Using Partial Budget Analysis to Gauge Economic Benefits

Presented by:

- Jean Brokish, Midwest Program Manager
- Sarah Blount, Midwest Conservation Technician

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Overview

Case Studies

- Retrospective look at soil health practices

Predictive Assessment

- Predictive look at soil health practices
  > featuring Eric Hanson's data

Agenda

Item	Time
Intro to AFT Case Studies	10 minutes
Group review and discussion of case studies	20 minutes
Report out on case studies	10 minutes
Intro to AFT Predictive Assessment tool	5 minutes
Review farmer data in Predictive Assessment	30 minutes
Review farmer data report	5 minutes
Discuss findings	10 minutes

Case Studies

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Methods Used to Develop Case Studies

1. Identify “soil health successful” farmers
   - Minimum 4 years of good experiences with 1+ soil health management systems
   - Practices initiated no more than 15 years ago
   - Practices are used on a majority of the farmer’s operation
   - Farmer has a success story to share
2. Data collection
   - Conduct full farmer interview
     - Soil health practices used/for how long, input costs, equipment used, crop rotation, yield, time spent learning
   - Calculator tool creates a partial budget analysis
3. Case study sheet creation
   - Farmer’s story, inputs, and partial budget analysis included
   - One-page (front and back) sheet to share information

Midwest Case Studies

- Four Midwest-based case studies
  - 2 IL, 2 OH
  - Corn/soybean rotation
  - Have been doing soil health practices for some time
  - Read over case study & discuss questions with your group

Group Breakout

- Splitting into groups based on role
  - Farmer
  - Retailer
  - Outreach
- Count by 4s based on role

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Group Discussion Questions – Case Studies

1. Are the results what you expected, based on the introduction?
   - Are they similar to results you've seen?

2. What were the keys to success?
   - What primary factors contributed to profits?

3. How would you use this information to communicate to:
   - Farmers
   - Retailers
   - Landowners

Predictive Assessment Tool

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Case Study vs. Predictive Assessment

Case Study	Predictive Assessment
Used for "soil health successful" farmers	Used for "soil health curious" farmers
Retrospective look at already-implemented practices	Predictive look at practices yet to be implemented (or recently adopted)
Based on available farmer data	Based a combination of farmer's data and predictive models
Quantification of the farmer-observed soil health and economic improvements attributable to implementing soil health practices	Quantification of the anticipated soil health and economic improvements
Data used by farmer to see what previous decisions on their farm have changed	Data used by farmer to make decisions about practices and economics going forward

Questionnaire Review

Main Sections

1. Pre-Interview Information
   - Basic farm overview – rotation, location, soil types, acres, etc
2. Soil Health Practices and Potential Short-Term Economic Impacts
   - Conservation crop rotation, no-till or reduced tillage, cover crops, nutrient management
3. Potential Long-Term Economic Benefits
   - Effects of improved soil organic matter over time on yield, nutrient availability, and water holding capacity

Discussion Questions – Predictive Assessment

1. Are the assumptions reasonable?
   - Do you agree that increased SOM results in
     - Yield increase?
     - Drought resiliency?

2. Are the short / long term results what you expected? Why?

3. What other tweaks could be made to increase ROI? (seeding rate, different equipment, etc)

4. Would you use this type of tool? How?

Live PSHEC Demo

Predictive Soil Health Economic Calculator (P-SHEC) Questionnaire
For "Soil Health Curious" Farmers
(Those who have yet to adopt soil health practices
but are interested in evaluating the potential costs and benefits of doing so)
Row Crop Version: Corn, Soybeans, Hay, and Wheat

August 10, 2021

I. Information Provided in the "Pre-Interview Form"

Thank you for completing the Pre-Interview Form in advance of this full P-SHEC Questionnaire. Your responses have been inserted below. At this point, you should have read and discussed the Predictive Soil Health Economic Assessment Project's "Introduction" document with your advisor and signed the Consent Form. Please do so if you have not. Please complete the rest of this full questionnaire with your advisor.

