Outcomes Estimation Tools Training Webinar Series

1ichelle 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)



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!!





Time for 3 polls!



Tools in 2023 Trainings*

May 3: Webinar Launch & PCOC (recording)

June 7: Model My Watershed (recording)

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

<u>August 2: NRCS Cover Crop Economics Tool</u> (economic) (recording)

September 6: FieldPrint Platform (recording)

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

<u>November 1: PTMApp Web Tool (water</u> <u>quality)</u> (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



AFT Water Initiative Mission Statement: Improving water resources by incentivizing farmers to adopt soil health practices through environmental & economic impact quantification

The Retrospective – Soil Health Economic Calculator (SHEC) Tool

Ellen Yeatman, Ag Economist AFT Water Initiative

American Farmland Trust

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

Hi, I'm Ellen!

Home: Driggs, WYdaho

Education:



Ellen Yeatman

Ag Economist & Water Research Manager 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





Agenda

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





Overview of the R-SHEC Tool





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	<u>Row Crop R-SHEC Tool:</u> Reduced tillage, no-till, nutrient management, cover crops, conservation crop rotation (diversification of rotation) <u>Almond R-SHEC Tool:</u> cover crops, conservation cover, nutrient management, mulching, compost



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 Excelbased 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



Project Background







Soil Health Case Study

The Purdy Family, Picabo Livestock, ID

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 still haam and nocky clay riverbed in Blaine County, Idaho. Although the yev and popted soll health practices on their entire acreage, this study focuses on their 1800-ere rotation that includes 2 years of barley and 4 years of alfalfa where the Purtys practice no-till, cover cropping, and nutrient management. The ranch is 100% irrigated and is protected from development by a conservation essement.

Soil Health, Eco Quality, and Clir The Purdy's initial motivation for transitioning away from conventional management, especially Partial budgeting an intensive tillage, was the severe wind erosion often experienced in this region of Idaho. Constantly mate the marginal b dredging precious silty topsoil to maintain the cover-cropping, and health practices at P world-class trout stream that the ranch abuts was redibly expensive, and seeing how much topsoil was limited to only the had run off the fields was "heartbreaking." In 2014 ables affected by the they began their no-till journey on both barley and The table on page 2 n alfalfa, then expanding across all their acreage as economic effects re soil health practices. they acquired the necessary equipment, a process which took about four years. income increased by on the 1,800-acre stud Prior to their adoption of cover crops in 2015, the return on inves

ranch's fields would sit have over the winter, which Pat calls "the kiss of death for soil health and maintaining topsoil." Now, the Purtys plant a fail forage mix, which includes peas, lentils, vetch, turrips, and a pay/vetch/ientil incculant, on roughly half of their barley acres. This mix plas the voluntee barley growth provides excellent grazing for their cattle in the fail 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

USDA	United States Department of Agriculture	The Nature 🚱	-
	Natural Resources Conservation Service	Idaho	Ame

ID Farm at a Gla COUNTY: Blaine, ID WATERSHED: Silver Creek & Big Wood River CROPS: Alfald hay: inton of ady blend to a split inton of ady blend to a split policiation of a liquid blend. They also began to adopt interbols. moving example

The Purdy Family, Picabo Livestock, ID

health practice adoption, providing an additional sT_1/ac_yT_r 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 5.9%. The Purdys have experienced two decreases in cost. First, by switching to no-till, they eliminated two tullage passes

no-till, they eliminated two tillage passes for barley and three passes for alfalfa, reducing their annual machinery costs by \$43/a/c/yr.' Second, they've eliminated the use of insecticies on alfalfa altogrether Finally. Picabo Livestock employees spend

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 assuings of \$8/ac/yr or \$8,600/yr. Owenall the largest ont increases that The Pureks have seen seinificant improve-

Overall, the largest cost increases that Picabo Livestock has incurred are due to changes in nutrient management practices. Incorporating newer soil sampling method is inore costly, an additional 82/ac/yr.

more expensive than conventional fertilizer costing the farm an additional 842/ac/yr. Finally, custom-thiring manure application on alfafia and the additional passe required for spilt application of fluid fertilizer on as panalysis, which is dramatically chanc-**Closing Theoughts**

don't get stuck anymore. I can irrigate a

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 is 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." *Winters Lie Rus & Ellen Yatma*,



- 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 <u>case studies</u> 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

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- 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





Case Study development

Soil Health Case Study The Purdy Family, Picabo Livestock, ID

Introductio

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 Bl County, Idaho. Although they've adopted soil health ractices on their entire acreage, this study focuses on their 1800-acre rotation that includes 2 years of barley and 4 years of alfalfa where the Purdys practice no-till, cover cropping, and nutrient manage ment. The ranch is 100% irrigated and is protected instead of every field. 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 ofter experienced in this region of Idaho. Constantly dredging precious silty topsoil to maintain the world-class trout stream that the ranch abuts was scredibly expensive, and seeing how much topsoi 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 arley growth provides excellent grazing for the

The second largest per acre increase in net cattle in the fall before it frost-kills over the income is due to barley and alfalfa average yield Around the same time that the random gan no-till-ing, the Purdys began reworking their nutrient increases of 5 bu/ac and 0.5 ton/ac, respectively, that the Purdys attribute to their soils' higher

organic matter (SOM) content as a result of soil Nature 🚱 merican Farmland Tru

on of a dry blend to a split mlication of a liquid blend hey also began to adopt different soil sampling methods, moving away from relying exclusively on traditional chemica extraction tests. They've added the Haney soil organic matter, Solvita Labile Amino-Nitroger and Volumetric Aggregate Stability tests and limit fall soil sampling to one sample per select fields

fine every year. In general,

n alfalfa fields, they switched

om dry then liquid synthetic

ertilizer to custom-applied

00% manure compost: and

barley fields, they transi

oned from a single applica

Soil Health, Economic, Water **Quality, and Climate Benefits** Partial budgeting analysis was used to esti

cost of cover crop seed

Lune Lunger

-cropping, and nutrient manag

soil health practices, Picabo Livestock's net

The largest per-acre increase in net income is

return on investment

estimated to be \$74/a

outweight

mate the marginal benefits and costs of no-till, health practices at Picabo Livestock. 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 three me increased by \$65/ac/yr, or by \$117,137/y on the 1.800-acre study area, achieving a 136% attributed to the forage value of their cover crops

JUNE 2023

as I want and I don't see runoff" Th COMET-Planner Tool estimates abo Livestock's soil health practic ed in a reduction of 302 metric tons equivalent/vr. corresponding to 37 cars off the road for one yea

ting small, experiledging that mistake ess. For them, the bigg en changing their mindset. Th toing from viewing their soil as ing it as a living, biological or which they are stewards. Says Pat, v your soil as a living biologic really does challenge you ethize your behavio

