) in (2)-(6) listed above if not captured in the change in Net Income calculations (see "Net Income Values by Crop" tab) and if change(s) applies to both**

Change in Net Income due to Change in Crop Rotation

TIPS:

(1) No data entry is required in the following table as the values populate automatically using rotation information entered on the "**Farm Info**" tab then subsequently populate Net Income Per Acre from "Net Income

BENCHMARK ROTATION				
Acreage in Rotation:	1800			
Crops Grown	# Years in Rotation	Acres	Net Income Per Acre	Net Income All Acres
Barley	2	600	$0	**$0**
Hay	4	1,200	$279	**$334,584**
0	0	0	$0	**$0**
0	0	0	$0	**$0**
Weighted Average Annual			**$186**	**$334,584**

CURRENT ROTATION				
Acreage in Rotation:	1800			
Cash Crop	# Years in Rotation	Acres	Net Income Per Acre	Net Income All Acres
Barley	2	600	$0	**$0**
Hay	4	1,200	$279	**$334,584**
0	0	0	$0	**$0**
0	0	0	$0	**$0**
Weighted Average Annual			**$186**	**$334,584**

			Per Acre	All Acres
Change in Net Income			**$0**	**$0**

Click here for Net Income data source

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combine

American Farmland Trust

PARTIAL BUDGET ANALYSIS

ABOUT THIS TAB:

DO NOT EDIT THIS TAB: This tab and the table within should not be edited. Create your final PBA table in the subsequent tab called "Editable PBA" so if any mistakes are made you have this tab to reference and save results.

The Partial Budget Analysis tab autopopulates and organizes the effects calculated on the preceeding tabs into four quadrants:

(1) Increase in Income;
(2) Decrease in Cost;
(3) Decrease in Income; and
(4) Increase in Cost

Positive effects are displayed on the left and negative effects on the right. Effects are sorted automatically into the four quadrants based on their value. **Columns A and K** display the effect category from previous tabs assigned to the adjacent cell. NRCS practice codes are used instead of practice names as follows: **329 represents tillage changes, 340 is Cover Crops, 590 is Nutrient Management, and 328 is Conservation Crop Rotation.** The table can house every possible effect from the preceeding tabs. This means that most of the rows will not be populated. Totals are summarized at the bottom of the table for the entire Study Area. These totals are used to calculate the net change in income on a per acre basis and for the Study Area. The table also calculates the return on investment. **All values are on an annual basis.** Suggested footnotes appear at the bottom of the table followed by a summary of financial assistance payments received, if any.

This table should not be edited here, but on the subsequent tab called "Editable PBA".

NOTE: Farmer Name and Watershed Name are populated using information entered on the **Farm Info** tab.

Farmer Name
The Purdy Family
Watershed Name
Silver Creek - Wood River

WARNING: DO NOT attempt to edit the table as it contains complex formulas. The user risks losing the calculated effect information if the formulas are broken. The "Editable PBA" tab is identical to the Partial Budget Analysis tab and can be used for producing a version for publication.

Economic Effects of Soil Health Practices on Picabo Livestock Co (2021 Prices)

		Increases in Net Income				Decreases in Net Income				
		Increase in Income				Decrease in Income				
		Item	Per Acre	Acres	Total	Item	Per Acre	Acres	Total	
32	329 Yield	NA	$0	0	$0	NA	$0	0	$0	329 Yield
33	340 Yield	NA	$0	0	$0	NA	$0	0	$0	340 Yield
34	340 Grazi	NA	$0	0	$0	NA	$0	0	$0	590 Yield
35	340 Grazi	NA	$0	0	$0	NA	$0	0	$0	328 Net Income
36	340 Grazi	NA	$0	0	$0	NA	$0	0	$0	328 Yield
37	340 Hay	Income from Harvesting/Grazing Cover ($/Ac)	$74	300	$22,275	NA	$0	0	$0	All Practices
38	590 Yield	NA	$0	0	$0					
39	328 Net I	NA	$0	0	$0					
40	328 Yield	NA	$0	0	$0					
41	All Practi	Yield Impacts Due to Soil Health Practices	$71	1,800	$127,050					
42		**Total Increased Income**			**$149,325**	**Total Decreased Income**			**$0**	
43		**Decrease in Cost**				**Increase in Cost**				
44		**Item**	**Per Acre**	**Acres**	**Total**	**Item**	**Per Acre**	**Acres**	**Total**	
45	329 Mac	Change in Machinery Cost due to Change in Tillage	$61	900	$55,035	NA	$0	0	$0	329 Machinery
46	329 Nutr	NA	$0	0	$0	NA	$0	0	$0	329 Nutrients
47	329 Pest	NA	$0	0	$0	NA	$0	0	$0	329 Pesticides
48	329 Erosi	NA	$0	0	$0	NA			$0	329 Education
49	340 Nutri	NA	$0	0	$0	Cover Crop Costs	$69	300	$20,580	340 Costs