Name of farm: Hanson Farms **Name of farmer:** Eric Hanson

Total farm acres: 2300 **Acres owned:** 2000 **Acres rented:** 300

Farm address: ~1/2 mile north of Berwick Il

Mailing address (if different from above):

County: Warren **Watershed:**

Phone number: **Email:**

Date: **Name of Advisor:**

Hanson Farms

Eric and his Dad farm together: 2300 total acres, 2000 owned (Eric, Dad, Grandma) + 300 acres rented (Eric)

600 acres under Eric's mngt; 2021 was Eric's fifth crop year

Study field is 40 acres just north of Berwick Illinois in Warren County
Varies from 0-2% slopes to 10% slope, with grassed waterways and WASCOBs to mitigate slope.

DETERMINE STUDY AREA FOR PREDICTIVE ECONOMIC ANALYSIS:

Jean note: much of this section is gathering data on whole farm and is likely not needed

1. **Is your farm sub-divided into enterprises (e.g., row crop, pasture, vegetables)? If so, please describe each enterprise and associated acreage (please make sure all acres add up to the total farm acres provided above):**

2. **Please describe your farm's topography** (e.g., rolling hills, flat, flood plain, etc.)**:**

Row Crop General Farm Information

ABOUT THIS TAB:

The **Farm Info** tab records very general information including farmer name, name of farm, county and state location of farm, watershed (optional), Study Area acreage, Study Area soil health practices, time spent each year on educational activities, and farmer's fertilizer and crop prices (optional). The ***Clear All Data*** button below will clear entries in yellow cells throughout the workbook.

Farmer Name	Farm Name	County	State
Eric Hanson	Farms	Warren	IL

Watershed Name

Clear All Data

Is this an Organic Farm? (Y/N)	No
Study Area Acreage	40

Tips:
(1) Analysis assumes selected soil health practices will be used on ALL acres every year.
(2) Enter "x" in all that apply.

Soil Health Practices Selected for Assessment	
No-till/Strip Till/Reduced Tillage	x
Cover Crops	x
Nutrient Management	
Conservation Crop Rotation	x

Anticipated Cost for Educational Activities	
Typical Learning Cost ($/Acre)[1]	$2.91
OR Farmer's Estimated Learning Cost (Optional)	
Hourly Labor Rate ($)	
Expected Hours/Year for Study Area	
Total Cost for Study Area	$0.00
Cost per Acre ($/Acre)	$0.00

[1] Average per acre cost for seven AFT published farmer cropland case studies. (See *Prices* tab cells A26-B36.)

Read Me | Farm Info | Cons Crop Rotation | Tillage | Cover Crops | Nutrient Mgt. | Combin