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

Increases in Net I	ncome		Decreases in Net Income					
Increase in Incor	ne			Decrease in Income				
ITEM	PER ACRE	ACRES	TOTAL	ITEM	PER ACRE	ACRES	TOTAL	
Grazing cover crop benefit (+0.33 ton/ac)	\$74	300	\$22,275	None identified	None identified		\$0	
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	Total Decreased Income			\$0	
Decrease in Cos	it .			Increase in Cost				
ITEM	PER ACRE	ACRES	TOTAL	ITEM	PER ACRE	ACRES	TOTAL	
Machinery cost savings due to no-till	\$49	900	\$44,325	Cover crop seed and planting costs	\$69	300	\$20,580	
No longer applying insecticides to alfalfa	\$8	1,200	\$9,600	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 Decreased Cost			\$53,925	Total Increased Cost			\$86,114	
Annual Total	increased Ne	t Income	\$203,250	Annual Total Dec	Income	\$86,114		
Total Ac	res in this Stu	udy Area	1,800	Total Acres	1,800			
Annual Per Acre I	ncreased Ne	t Income	\$113	Annual Per Acre Dec	reased Net	Income	\$48	
	Annu	al Char	ge in Tot	al Net Income = \$117,137				
	Annu	al Char	ge in Net	Income Per Acre = \$65				
		Retu	rn on Inv	estment = 136%				
Mohinory and mohino from of a remain line that dependent in interest instances, remain appricts, and fair the first hard benergy broading bits, the bits hard benergy bits and the second se								
For more information about this study or to discuss soil health practices, please contact								

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/soilhealthcasestudie

- 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 ٠ external review with NRCS economics & soil health scientists
 - NRCS lead: Bryon Kirwan, National Economist _



United States Department of Agriculture

Natural Resources Conservation Service



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

3 CA almond





5 NY diverse row crop



2 IL corn-soybeans 3 OH corn-soybeans





Soil Health, Economic, Web

Soil Health Case Study





1 ID hay & barley 2 PA row crops





















2 OK row crop









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 Northease 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



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







Idaho





Method Overview



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

• Step 1: Download & digest Tool Kit



AFTs <u>Soil Health Case Study Project</u> developed four methods to evaluate the economic, water quality, and climate outcomes experienced by 'soil health successful' row crop farmers and almond growers (those who have had four or more years of economic success using one or more soil health practice) and communicate the results in compelling and easy-to-read two-page case studies. We are sharing these methods with our fellow ag conservation professionals in a 'soil health tool kit' so they can conduct their own analyses of producers in their area who have successfully adopted soil health practices and produce their own case studies.



Resolutions Fill out the form below for FREE access to the Row Crop and Almond Retrospective Soil Health Economic Calculator (R-SHEC) Tool and associated materials, known as the Soil Health Tool KL. With this Tool KL, you will be equipped to create your own case studies. Filling out the form will also allowing to contact you



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Estimates the economic effect of changes in crop production systems, and

Economic Methods: AFT's Consulting Economist (retired NRCS-NY

Economist) Florence Swartz, developed the economic methods for the

AFT Soil Health Case Studies based on her two New York case studies

and the NRCS Cover Crops Economics Tool, in collaboration with AFT's

Focuses only on variables affected by these changes.

The primary effects analyzed by the Calculator include changes in machinery, fertilizer, pesticide, yield, erosion repair, and learning costs.

Water Quality Methods: Perez developed materials for the AFT Staff Team to use the <u>Nutrient Tracking Tool</u> to estimate the nitrogen, phosphorus, and sediment reduction benefits from the farmer crop fields attributable to the adoption of soil health practices.



American Farmland Trust

Download the Soil Health Case Study Tool Kit

Soil Health Economic and Environmental Case Study Tool Kit

Updated: Sept. 28, 2022

Fill out the form below for FREE access to American Farmland Trust's Retrospective Soil Health Economic Calculator (R-SHEC) Tools for row crops and almonds and the associated questionnaire and training resources, known as the Soil Health Economic and Environmental Case Study Tool Kit.

The Row Crop R-SHEC Tool analyzes the on-farm costs and benefits of adopting reduced tillage, cover crops, and/or a change in nutrient management, or solely the adoption of a conservation crop rotation (i.e., diversification of crop rotation). The crops that can be analyzed include barley, corn grain, corn silage, grain sorghum (milo), hay, oat, soybeans, and wheat. The Almond R-SHEC Tool analyzes the costs and benefits of adopting a change in nutrient management, cover crops, mulching, and/or compost application.

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

• Step 1: Download & digest Tool Kit



AFTs <u>Soil Health Case Study Project</u> developed four methods to evaluate the economic, water quality, and climate outcomes experienced by 'soil health successful' row crop farmers and almond growers (those who have had four or more years of economic success using one or more soil health practice) and communicate the results in compelling and easy-to-read two-page case studies. We are sharing these methods with our fellow ag conservation professionals in a 'soil health tool kit' so they can conduct their own analyses of producers in their area who have successfully adopted soil health practices and produce their own case studies.

Resources

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AFT Soil Health Case Studies based on hor <u>two New York case studies</u> and the <u>NRCS Cover Crops Economics Tool</u>, in collaboration with AFTs Project Laader, Michelle Perce. The AFT Retrospective Soil Health Economic Calculator is an 11-tab excet spreadsheet tool that helps conservationist conduct a partial budget analysis (BA) and generate a PBA table. The partial budget analysis: • Compares costs and benefits "before" & "after" soil health practice implementation. • Estimates the economic effect of changes in crop production

Economic Methods: AFT's Consulting Economist (retired NRCS-NY Economist) Florence Swartz, developed the economic methods for the

systems, and • Focuses only on variables affected by these changes.

The primary effects analyzed by the Calculator include changes in machinery, fertilizer, pesticide, yield, erosion repair, and learning costs.

Water Quality Methods: Perez developed materials for the AFT Staff Team to use the <u>Nutrient Tracking Tool</u> to estimate the nitrogen, phosphorus, and sediment reduction benefits from the farmer crop fields attributable to the adoption of soil health practices.



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



AFTs <u>Soil Health Case Study Project</u> developed four methods to evaluate the economic, water quality, and climate outcomes experienced by 'soil health successful' row crop farmers and almond growers (those who have had four or more years of economic success using one or more soil health practice) and communicate the results in compelling and easy-to-read two-page case studies. We are sharing these methods with our fellow ag conservation professionals in a 'soil health tool kit' so they can conduct their own analyses of producers in their area who have successfully adopted soil health practices and produce their own case studies.

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Economic Methods. AFTs Consulting Economics (relied NRGC-NY Economis) Florence Swartz, developed the economic methods for the AFT Soil Health Case Studies based on ther <u>two lew York case studies</u> and the <u>NRGS Cover Crops Economics Tool</u>, in collaboration with AFTs Project Leader, Michelle Perez: The AFT Retrospective Soil Health Economic Calculator is an II-tab excel spreadsheet tool that helps conservationists conduct a partial budget analysis (PBA) and generate a PBA table. The partial budget analysis:

- Compares costs and benefits "before" & "after" soil health practice implementation,
- Estimates the economic effect of changes in crop production systems, and
- Focuses only on variables affected by these changes.

