Outcomes Estimation Tools Training Webinar Series

Michelle Perez, PhD
Water Initiative Director

Aysha Tapp Ross
Water & Soil Health Specialist

Kinzie Reiss
Ag Conservation Innovations Program & Communications Manager

Julie Platz
Ag Conservation Innovations Associate

Launch of the 2023-2024 Series
May 3, 2023

American Farmland Trust

About Kinzie Reiss

- Agriculture Conservation Innovations Program & Communications Manager
- BS in Agricultural Education from Kansas State University
- Work with farmers on adopting conservation practices, Brighter Future Fund, & manage communications for ACI
- Farm with my husband & three small children in western Kansas; started direct to consumer pork sales business

American Farmland Trust

Webinar reminders

- Zoom Webinar
- Q&A - last 15 minutes
  - Vote up feature!
- Recording will be available
- Email with resources to follow each webinar
- Evaluation survey in the Chat box

Agenda

- Welcome & Reminders
- Needs Assessment Results
- Overview of the Webinar Series
- Walk through the OET Guide
- Training on the back-of-envelope method & the PCOC Tool
- Q&A

WALTON FAMILY FOUNDATION

American Farmland Trust

Time for a poll!

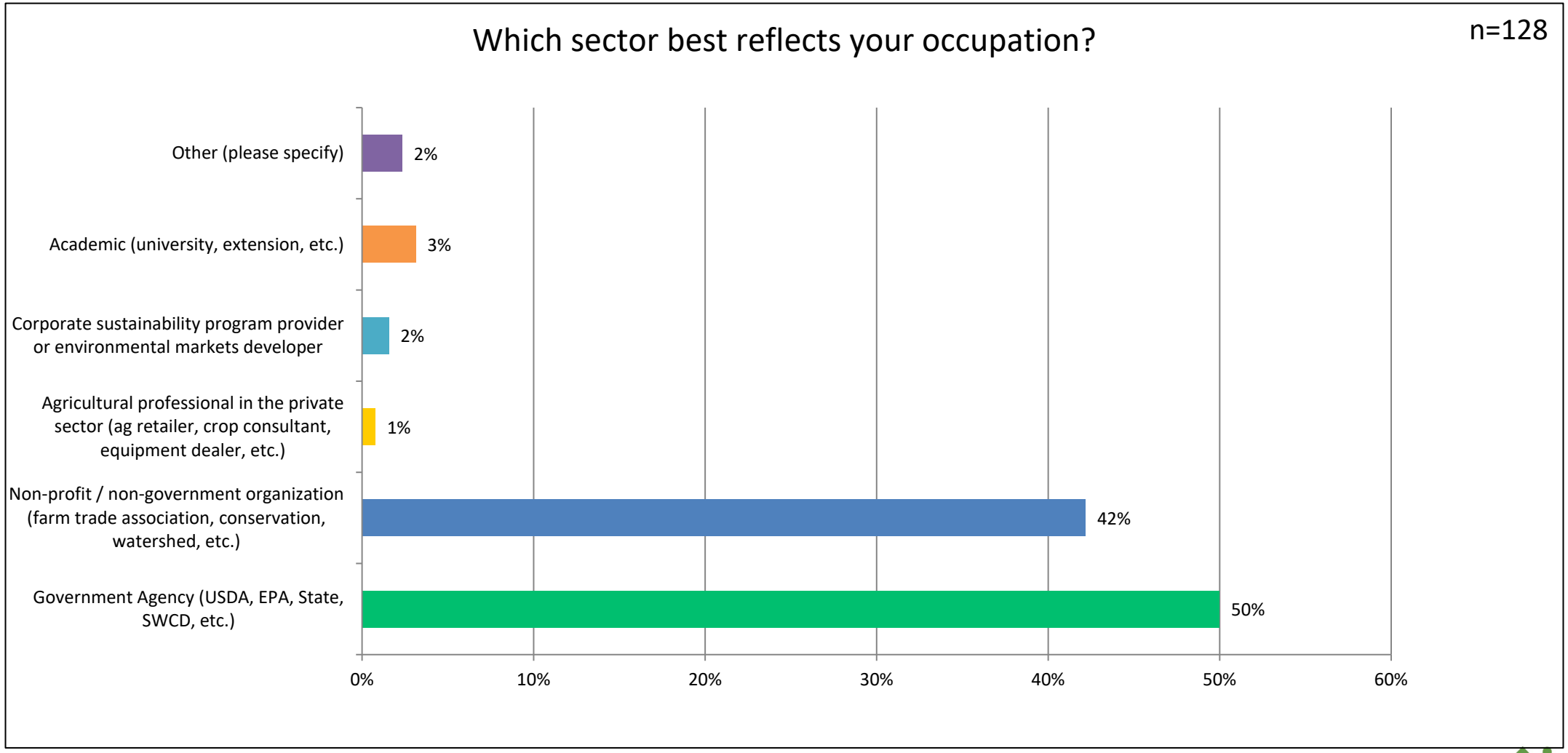
About Julie Platz

- Agriculture Conservation Innovation Program Associate
- Hosts farmer peer-to-peer meetings and Women for the Land Learning Circles
- Regional Lead for Ohio and Michigan with the Great Lakes Protection Fund Navigator Program
- Bachelor of Science in Environmental Science and Biology from Otterbein University in Westerville, Ohio

American Farmland Trust

Highlights from the Needs Assessment

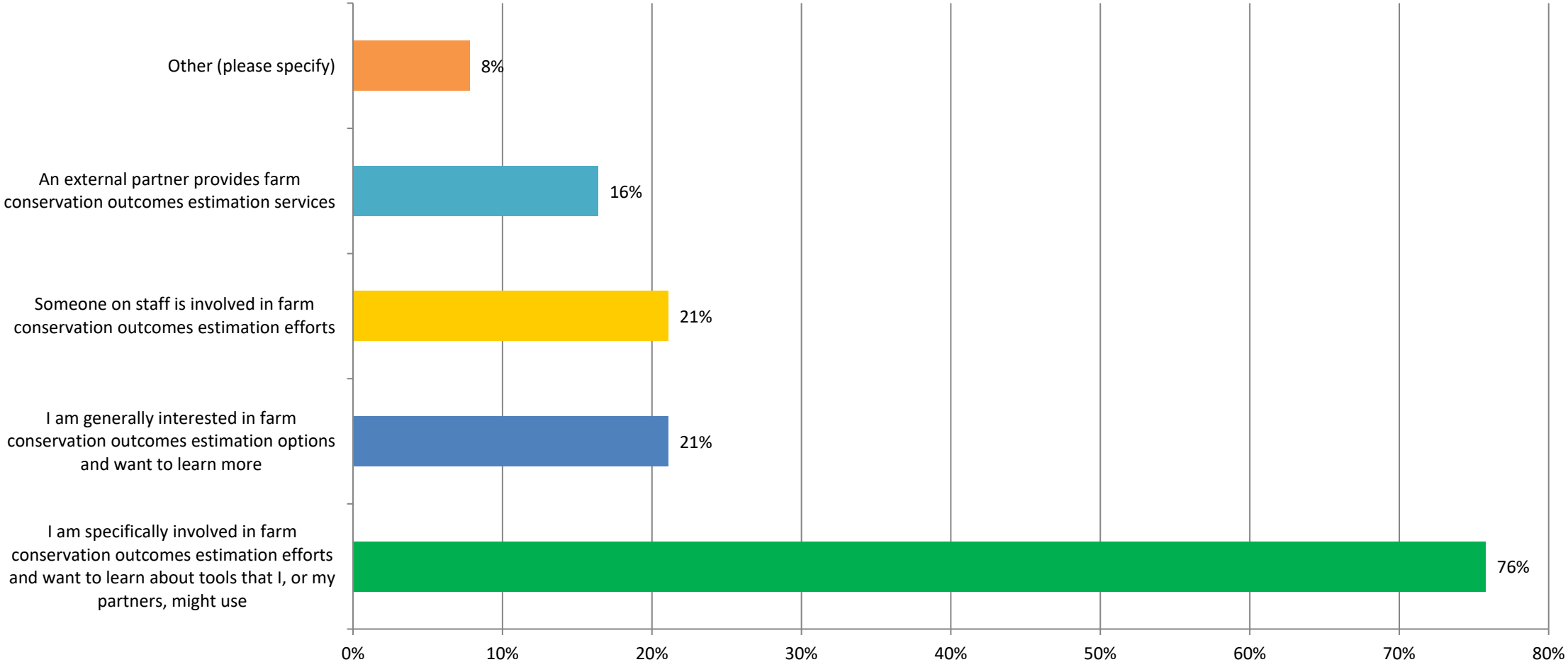
Demographics - Needs Assessment Respondents