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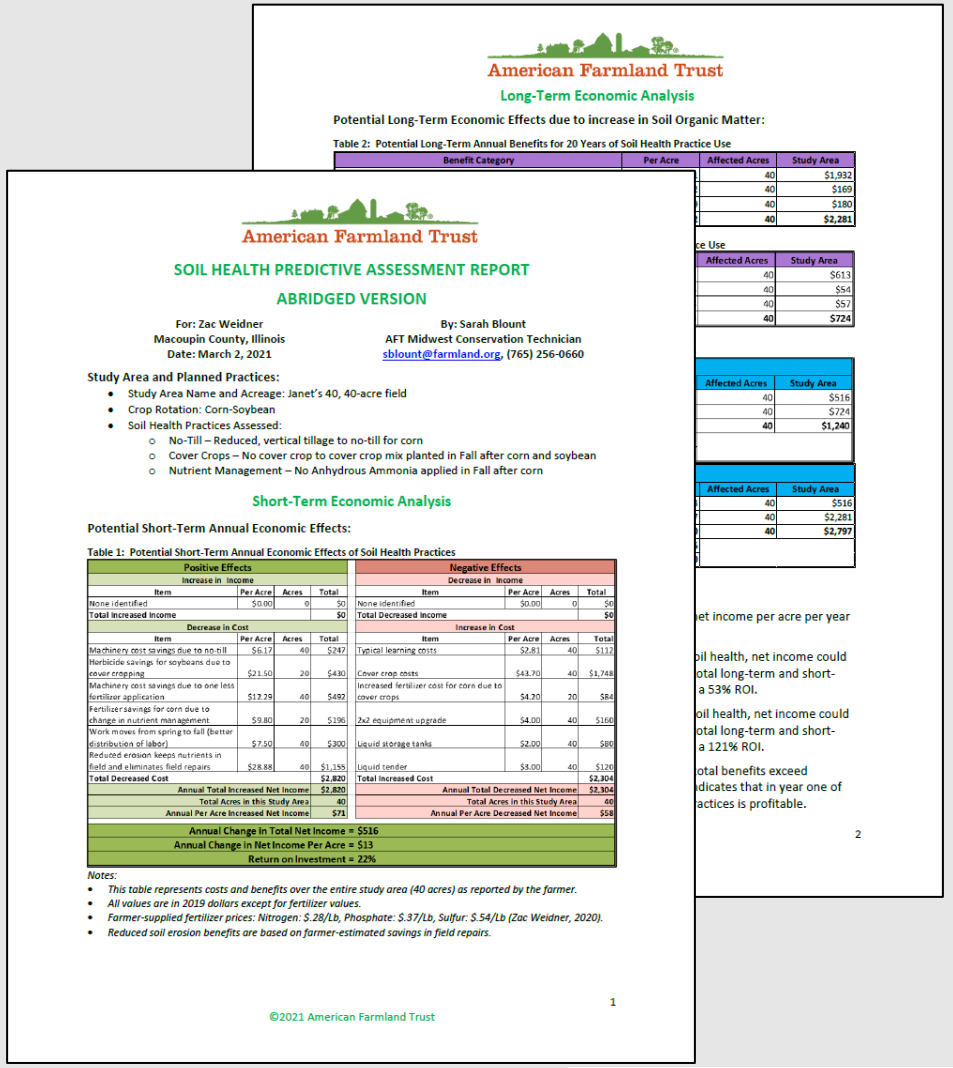
Farmer Report – 2 pages

What's Included

- Size of study area, crop rotation, soil health practices assessed
- Short-term economic analysis table
- Long-term economic analysis tables
  - Due to increase in SOM
  - Combined short- and long-term results
- Written summary of results



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SOIL HEALTH PREDICTIVE ASSESSMENT REPORT

ABRIDGED VERSION

For: Zac Weidner
Macoupin County, Illinois
Date: March 2, 2021

By: Sarah Blount
AFT Midwest Conservation Technician
sblount@farmland.org, (765) 256-0660

Study Area and Planned Practices:

- Study Area Name and Acreage: Janet's 40, 40-acre field
- Crop Rotation: Corn-Soybean
- Soil Health Practices Assessed:
  - No-Till – Reduced, vertical tillage to no-till for corn
  - Cover Crops – No cover crop to cover crop mix planted in Fall after corn and soybean
  - Nutrient Management – No Anhydrous Ammonia applied in Fall after corn

Short-Term Economic Analysis

Potential Short-Term Annual Economic Effects:

Table 1: Potential Short-Term Annual Economic Effects of Soil Health Practices

Positive Effects			
Increase in Income			
Item	Per Acre	Acres	Total
None identified	$0.00	0	$0
Total Increased Income			$0
Decrease in Cost			
Item	Per Acre	Acres	Total
Machinery cost savings due to no-till	$6.17	40	$247
Herbicide savings for soybeans due to cover cropping	$21.50	20	$430
Machinery cost savings due to one less fertilizer application	$12.29	40	$492
Fertilizer savings for corn due to change in nutrient management	$9.80	20	$196
Work moves from spring to fall (better distribution of labor)	$7.50	40	$300
Reduced erosion keeps nutrients in field and eliminates field repairs	$28.88	40	$1,155
Total Decreased Cost			$2,820
Annual Total Increased Net Income			$2,820
Total Acres in this Study Area			40
Annual Per Acre Increased Net Income			$71