The primary effects analyzed by the Calculator include changes in machinery, fertilizer, pesticide, yield, erosion repair, and learning costs.

Water Quality Methods: Perez developed materials for the AFT Staff Team to use the <u>Nutrient Tracking Tool</u> to estimate the nitrogen, phosphorus, and sediment reduction benefits from the farmer crop fields attributable to the adoption of soil health practices.

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	8 1 - Training Materials	September 28, 2022	Ellen Yeatman	8 items	🛞 Shared
	2 - Methods to Identify a Soil Health Succe	July 12, 2021	Michelle Perez PhD	6 items	용 Shared
	3 - Economic Methods	July 12, 2021	Michelle Perez PhD	11 items	용 Shared
	8 4 - Environmental Methods	July 12, 2021	Michelle Perez PhD	7 items	🛞 Shared

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)





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 BUFFAINE USE 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 abred) Row Crop Version: Barley, Com Graing, Grain Sorghum, Hay, Oats, Soybeans, Wheat Updated: November 2, 2023	3. <u>Detail</u> below ju small grains as guidance. Clear Table 1: Farm Rotation (corn, soy, barley, h	America Astronomic styper reading and a stype of the only crops that out example rows to make re- s and Timeline of Soil Health Row Crop Rotations ny, wher, oots, sorghum, and/- grains)	an Farmlar ELAND TRATS e either corn, s t our economic boom as needed Practice Use or other small	constant of the second se	orghum, and/or other ale in gray rows for tice Info rient management, rops)
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.	Rotation Name	Crop and Years in Rotation	Average Acreage	SH Practices by Crop	Year Initiated each SH Practice
Name of farm: Name of farmer:	E.g., Corn-Soybean-Hay	Corn-1, Soy-1, Hay-3	1100	NO-till - Soy NM - All Cover Crop – Corn, Soy	2010 2015 2014
Total farm acres: Acres owned: Acres rented: Farm address (f 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.	E.g., Corn-Soybean	Cam-1, Soy-1	500	No-till - Soy	• 2010
2. Is your farm organic?					



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

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	- Accord any acaciptions about crop 1 sum	s experienced by suitering to no-myned	aacca mage.



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

A	В	С	D	E F	G
1	Changes du	e to Chang	ing Tillage		
2					
3 AB	OUT THIS TAB:				
4 The	Tillage tab calculates the increases and decreases in costs and	returns (called	economic effec	ts) due to changes in type of t	illage used.
5 Ecol	nomic effects on this tab include changes in: (1) machinery cos	ts associated wi	ith crop establis	hment; (2) yield; (3) fertilizer	use; (4) pesticide
a use;	(5) soil erosion; and (6) other benefits or costs as identified by	the farmer. All	effects on this t	ab are calculated on an annua	al per acre basis
7 and	for the entire Study Area. If a particular effect cannot be attr	ibuted solely to	a change in tilla	ige, the user can enter it on t	he Combined
8 Prac	ctice Effects tab.				
0	Impact of Tillage Change on Establishment Co	ost due to Cl	hange in Till	age	
2	Crop 1:	Barley			
3	Benchmark Tillage:	Conventional			
4	Benchmark Acres:	600			
5	Benchmark Years in Rotation:	2			
16	Gron 1 Ronchmark Tillago Machinony	Cost/Ac	# Dassos /Vr	Total Cost/As	
7	Moldboard plow 6 bottom	\$28.50	# Passes/ 11	\$28.50	
8	Tandem disk 23 ft 7 in	\$14.20	1.0	\$14.20	
9	Grain drill, 25 ft.	\$15.40	0.5	\$7.70	
20	Field cultivator, 29 ft. 6 in.	\$12.50	0.5	\$6.25	
21	Total	, ILIOO	0.0	\$66.65	
22	Current Tillage:	No-Till			
23	Current Acreage:	600			
4	Current Years in Rotation	2			
25	Crop 1 Current Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac	
.6	Air seeder, 36 ft.	\$19.30	1.0	\$19.30	
./		\$0.00		\$0.00	
.8		\$0.00		\$0.00	
9	Tatal	\$0.00		\$0.00	
1	Total			\$19.30	
2					
3	Crop 2:	Hav			
4	Benchmark Tillage	Conventional			
5	Benchmark Acres:	300			
36	Benchmark Years in Rotation	4			
37	Crop 2 Benchmark Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac	
38	Moldboard plow, 6 bottom	\$38.50	1.0	\$38.50	
9	Tandem disk, 23 ft. 7 in.	\$14.20	1.0	\$14.20	
<	> Read Me Farm Info Tillage Nutrie	nt Mat. Co	ver 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				Decreases in Net Income					
Increase in Income				Decrease	e in Inc	ome				
ltem	Per Acre	Acres	Total		ltem		Per Acre	Acres	Total	
Yield Impacts due to Cover Crops	\$16.36	700	\$11,455		None i dentified					
Total Increased Income			\$11,455		Total Decreased Income				\$0	
Decreuse in C	ost				Increa	se in Co	ost			
ltem	Per Acre	Acres	Total		ltem		Per Acre	Acres	Total	
Machinery Cost Savings due to Reduced					Increased Herbicide Cost due to Re	red				
Tillage (3 less passes over the field)	\$17.81	1,400	\$24,933		Tillage	\geq 2	\$5.00	1,400	\$7,000	
Machinery Cost Savings due to Change in										
Nutrient Mgt.	\$2.98	1,400	\$4,165		Cover Crop Costs		\$39.00	700	\$27,300	
Fertilizer Savings due to Change in Nutrient										
Mgt.	\$69.00	700	\$48 <i>,</i> 300		Cover Crops Learning Activities		\$1.87	700	\$1,308	
					Nutrient Mgt. Learning Activities		\$0.93	1,400	\$1,308	
Total Decreased Cost			\$77,398		Total Increased Cost				\$36,916	
Annual Total Increased Net Income			\$88,853		Annual Total Decreased Net Inco	m			\$36,916	
Total Acres in this Study Area			1,400		Total Acres in this Study Area				1,400	
Annual Per Acre Increased Net Income \$63 Annual Per Acre Decreased Net Income \$26										
Annual Char	Annual Change in Total Net Income = \$51,937									
Annual Change	Annual Change in Net Income Per Acre = \$37									
Return on Investment = 141%										

Step 9: Write a case study

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Soil Health Case Study Template & Writing Guide

*Note: The writing guide that used to be a standglone 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 acress and study area acres) E.g.: 490 acres. (100-acres study area) SOILS: (Dominant sail type(s) and topparphy to help readers quickly determine how similar their farm may be to the featured farm, do not include word "sail(s)" again as repetitive) E.g.: Sloy loarns. 1-10% slopes SOIL HEALTH PAACTICES:

Introduction (About 300 Words, n=____):

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

Describe the farm

- a. Acreage, county, topography, generic soil type descriptions b. What's grown, acres in crop rotation, etc.
- what's grown, acres in crop rotation, etc.
 When the farmer started farming and who they farm with
- Optional: Acreage owned versus rented (especially if that has a bearing on use of SH practices on leased (and)
- 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.
- If received FA or quantified learning costs, mention here (if space allows) with reference to applicable footnotes.