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combined Practice Effects | ONLY CCR | Partial Budget Analysis

American Farmland Trust

PARTIAL BUDGET ANALYSIS

Farmer Name
Nicholas Purdy
Watershed Name
Silver Creek - Wood River

Economic Effects of Soil Health Practices on Picabo Livestock Co (2021 Prices)[2]

Increases in Net Income

Increase in Income

ITEM	PER ACRE	ACRES	TOTAL
Grazing cover crop benefit (+0.33 ton/ac)	$74	300	$22,275
Increased yields for barley (+5 bu/ac) and alfalfa (+0.5 ton/ac) due to soil health practices	$71	1,800	$127,050
Total Increased Income			**$149,325**

Decrease in Cost

ITEM	PER ACRE	ACRES	TOTAL
Machinery cost savings due to no-till	$49	900	$44,325
No longer applying insecticides to alfalfa	$8	1,200	$9,600
Total Decreased Cost			**$53,925**

Annual Total Increased Net Income	**$203,250**
Total Acres in this Study Area	**1,800**
Annual Per Acre Increased Net Income	**$113**

Decreases in Net Income

Decrease in Income

ITEM	PER ACRE	ACRES	TOTAL
None identified			$0
Total Decreased Income			**$0**

Increase in Cost

ITEM	PER ACRE	ACRES	TOTAL
Cover crop seed and planting costs	$69	300	$20,580
Additional cost for new soil sampling methods	$2	1,800	$3,600
Alfalfa nutrient cost increase with switch to manure compost from synthetic fertilizer	$42	1,200	$50,880
Machinery cost increase due to changes in nutrient management	$5	1,800	$9,090
Combined practices learning activities			$1,964
Total Increased Cost			**$86,114**

Annual Total Decreased Net Income	**$86,114**
Total Acres in this Study Area	**1,800**
Annual Per Acre Decreased Net Income	**$48**

Annual Change in Total Net Income = $117,137
Annual Change in Per Acre Net Income = $65
Return on Investment = 136%

Footnotes:

[1] Machinery costs include cost of custom hire, labor, depreciation, interest, insurance, housing, repairs, and fuel (Iowa State University Extension, 2022. Ag

Read Me | Farm Info | Tillage | Nutrient Mgt. | Cover Crops | Combined Practice Effects | ONLY CCR | Partial Budget Analysis | Editable PBA | Prices | Machinery Costs

American Farmland Trust

MACHINERY COSTS

ABOUT THIS TAB:

This tab is the source for machinery costs used on the "Tillage" and "Nutrient Mgt." tabs. This tab contains machinery costs expressed on a per acre basis (with the exception of manure application costs which are either in $/gal or $/hr). Machinery costs include overhead (depreciation, interest, insurance, housing, and repair charges), fuel and lubrication charges, and labor costs for both the tractor and the implement it is pulling. These costs are used to calculate changes in either establishment costs due to a change in tillage (on the "Tillage" tab) or changes in fertilizer application costs (on the "Nutrient Mgt." tab). Nearly all costs shown below are from the University of Illinois Farmdoc website. The fertilizer application costs are from the Iowa State Custom Rate Survey as they were not available from the University of Illinois. We chose the University of Illinois as a source for machinery costs because their dataset appeared to be the most comprehensive. Because these costs are from the Midwest, they are most appropriate for use in that region. AFT has used these machinery costs for farms outside the Midwest -- using national prices or costs to avoid biasing the results in cases where the farmer's prices may not be representative of typical prices. Users should evaluate the costs shown for relevancy in their area and make adjustments as needed, being careful to document all changes.

Note: If a user needs to add their own equipment and per acre cost, you can add to this list as needed in the clearly

Tillage, Fitting and Planting Machinery Costs[1]

	Item	Source	Tractor HP	2021 ($/Acre)
	Air seeder, 28 ft.	Univ. Illinois	285	$21.50
	Air seeder, 36 ft.	Univ. Illinois	285	$19.30
	Air seeder, 44 ft.	Univ. Illinois	310	$18.10
	Broadcast seeding, 20 ft.	Univ. Illinois	85	$9.10
*	Chisel Plow, 12 ft	Univ. Illinois	140	$18.59
*	Chisel Plow, 15 ft	Univ. Illinois	155	$15.77
	Chisel Plow, 21 ft	Univ. Illinois	205	$15.70
	Chisel Plow, 23 ft	Univ. Illinois	225	$15.70
	Chisel Plow, 27 ft.	Univ. Illinois	260	$15.80
	Chisel Plow, 30 ft.	Univ. Illinois	285	$14.90
	Chisel Plow, 35 ft.	Univ. Illinois	310	$13.60
	Chisel Plow, 40 ft.	Univ. Illinois	390	$12.20
	Chisel Plow, 44 ft.	Univ. Illinois	440	$13.00