Negative Effects			
Decrease in Income			
Item	Per Acre	Acres	Total
None identified	$0.00	0	$0
Total Decreased Income			$0
Increase in Cost			
Item	Per Acre	Acres	Total
Typical learning costs	$2.81	40	$112
Cover crop costs	$43.70	40	$1,748
Increased fertilizer cost for corn due to cover crops	$4.20	20	$84
2x2 equipment upgrade	$4.00	40	$160
Liquid storage tanks	$2.00	40	$80
Liquid tender	$3.00	40	$120
Total Increased Cost			$2,304
Annual Total Decreased Net Income			$2,304
Total Acres in this Study Area			40
Annual Per Acre Decreased Net Income			$58

Annual Change in Total Net Income = $516
Annual Change in Net Income Per Acre = $13
Return on Investment = 22%

Notes:

- *This table represents costs and benefits over the entire study area (40 acres) as reported by the farmer.*
- *All values are in 2019 dollars except for fertilizer values.*
- *Farmer-supplied fertilizer prices: Nitrogen: $.28/Lb, Phosphate: $.37/Lb, Sulfur: $.54/Lb (Zac Weidner, 2020).*
- *Reduced soil erosion benefits are based on farmer-estimated savings in field repairs.*

1

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Long-Term Economic Analysis

Potential Long-Term Economic Effects due to increase in Soil Organic Matter:

Table 2: Potential Long-Term Annual Benefits for 20 Years of Soil Health Practice Use

Benefit Category	Per Acre	Affected Acres	Study Area
		40	$1,932
		40	$169
		40	$180
		40	$2,281

Affected Acres	Study Area
40	$613
40	$54
40	$57
40	$724

Affected Acres	Study Area
40	$516
40	$724
40	$1,240

Affected Acres	Study Area
40	$516
40	$2,281
40	$2,797

…et income per acre per year

…oil health, net income could …otal long-term and short- …a 53% ROI.

…oil health, net income could …otal long-term and short- …a 121% ROI.

…otal benefits exceed …dicates that in year one of …actices is profitable.

2

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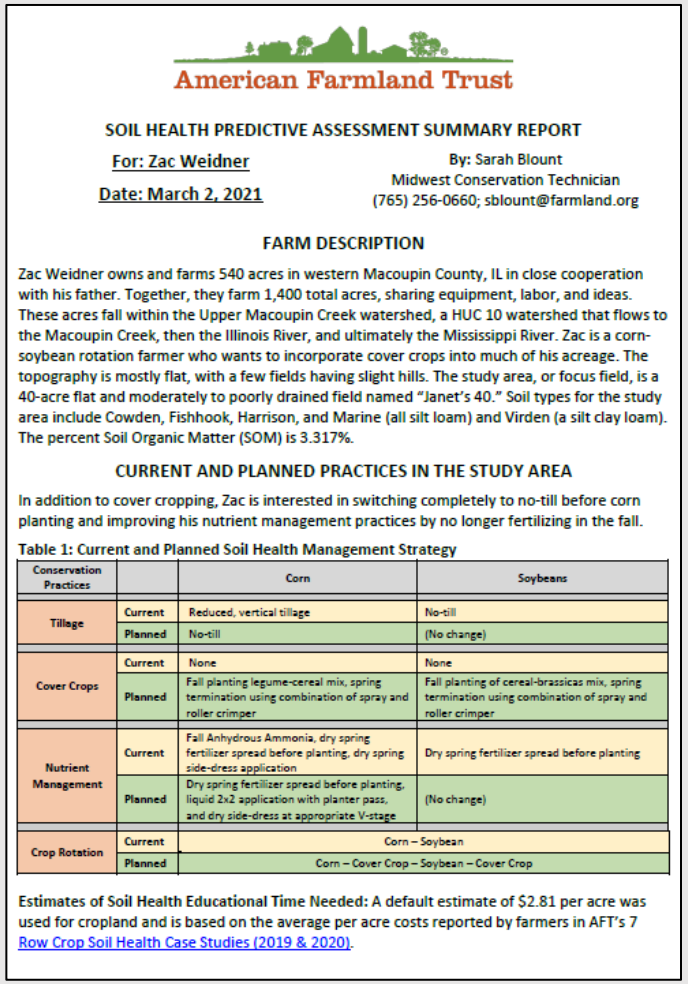
Farmer Report – 7 pages