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

Use \$/ac, \$/ac/gc, \$/gc, 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:

 \square

Partial budgeting analysis was used to estimate the marginal benefits and costs of X, and 2 soli health paratices on the ______ form. 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) soli health practices, _____s net income increased by S_{-} Jackg, or by S_{-} Mg, on the _____area study, area, policing $a = \frac{M}{2}$ ferture on investment.

Focus your description of the estimated economic benefits and costs by "exploining the numbers" in the partial budget table in a logical sense. For example, since the table stars with the stars of furcreased yields for many farmers, you might start with a paragraph on that. Then, it may make sense to describe the economic stars for each soil health practice in a paragraph. For each practice normal, include introductory senteness to any items that appear in the PBA Table (i.e., increase) in income and decreases in cast and then in decreases in net income and increases in cost). And wave in staries the decreases in cast and then in decreases in the income and increases in cost). And wave in staries the (e.g., swings in amount of nitrogen applied and cost, time, agrachemicals, planting costs, inprovements in jurides, 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 halding 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 <u>VS, YK, and ZK</u> respectively. USDA's COMET-Farm tool estimates that Farmer Name's soil howith practices resulted in a <u>VS</u> reduced in a tool greenhouse gas emissions from this same field. This corresponds to taking <u>eff</u> can off the road.

Table Rock Farm DFBS Case Study:

AFT used USDA's COMET-Form Tool to estimate the water quality benefits and greenhouse gas emission changes associated with Toble Rock Farm's use of no-till, cover craps, a diversified roop ratation, and nutrient management practices on a ²d-core field within the study area. The COMET-Farm analysis estimates that their soil health practices have reduced nitrogen, phosphorus, and sediment losses by ²M, 2005, and 2005, respectively, and resulted in a ¹OM-reduction in total greenhouse gas emissions, corresponding to taking ² cars of did without the total.

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. Scatty's use of cover crops, strip-till, and nutrient management reduced nitrogen, phosphorous, and sediment losses by 73%, 22%, and 85%,

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

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Economic Effe	ts of S	oil He	alth Pr	actices on Thorn	idyke Farms ecreases in Net in	(2018) come		_
Increase in Incol	050 4/05	ACRES	TOTAL		Decrease in Incon	050 A/05	ACRES	1074
Yield Impacts due to Cover Crops	\$12.95	700	\$9,067	None Identified				\$
Total Increased Income	-		\$9.067	Total Decreased Income				\$
Decrease in Co	1	_			Increase in Cost			
ITER	PER ACRE	ACRES	TOTAL	110	4	PER ACRE	ACRES	TOTA
Nutrient Savings Due to Nutrient Management	\$66.00	700	\$46,200	Nutrient Management Lear	ning Activities	\$0.87	1,400	\$1,2
Reduced Machinery Cost due to Reduced Tillage	\$17.68	1,400	\$24,746	Cover Crops Learning Activ	ities	\$1,74	700	\$1,2
Reduced Machinery Cost due to Nutrient Mgt.	\$2.73	1,400	\$3,815	Cover Crop Costs		\$39.00	700	\$27,30
				Increased Pesticide Cost du	e to Reduced Tillage	\$5.00	1,400	\$7,00
Total Decreased Cost			\$74,761	Total Increased Cost				\$36,74
Annual Total Increased Net Income			\$83,828	Annual Total Decreased No	tincome			\$36.74
Total Acres in this Study Area		_	1400	Total Acres in this Study Ar	de Area			
Annual Des Aren Incomend Nat Income	of Dec. Long Language Matchesen				Not lacome		_	

Total Decreased Cost	\$74,761	Total Increased Cost
Annual Total Increased Net Income	\$83,828	Annual Total Decreased Net Income
Total Acres in this Study Area	1,400	Total Acres in this Study Area
Annual Per Acre Increased Net Income	\$60	Annual Per Acre Decreased Net Income
Annual Chan	ige in Tota	l Net Income = \$47.086
Annual Char	ige in Per	Acre Net Income = \$34
This table represents costs and benefits over the entire study area (1,400 acres) a	as reported by	information about USDA's Nutrient Traci
the farmer.		tracking-tool-ntt. For information about 1
All values are in 2018 dollars. Come and the bits contained for the second state of the Contained State of the Contained State of the Contained		nrol colostato adu/. This material is based
Drop prices used in the analysis. Corn \$1.55/36, Soyteans \$8.86/351 Source Cro Newwary USDA NASS	p varies rees	NUCLEAR TO CONSTRUCT The International Information
Fortilizer prices used in the analysis: Phosphate: \$.20/LR, Potash: \$.27/LR. Source Costs of Crop Production in Jown-2018	e Estimated	The Thorndykes are receiving technical and Conservation Stewardship Program. Date
For information about study methodolosy, see http://farmland.org/sollhealthcase	studies. For	study does not include the CSP income.

For more information about this study or to discuss sol health practices, please contact Dr. Emily Bruner, American Familiand Trait, Midwell Conservation & Solewardhin Provent Manager, eteroare @formiand.org Ford County Sol & Water Conservation District, 277-249–4388 ext. 3 and MRCS Fauch Field Office, 2739–2271 ext. 3. Both are at 1380 Well Otawa, P.O. Bouz 32, Partion, 1, 60557. To eval more case studies, with Familiand applicable abias studies