American Farmland Trust

Which of the following best describes your role or the role of others in conducting outcomes quantification and reporting for your project? (Select all that apply)

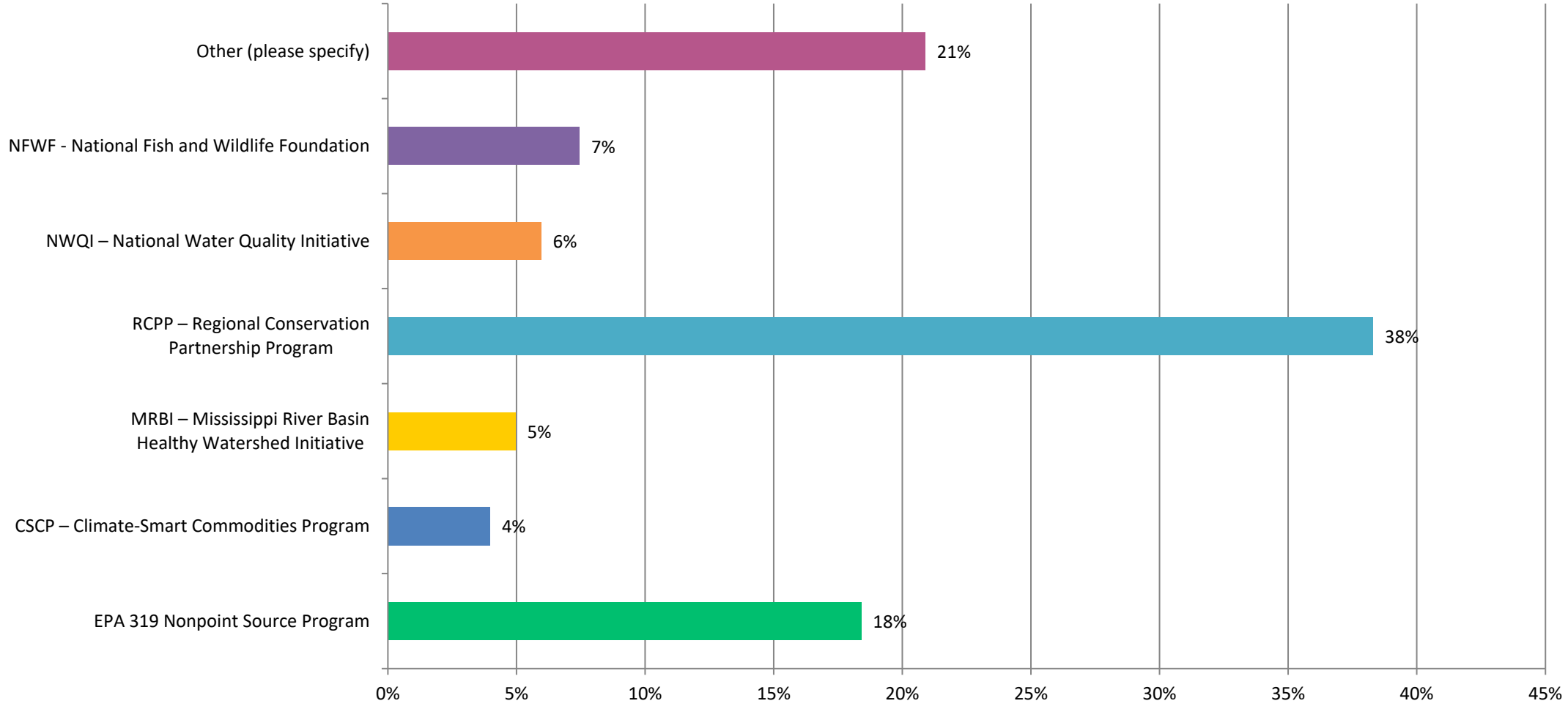
n=128



American Farmland Trust

What type of funding program (federal, state, local, private sector) helped initiate and/or continues to sustain your project. Select all that apply.