Strengths & Limitations

Strengths	Limitations
• One or multiple soil health practices can be analyzed • Grazing or haying of cover crops can be included	• Data intensive - Requires significant interview time with the farmer to obtain the production and management data for their conventional, before and after soil health adoption management scenarios *(gathering averages)*
• Adaptable to farmer's specific rotation & field operations	• Limited to a farm level analysis and specific crops
• Default data used in the Tool can be updated or changed by the user in the workbook	• Works best for row crop- and almond-dominated production states
• Excel-based tool that is easy to download and work in; no internet required once downloaded to your computer	• Currently, R-SHEC Tool doesn't work well for analyzing a conservation crop rotation alongside other practices
• Results presented in a pre-populated partial budget analysis table that is easy-to-interpret and compelling and can be easily edited and saved as an independent table of results	

American Farmland Trust

Upcoming . . .

- **Spring 2024 R-SHEC Tool re-release will include:**
  - **Improving conservation crop rotation calculations** with more accurate estimates of resulting change in per acre net income with introducing new crops to a rotation alongside adoption of other soil health practices
  - **Streamlining data input process** (reducing the number of replicated tables)
  - **Updating prices** – using rolling 5-year averages up to 2023 (instead of year-specific values)
  - Adding regionally-specific machinery cost options so the user can choose to use other data besides Illinois/Iowa data

- **Fall 2024 Predictive SHEC Tool release**
  - Predicts short- and long-term changes in costs and benefits with adoption of practices

- **Beginning development of a Retrospective Grazing Economic Tool**

- **New case studies** always coming!

Meet the Team!

Ben Wiercinski
Ag Economist

Chellie Maples
Ag Economist

Meng Li
Sr. Soil Health Scientist

Aysha Tapp Ross
Water & Soil Health Scientist

Bonnie McGill
Sr. Climate & Soil Health Scientist

Laila Puntel
Assistant Professor, UNL

Michelle Perez
Water Initiative Director

Bianca Moebius-Clune
Climate and Soil Health Director

Ellen Yeatman
Ag Economist

Lia Raz
Case Study Author

Jen Tillman
Research Scientist & Case Study Author

Robert Ellis
Ag Economist

Kent Bohnhoff
Consulting Case Study Author

Photo by: William Thiele for the Thiele Dairy Farm Case Study (PA)

Thank you for listening!

Don't forget to check out the Soil Health Case Study Tool Kit to use the R-SHEC Tool &/or develop case studies

https://farmland.org/soil-health-case-studies-methods/

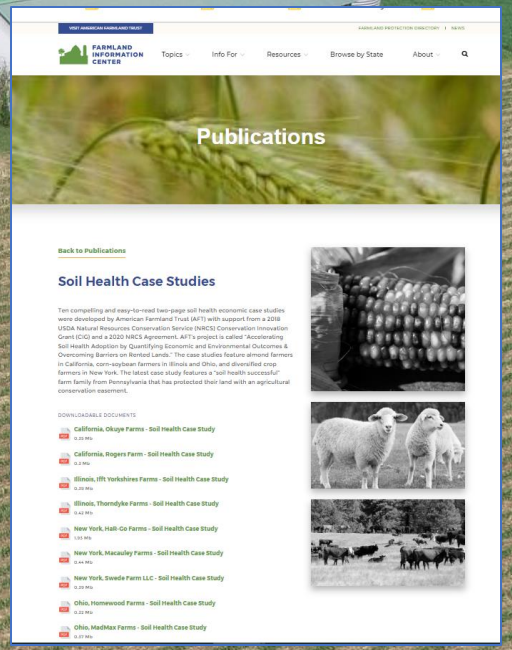
Keyword search:

"AFT Tool Kit"

"AFT RSHEC Tool"

"AFT soil health case studies"

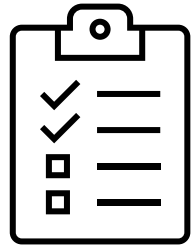
"AFT economic case studies"



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

Next steps in our outcomes estimation journey

- ❑ Join January 10th for the SIPES/SIDMA social tool and method webinar
- ❑ Fill out the 8-question (2-min) online evaluation survey
- ❑ Schedule a free "coaching" session with us
  - ❑ **Email atappross@farmland.org, RE: Coaching Request**
- ❑ Order a free print copy of the OET Guide
  - ❑ Keyword: "AFT outcomes tools"



Please keep in touch:
outcomestools@farmland.org

American Farmland Trust