 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

×	AutoSave on D E ' · · · ID_Picabo Livestock R-SHEC Tool R · Saved ·	∠ Search					
File	Home Insert Page Layout Formulas Data Review View Automate Help						
G13	\sim : $\times \checkmark f_x$						
	A B C D			Е	F	G	Н
1							
2	American Farmland Trust						
3	SAVING THE LAND THAT SUSTAINS US						
4	Retrospective Soil Health Economic Calculator (R-SHEC) Tool					
5	ROW CROP VERSION						
6	© 2022 American Farmland Trust						
7	Updated: September 28, 2022						
8	The Row Crop version of the R-SHEC Tool is designed to estimate the economic effective statement of the seconomic effectiv	ffects, retrospectively,	of soil health				
9	practices adopted by "soil health successful" row crop farmers. The Tool can be $\boldsymbol{\iota}$	used with row crop fa	rmers that				
10	have adopted any combination of No-till or Reduced Tillage, Cover Cropping, a	nd Nutrient Managen	nent, OR				
10	Conservation Crop Rotation for four or more years and within the last 15 years	s , on fields growing ba	rley, corn				
11	grain, corn silage, grain sorghum (milo), soybeans, oats, wheat, and/or hay.						
12							
13	The Tool analyzes the costs and benefits of benchmark operations (pre-adoption	of soil health practices	s) versus				
14	current operations (post-adoption of soil health practices) that changed with ado	ption. The farmer mus	st have a clear				
15	understanding of their average benchmark versus current costs and benefits.						
16	The Tool employs a partial budget analysis (PBA) to estimate the change in net in	ncome due to adoptio	n of soil				
17	health practices. A PBA focuses only on variables that change. This PBA analyze	es economic effects w	ithin these				
18	cost/benefit categories: machinery, fertilizer, pesticide, vield, erosion repair, le	arning costs. and ope	en-ended				
19	"other costs/benefits". The Tool compares average costs & benefits in these cate	egories "before" & "af	ter" soil				
20	health practice adoption, relying on a combination of user inputs and standardize	ed cost and price inform	mation built				
21	into the Tool. Whenever possible, national prices or costs are used to avoid biasi	ng the results in cases	where the				
22	farmer's prices may not be representative of typical prices. However, the user do	es have the option to	use the				
23	farmer's own prices for fertilizer and crops. Prices and their sources are listed on	the "Prices", "Machine	ery Costs",				
25	and "Net Income Values by Crop" tabs. Results are displayed in a PBA table on a	n annual basis for the	e Study Area				
26	on the Partial Budget Analysis tabs.						
20							
<	Read Me Farm Info Tillage Nutrient Mgt. Cover Crops Combined Practice Effects ONLY Control	CR Partial Budget Analysis	Editable PBA Price	Machinery C	losts Net I	ncome Values by Cro	op Lists



_						
	Α	В	С	D	E F	G
1		Row Crop Farn	n General	Informatio	n	
2						
3	AB	OUT THIS TAB:				
4	The	Farm Info tab records very general information including fa	rmer name, nar	ne of farm. locatio	n, watershed, Study Area ben	chmark and
5	curr	ent crop rotations, Study Area soil health practices, time sp	ent each year o	n educational activ	ities, and farmer's fertilizer a	nd crop
6	price	es (optional).	-			
7						
8		Farmer Name	County	State		
9		Nicholas Purdy	Blaine	Idaho		
10		Farm				
11		Picabo Livestock Co			. 1	
12		Watershed Name		Clear All Dat	ta	
13		Silver Creek - Wood River				
14						
15						
16		Study Area Crop Rotation (required entry)				
18		Benchmark Rotation	1			
19		Сгор	# Years	Acres		
20		Barley		2 60	0	
21		Hay		4 120	0	
22						
23						
24		Total (Study Area)		6 180	0	
25		Current Rotation	•	1		
26		Сгор	# Years	Acres		
27		Barley		2 60	0	
28		Нау		4 120	0	
29						
30						
31		Total (Study Area)		6 180	0	
32						
33						
34		Study Area Soil Health Practices for Analys	is			
35		TIP: Enter an "x" in all that apply.				
36		Soil Health Practice		Year adopted		
37		No-Till or Reduced Tillage	х	2014		
38		Nutrient Management	Х	2015		
39		Cover Crops	Х	2016		
40		Note: A change in crop rotation cannot be analyzed with other soil	health practices a	lue to data		
41		discrepancies.				
42		Conservation Crop Rotation (CCR)				
43						
44		Time Spent on Educational Activities				
<		> Read Me Farm Info Tillage Nutri	ient Mgt. 🛛 🕻	Cover Crops	Combined Practice Effects	ONLY CCR



	AB	С	D	E F	G
1	Changes du	e to Chang	ing Tillage		
2					
3	ABOUT THIS TAB				
4	The Tillage tab calculates the increases and decreases in costs and	returns (called	economic effec	ts) due to changes in type (of tillage used.
5	Economic effects on this tab include changes in: (1) machinery cos	ts associated wi	th crop establis	hment; (2) yield; (3) fertili	zer use; (4) pesticide
6	use; (5) soil erosion; and (6) other benefits or costs as identified by	the farmer. All	effects on this ta	ab are calculated on an an	nual per acre basis
7	and for the entire Study Area. If a particular effect cannot be attr	ibuted solely to	a change in tilla	age, the user can enter it o	n the Combined
8	Practice Effects tab.				
10	Impact of Tillage Change on Establishment Co	ost due to Cl	hange in Till	age	
12	Crop 1:	Barley			
13	Benchmark Tillage:	Conventional			
14	Benchmark Acres:	600			
15	Benchmark Years in Rotation:	2			
16	Crop 1 Benchmark Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac	
17	Moldboard plow, 6 bottom	\$38.50	1.0	\$38.50	
18	Tandem disk, 23 ft. 7 in.	\$14.20	1.0	\$14.20	
19	Grain drill, 25 ft.	\$15.40	0.5	\$7.70	
20	Field cultivator, 29 ft. 6 in.	\$12.50	0.5	\$6.25	
21	Total			\$66.65	
22	Current Tillage:	No-Till			
23	Current Acreage:	600			
24	Current Years in Rotation	2			
25	Cron 1 Current Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac	
26	Air seeder, 36 ft.	\$19.30	1.0	\$19.30	
27		\$0.00		\$0.00	
28		\$0.00		\$0.00	
29		\$0.00		\$0.00	
30	Total			\$19.30	
31					
32					
33	Crop 2:	Нау			
34	Benchmark Tillage:	Conventional			
35	Benchmark Acres:	300			
36	Benchmark Years in Rotation	4			
37	Crop 2 Benchmark Tillage Machinery	Cost/Ac	# Passes/Yr	Total Cost/Ac	
38	Moldboard plow, 6 bottom	\$38.50	1.0	\$38.50	
39	Tandem disk, 23 ft. 7 in.	\$14.20	1.0	\$14.20	
	< > Read Me Farm Info Tillage Nutrie	nt Mgt. Co	ver Crops	Combined Practice Effec	ts ONLY CCR