n=201

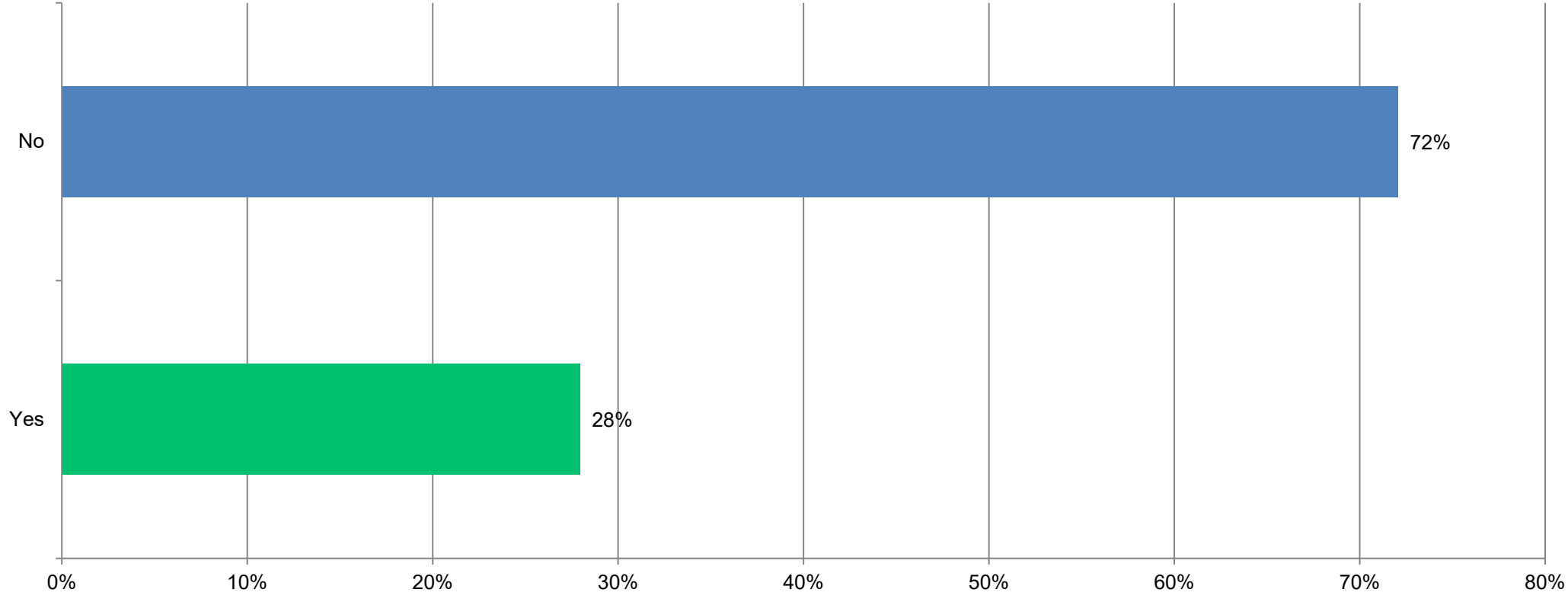


American Farmland Trust

Reason for this Webinar

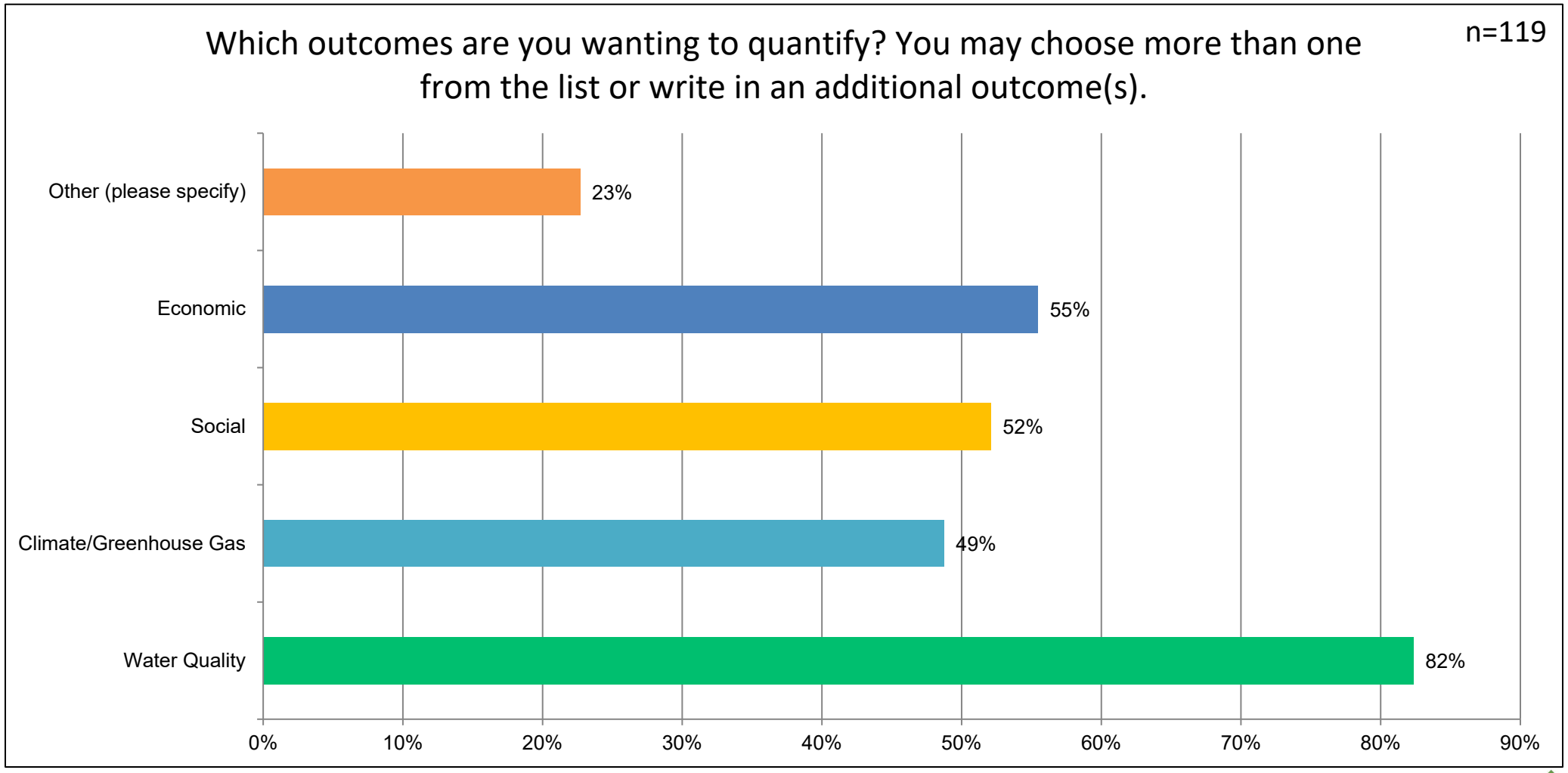
Prior to this needs assessment and announcement about the outcomes estimation tools training webinars, had you heard about the AFT Outcomes Estimation Tools Guide?