What's Included

- Written farm description
- Chart of current and planned practices
- Written summary of the short-term partial budget analysis methods and key findings
- Short-term economic analysis table
- Written summary of the long-term economic benefit analysis, inputs used, and key findings
- Written and tabular versions of yield analysis, soil fertility, and water storage benefits
- Written summary of potential long-term benefits with key findings with table
- Written conclusion with combined short- and long-term results



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SOIL HEALTH PREDICTIVE ASSESSMENT SUMMARY REPORT

For: Zac Weidner

Date: March 2, 2021

By: Sarah Blount
Midwest Conservation Technician
(765) 256-0660; sblount@farmland.org

FARM DESCRIPTION

Zac Weidner owns and farms 540 acres in western Macoupin County, IL in close cooperation with his father. Together, they farm 1,400 total acres, sharing equipment, labor, and ideas. These acres fall within the Upper Macoupin Creek watershed, a HUC 10 watershed that flows to the Macoupin Creek, then the Illinois River, and ultimately the Mississippi River. Zac is a corn-soybean rotation farmer who wants to incorporate cover crops into much of his acreage. The topography is mostly flat, with a few fields having slight hills. The study area, or focus field, is a 40-acre flat and moderately to poorly drained field named "Janet's 40." Soil types for the study area include Cowden, Fishhook, Harrison, and Marine (all silt loam) and Virden (a silt clay loam). The percent Soil Organic Matter (SOM) is 3.317%.

CURRENT AND PLANNED PRACTICES IN THE STUDY AREA

In addition to cover cropping, Zac is interested in switching completely to no-till before corn planting and improving his nutrient management practices by no longer fertilizing in the fall.

Table 1: Current and Planned Soil Health Management Strategy

Conservation Practices		Corn	Soybeans
Tillage	Current	Reduced, vertical tillage	No-till
	Planned	No-till	(No change)
Cover Crops	Current	None	None
	Planned	Fall planting legume-cereal mix, spring termination using combination of spray and roller crimper	Fall planting of cereal-brassicas mix, spring termination using combination of spray and roller crimper
Nutrient Management	Current	Fall Anhydrous Ammonia, dry spring fertilizer spread before planting, dry spring side-dress application	Dry spring fertilizer spread before planting
	Planned	Dry spring fertilizer spread before planting, liquid 2x2 application with planter pass, and dry side-dress at appropriate V-stage	(No change)
Crop Rotation	Current	Corn – Soybean	
	Planned	Corn – Cover Crop – Soybean – Cover Crop	

Estimates of Soil Health Educational Time Needed: A default estimate of $2.81 per acre was used for cropland and is based on the average per acre costs reported by farmers in AFT's 7 Row Crop Soil Health Case Studies (2019 & 2020).

Discussion Questions – Predictive Assessment

1. Are the assumptions reasonable?
   - Do you agree that increased SOM results in
     - Yield increase?
     - Drought resiliency?

2. Are the short / long term results what you expected? Why?

3. What other tweaks could be made to increase ROI? (seeding rate, different equipment, etc)

4. Would you use this type of tool? How?

To Learn More…

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Helpful Links

- Soil Health Case Study Methods & Tool Kit page with RSHEC Training Videos
  - https://farmland.org/soil-health-case-studies-methods/
- Blank PSHEC questionnaire
  - In ISAP folder
- Equipment list
  - In ISAP folder

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Share your story

AFT is recruiting farmers experienced with regenerative soil health practices

- Interview
- Data analysis
- Video profile