							•
	Changes in Nutrient	Managem	ent (NM)	Activities			
2							
3	ABOUT THIS TAB:						
4	The Nutrient Management (NM) tab calculates economic eff	ects following	a change in N	M activities fo	r soil health	including	
6	changes in: (1) machinery costs associated with fertilizer	application; (2) yield; (3) fer	tilizer use; (4)	pesticide us	c; and (5)	
E.	other benefits or costs as identified by the farmer. All effe	ects on this ta all calculates a	b are calculate	d on an annus	al per acre ba	sis and for the	
0	Practice Effects tab	su sorery to a	change in NM, i	une user van e	anter to on the	compilied	
7							
6	Note: If growing hay in rotation, the tool assumes nutrient many	sgement activit	ties occur annual	ly. Otherwise, (iser must adju	st the number	
9							
10	Changes in Machinery Costs for Nutrient Ma	anagement	Activities				
11	(1) Only enter been longik and contact markings some at	tion, if there	nas a channe i	a autrient me	namemant and	ivities for soil	
13	health. Make sure you are not double counting if additional	soli health pra	rrices are being a	analyzed.	nagement ac	incles for sen	
14	(2) Review the list of machinery and associated costs (inclu	ded in the dra	pdown) on the	"Machinery Co	sts" tab to det	ermine the	
15	machinery that most closely matches your equipment.	Follow instruct	ions on "Machine	ery Costs" tab to	o add your owr	r machinery	
16	description and cost.						
17	(J) Denominary NM Description should describe the field for shift health. Saler (Benchmark NM Machinery from the	operation(s) (a doordown li	used to apply n	utrients prior tribes the mar	to change in hinere is edit	NM activities	
18	nutrients prior to change. Assess the cost/ac	e aropeown n	section beschild	corres or e me.	annery used i		
19	(4) Current NM Description should include description of	the field ope	ration(s) used	to apply nutrie	ents currently	. Select	
20	Current NM Machinery from the cropdown list that best	matches the n	nachinery used	to apply nutri	ents currenth	y. Assess the	
22	cost/ac.						
23	(5) User must enter Liop name (Using propositions) (6) User must enter Passes, Galloos, Units per Year) to calculate	coonges in NM	machinerwim	piement cost	14	
24	tor over max enter raves, conort, nours per real.						
25	Crop 1:	Bai	dey				
26	Benchmark NM Description:	Pre plant, dry	femilizer				
27	Benchmark Acres:	600					
28	Benchmark Years in Notation:	2					
			Passes,	Tetal			
29	Com 1 Benchmark NM Machinese	Contine	Gallons, Hours	Total Con1/Ac			
30	Lecture: application, dry bulk, applied	So to	1.0	State			
31		\$0.00		50.00			
32		\$0.00		\$0.00			
30	Total			\$6.15			
34	Current NM Description:						
35	Current Acres:	600					
36	Current Years in Botation:	2	-				
			Passes	Todat			
			mailons, Hours	Total			
37	Crop 1 Current MM Machinery	CONTRACTOR OF		CONTRACTOR			



	А	В	С	D	E	F	G	Н
1		Changes due t	o Adopting	Cover Cro	ops			
2								
3	ABC	DUT THIS TAB.						
4	The	Cover Crop tab calculates the economic effects attribut	ed to adopting o	over crops. Ec	onomic effect	s on this tab i	nclude (1)	
5	cove	er crop costs and changes in (2) cash crop yield, (3) ferti	ilizer applied, (4) pesticides u	sed, (5) soil e	rosion, and (6	i) other	
6	ben	efits or costs as identified by the farmer. Also, at the e	end of this tab, u	iser can calcul	ate the effect	s of grazing ar	nd/or	
7	han	vesting their cover crop as hay (7). All effects on this ta	ab are calculated	l on an annua	l per acre bas	is for the Stud	ly Area. If a	
8	part	ticular effect cannot be attributed solely to introducing	cover crops, the	user can ente	er it on the Co	mbined Practi	ce Effects tab.	
9	Note	e. This tab is setup to only analyze the switch from no cover	crop to planting a	cover cron. Thi	s tab does not	analuze switchi	ng of cover	
10	cron	species, changes in establishment methods, nor changes in	termination meth	ods. etc.		analyze switchi	ing of cover	
11								
12								
13	_	Cover Crop Costs						
16		Cash Crop Following Cover	Barley				SHOW AUDIEN	ICE HOW TO INPUT
1/		Years in Rotation	2 Dev Ference Mire	0	0	0		
10		Arros Planted	Dry Forage MIX					
20		Cover Crop Seed (\$/Ac)	\$30.00					
21		Establishment Cost (\$/Ac)	\$38.60					
22		Termination Cost (\$/Ac)	\$0.00				*Grazing spec	ific CC section belo
23		Other Costs (\$/Ac)						
24		Per Acre Cost by Crop (\$/Ac)	\$68.60	\$0.00	\$0.00	\$0.00)	
25		Total Cost by Crop (\$)	\$20,580	\$0	\$0	\$0)	
26								
27				Study Area	a Total Cost (\$)	\$20,580)	
28		Stud	dy Area Per Acre C	ost (Weighted	Average, \$/Ac)	\$69)	
29								
30		Yield Impacts due to Cover Crops						
31		Is this an organic farm? (Y/N)						
		TIPS:						
		(1) We suggest only entering changes in yield below if	Cover Cropping	is the only so	il health prac	tice analyzed,	, otherwise	
		enter yield impacts in the Combined Practice Effects ta	ab.					
		(2) User must answer above question "Is this an organ	nic farm?" or the	table will not	t calculate co	rrectly.		
		(3) User must enter their "Benchmark Average Yield" Al	ND "% Yield Incr	ease/Decrease	e" OR "Change	e în Ave. Yield	. If user	
		(4) Benchmark average yield should reflect the average	nange varue. e vield under bei	nchmark prac	tices before s	oil bealth pra	ctice	
32	-							
33		Cash Crop Following Cover	Barley	0	0	0	-	
34	_	Unit	Bushel	0	0	0	-	
35		Benchmark Average Yield (Unit/Acre)						
30		AND % Vield Introdes /Detrodes Due To Cover Cros (1/1%)						
51		Calculated Change in Ave. Yield Due to Cover Crop					-	
20						l		
	<	> Read Me Farm Info Tillage	Nutrient Mo	gt. Cover	Crops	Combined Pr	actice Effects	ONLY CCR



A B	С	D	Е	F	G
Changes due to the Com	bination o	of Soil Hea	Ith Practic	es	
Use this page to calculate effects	that cannot be	attributed to j	ust one practice		
ABOUT THIS TAB:					
The Combined Practice Effects tab calculates economic effect	ts that are attri	ibuted to a cor	mbination of s	oil health pra	ctices.
Economic effects on this tab include changes in: (1) yield;	(2) fertilizer us	se; (3) pesticio	de use; (4) soil	erosion rate;	and (5) other
benefits or costs as identified by the farmer. To avoid dout	ole counting, DO	NOT enter any	effect informati	on that is alrea	dy covered on
the individual practice tabs. All effects are calculated on an	annual basis p	er acre and to	r the entire Stu	idy 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 organ	nic farm?" or th	e table will no	ot calculate co	rrectly.	
(2) User must enter their "Benchmark Average Yield" A	ND "% Yield Inc	rease/Decrea	se" OR "Change	e in Ave. Yield'	'. If user
enters both of the latter calculation will use % vield of	hange value	, ,			
(3) Benchmark average vield should reflect the average	e vield under b	enchmark pra	ctices before s	oil health pra	ctice
(of benefitian are rage field should reneer the ore rag		enemien pre		on nearch pra	
Cash Crop	Barley	Hay			
	Bushel	Ton	0	0	
Benchmark Average Yield (Unit/Acre)	105	4			
AND					
Practices (+/- %)					
Practices (+/- Unit/Ac)	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	
Change in Ave. Vield due to Combined Practices (+/- 1)	5.00	0.50			
change in Ave. Held dde to combined Plactices (+)- of	5.00	0.00			
Standard Crop Brico per Unit ¹	¢5 15	¢196.00	\$0.00	¢0.00	
Farmer's Crop Price per Unit (Ontional)	\$0.00	0.00	\$0.00	\$0.00	
Total Change by Cron (\$)	\$15,450	\$111.600	\$0.55	\$0.00	
Total change by crop (o)	010,400	0111,000		\$0 \$0	
Per Acre Change by Crop (\$/Ac)	S261	5931	501		
Per Acre Change by Crop (\$/Ac)	\$26	\$93 Study Area To	SU otal Change (\$)	\$127.050	
Per Acre Change by Crop (\$/Ac) Study Ai	\$26 rea Per Acre Char	593 Study Area To nge (Weighted)	50 otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study An National average non-organic or organic price.	s26 rea Per Acre Char	593 Study Area To nge (Weighted J	otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study Av 1 National average non-organic or organic price. Click here for crop price data sources	s26	593 Study Area To nge (Weighted)	otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (S/Ac) Study A ¹ National average non-organic or organic price. Click here for crop price data sources	rea Per Acre Char	593 Study Area To nge (Weighted /	50 otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study A ¹ National average non-organic or organic price. Click here for crop price data sources	rea Per Acre Char	593 Study Area To nge (Weighted J	50 otal Change (S) Average, S/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study A ¹ National average non-organic or organic price. Click here for crop price data sources Impact of Soil Health Practices on Primary	rea Per Acre Char	Study Area To nge (Weighted J	50 otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study A ¹ National average non-organic or organic price. Click here for crop price data sources Impact of Soil Health Practices on Primary TIP: Enter negative values to indicate savings and positive of the sources of the sou	rea Per Acre Char Nutrients Us values to indicate	Study Area To nge (Weighted /	50 otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study A National average non-organic or organic price. Click here for crop price data sources Impact of Soil Health Practices on Primary TIP: Enter negative values to indicate savings and positive Cash Crop	s26 rea Per Acre Chai Nutrients Us values to indicate Barley	Study Area To nge (Weighted J sed e an increase in Hay	50 otal Change (\$) Average, \$/Ac)	\$127,050 \$71	
Per Acre Change by Crop (\$/Ac) Study A National average non-organic or organic price. Click here for crop price data sources Impact of Soil Health Practices on Primary TIP: Enter negative values to indicate savings and positive v Cash Crop Nitrogen (+/- Lbs/Ac)	szej rea Per Acre Chai Nutrients Us values to indicate Barley	Study Area To nge (Weighted A sed e an increase in Hay	su otal Change (\$) Average, \$/Ac) cost.	\$127,050 \$71	



Ť	~		-	_				
		Changes due to	Adoptin	ng Consei	rvation Cr	op Rotati	on	
				-				
	ABOUT THIS TAB:							
T	The Conservation (Crop Rotation (CCR) ta	ab estimates	s economic el	fects following	a change in r	otation for impr	rovement in
	soil health. The chang	je in net income is estimate	ed using US	DA Agricultur	al Resource M	anagement Su	arvey (ARMS) o	data on
	commodity costs and	returns. These survey data	a represent :	average cost:	s of production	n across the co	untry and are i	not linked
	to specific manag	ement systems, such	as conver	ntional tillag	ge or no-till.	Since these	e estimated	economic
	effects of a chang	je in crop rotation do i	not corres	pond to sp	ecific mana	gement syst	ems, it is no	et 👘
-	appropriate to con	nbine analysis of CCR	with char	nges in tilla	ge, nutrient	managment	, or cover c	rops
	practices.							
		e of a Concernation Crop I			محما بينغام حفامحم	anil kanabla ara		4
1	disorenancies Users	oan only analyze a Conserv	notation Crop	Rotation as a	zed with Other	son nearn prac Is practice. Als	o corpailade	cappot be
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	and (6) other benefits	or costs as identified by th	e farmer. Se	e the "Net Inc	ome Values b	y Crop" tab to I	earn more abo	out how
	changes in net incom	e is calculated. All effects	are calculat	ed on an ann	ual per acre b	asis for the enti	ire Study Area	
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5 340 Gras NA 50 0 50 328 Met Income Image: Strategy of the strategy o	34	340 Graz	NA	\$0	0	\$0	NA		\$0	0	\$0	590 Yield						
3 40 Grag MA 10 0 10 0 10 0 10 288 Net Income 3 40 Grag MA 10 0 10 0 10 0 10 328 Net Income 3 40 Grag MA 10 0 10 0 10 0 10 10 0 10																		
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3 30 Hay Isome from Harvesting/Grasing Cover \$74 300 \$22,275 NA \$10 0 10 3 30 Hay 10 0 10 0 10	36	340 Graz	NA	\$0	0	\$0	NA		\$0	0	\$0	328 Yield						
7 300 Hay 174 300 122,215 NA 10<			Income from Harvesting/Grazing Cover		-						* -							
3 39 Yiele NA 10 0 10	37	340 Hay	(\$/Ac)	\$74	. 300	\$22,275	NA		\$0	0	\$0	All Practices						
3 328 Net NA 10 0 10 0 10 <	38	590 Yield	NA	\$0	0	t0												
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5 329 Mac Change in Machinery Cost due to Change \$	44		Item	Per Acre	Acres	Total	ltem	Pei	r Acre	Acres	Total							
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Combined Practice Effects ONLY CCR Partial Budget Analysis	49	340 Nutr	INA	02	0	102	I Cover Crop Costs		1 69	300	\$20.580	340 Costs						
		<	> Read Me F	arm In	nfo	Tillage	Nutrient Mgt.	Cover Cro	ops	Co	mbine	d Practice Effects	ON	LY CCR	Par	tial Bud	get Ana	lysis

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	А	В	С	D	Е	F	G	Н	I	J
1				PAR	FIAL BUD	G	ET ANALYSIS			
22		Farmer Name								
23		Nicholas Purdy								
24		Watershed Name								
25		Silver Creek - Wood River								
26										
27		Economic Effect	ts of So	il Healt	h Practice	es	on Picabo Livestock Co (202	1 Prices	2	
28		Increases in Ne	et Income	•			Decreases in Net	Income		
29		Increase in Ir	ncome				Decrease in Inc	ome		
30		ITEM	PER ACRE	ACRES	TOTAL		ITEM	PER ACRE	ACRES	TOTAL
31		Grazing cover crop benefit (+0.33 ton/ac)	\$74	300	\$22,275		None identified			\$0
		Increased yields for barley (+5 bu/ac) and								
		alfalfa (+0.5 ton/ac) due to soil health								
32		practices	\$71	1,800	\$127,050					
33		Total Increased Income			\$149,325		Total Decreased Income			\$ 0
34		Decrease in Cost					Increase in C	ost		
35		ITEM	PER ACRE	ACRES	TOTAL		ITEM	PER ACRE	ACRES	TOTAL
36		Machinery cost savings due to no-till	\$49	900	\$44,325		Cover crop seed and planting costs	\$69	300	\$20,580
							Additional cost for new soil sampling			
37		No longer applying insecticides to alfalfa	\$8	1,200	\$9,600		methods	\$2	1,800	\$3,600
20							Alfalfa nutrient cost increase with switch to	Ć 40	1 200	¢50.000
38							manure compost from synthetic fertilizer	\$42	1,200	\$50,880
39							Machinery cost increase due to changes in	\$5	1 800	\$9,000
40							Combined practices learning activities	ÇÇ	1,000	\$1,050
11		Total Decreased Cost			¢52.025		Total Increased Cost			\$1,904
74					333,323					300,114
43		Annual Total In	creased Ne	et Income	\$203,250		Annual Total De	creased Ne	t Income	\$86,114
44		Total Acre	es in this St	udy Area	1,800		Total Acre	es in this St	udy Area	1,800
45		Annual Per Acre In	creased Ne	t Income	\$113		Annual Per Acre De	creased Ne	t Income	\$48
47		Amount	hongo in	Total AL	at lacours		¢117.107			
47		Annual C	nange in	Totar No	et income	-	\$117,137			
48		Annual Change in Per Acre Net Income = \$65								
49			Retu	ırn on In	vestment	=	136%			
50		Footnotes:								
51	¹ Machinery costs include cost of custom hire. Jahor, depresiation, interest, insurance, housing, repairs, and fuel (lower State University Extension, 2022, Ag									
<	> F	Read Me Farm Info Tillage Nutrient Mgt.	Cover Cro	ps Comb	ined Practice Eff	fect	S ONLY CCR Partial Budget Analysis Edit	able PBA	rices Mad	chinery Costs



	Α	В	С	D	F	G	Н	I	J	K	L
1		MACHINERY COSTS									
2											
3	АВО	UT THIS TAB:									
1	This t	ab is the source for machinery costs used on the "Tillage" and "Nutrient	Mgt." tabs. This	tab contains ma	chinery costs						
5	expre	ssed on a per acre basis (with the exception of manure application costs	which are either	in \$/gal or \$/hr	. Machinery						
6	costs	include overhead (depreciation, interest, insurance, housing, and repair	charges), fuel and	d lubrication cha	rges, and						
'	labor	costs for both the tractor and the implement it is pulling. These costs ar	re used to calcula	te changes in ei	ther						
;	estał	lishment costs due to a change in tillage (on the "Tillage" tab) or change	es in fertilizer app	lication costs (o	n the						
)	"Nutr	ient Mgt." tab). Nearly all costs shown below are from the University of	Illinois Farmdoc v	vebsite. The fer	tilizer						
0	appli	cation costs are from the Iowa State Custom Rate Survey as they were no	ot available from t	he University of	Illinois. We						
1	chose	e the University of Illinois as a source for machinery costs because their o	dataset appeared	to be the most							
2	comp	rehensive. Because these costs are from the Midwest, they are most ap	propriate for use	in that region. A	FT has used						
3	these	machinery costs for farms outside the Midwest using national prices of	or costs to avoid b	biasing the resul	ts in cases						
4	wher	e the farmer's prices may not be representative of typical prices. Users s	should evaluate th	ne costs shown f	or relevancy						
5	in the	ir area and make adjustments as needed, being careful to document all	changes.								
6											
7	Moto	It a user needs to add their own equipment and ner acro cost you can a	dd to this list as i	nooded in the cl	oarly						
8		Tillage, Fitting and Planting Maching	nery Costs ¹								
9					2021						
0		ltem	Source	Tractor HP	(\$/Acre)						
1		Air seeder, 28 ft.	Univ. Illinois	285	\$21.50						
2		Air seeder, 36 ft.	Univ. Illinois	285	\$19.30						
3		Air seeder, 44 ft.	Univ. Illinois	310	\$18.10						
4		Broadcast seeding, 20 ft.	Univ. Illinois	85	\$9.10						
5	*	Chisel Plow, 12 ft	Univ. Illinois	140	\$18.59						
6	*	Chisel Plow, 15 ft	Univ. Illinois	155	\$15.77						
7		Chisel Plow, 21 ft	Univ. Illinois	205	\$15.70						
8		Chisel Plow, 23 ft	Univ. Illinois	225	\$15.70						
9		Chisel Plow, 27 ft.	Univ. Illinois	260	\$15.80						
0		Chisel Plow, 30 ft.	Univ. Illinois	285	\$14.90						
1		Chisel Plow, 35 ft.	Univ. Illinois	310	\$13.60						
2		Chisel Plow, 40 ft.	Univ. Illinois	390	\$12.20						
3		Chisel Plow, 44 ft.	Univ. Illinois	440	\$13.00						
<	>	Read Me Farm Info Tillage Nutrient Mgt. Cover Crop	s Combined Pr	ractice Effects	ONLY CCR	Partial Budget	Analysis	Editable PBA	Prices	Machinery Costs	

American Farmland Trust

Strengths & Limitations

Strengths	Limitations
 One or multiple soil health practices can be analyzed Grazing or haying of cover crops can be include 	• 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 operation	• Limited to a farm level analysis and specific crops
• Default data used in the Tool can be updated or char 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 internet required once downloaded to your compute	 n; no 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 table that is easy-to-interpret and compelling and ca easily edited and saved as an independent table of results. 	analysis n be esults



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 Ellen Yeatman Ag Economist **Chellie Maples** Ag Economist Lia Raz Case Study Author **Michelle Perez** Meng Li Sr. Soil Health Scientist Water Initiative Director Jen Tillman Research Scientist & Case Study Aysha Tapp Ross Author Water & Soil Health Scientist **Bonnie McGill Robert Ellis** Sr. Climate & Soil Health **Bianca Moebius-Clune** Ag Economist Scientist Climate and Soil Health Director Laila Puntel **Kent Bohnhoff** Assistant Professor, UNL Consulting Case

Study Author

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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

Soil Health Case Study Methods and Tool Kit

AFT's doill learn Case Study: Project developed four methods to evaluate the common weak of the study: and climate actionnes experienced by 'noil health successful' row crop farmers and almond growers (future who have had four or more years of common success subject on the study and and the study of the study of the study of the study of the studiet. We are sharing these methods with our fallow agromershaften professional in 'noil health to did its of the year on study adopted soil health practices and produce their own case studies.

Comment of Merica, A. J. Concursing Economy of Merica ALS AME Second Seco

https://farmland.org/soilhealth-case-studies-methods/ Keyword search: "AFT Tool Kit" "AFT RSHEC Tool" "AFT soil health case studies" "AFT economic case studies"

Back to Publications	
Soil Health	Case Studies



lications



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** <u>atappross@farmland.org</u>, RE: Coaching Request
- Order a free print copy of the OET Guide
 - □ Keyword: "AFT outcomes tools"

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Please keep in touch: outcomestools@farmland.org