n=136

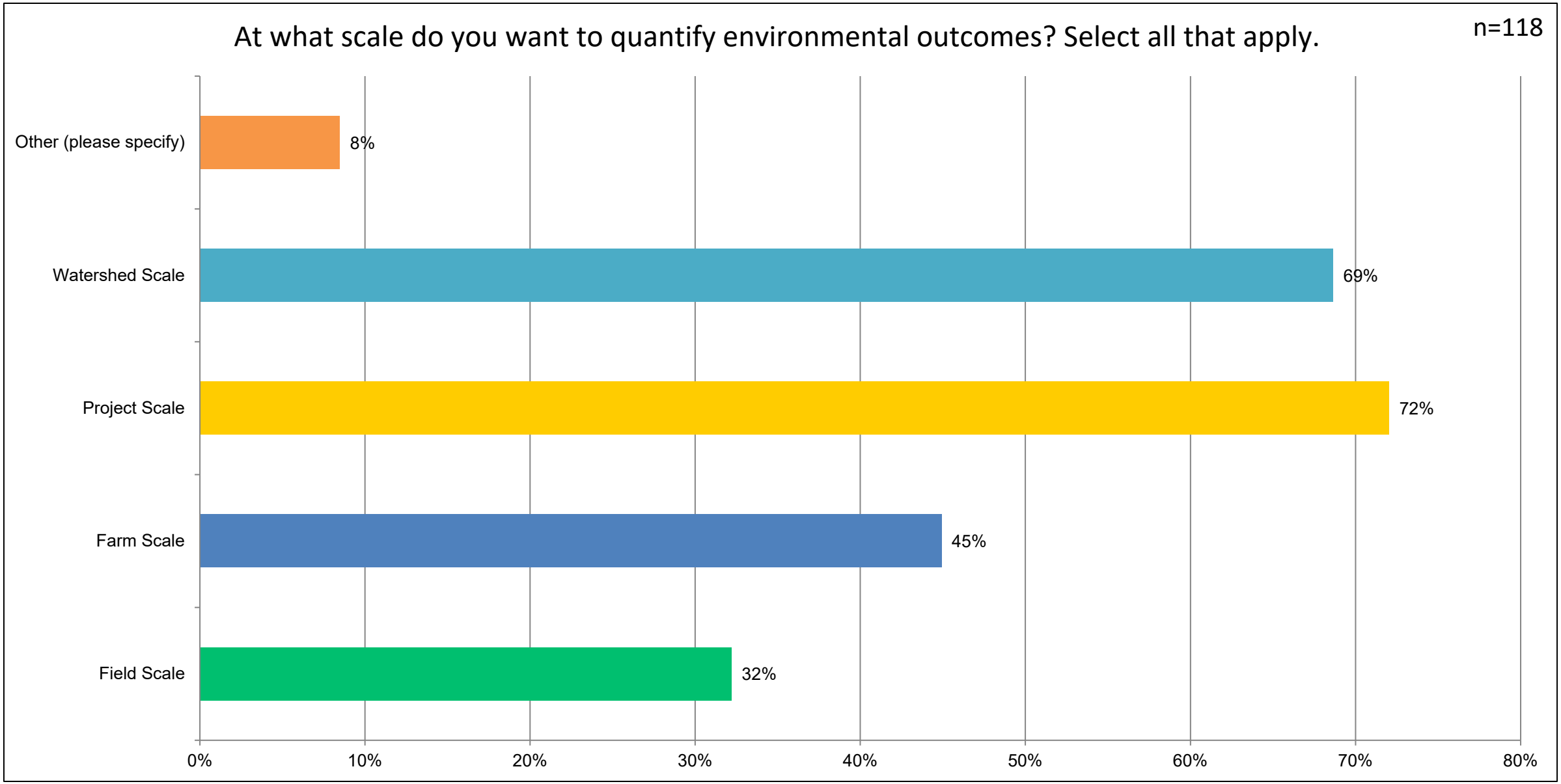


American Farmland Trust

Training Needs



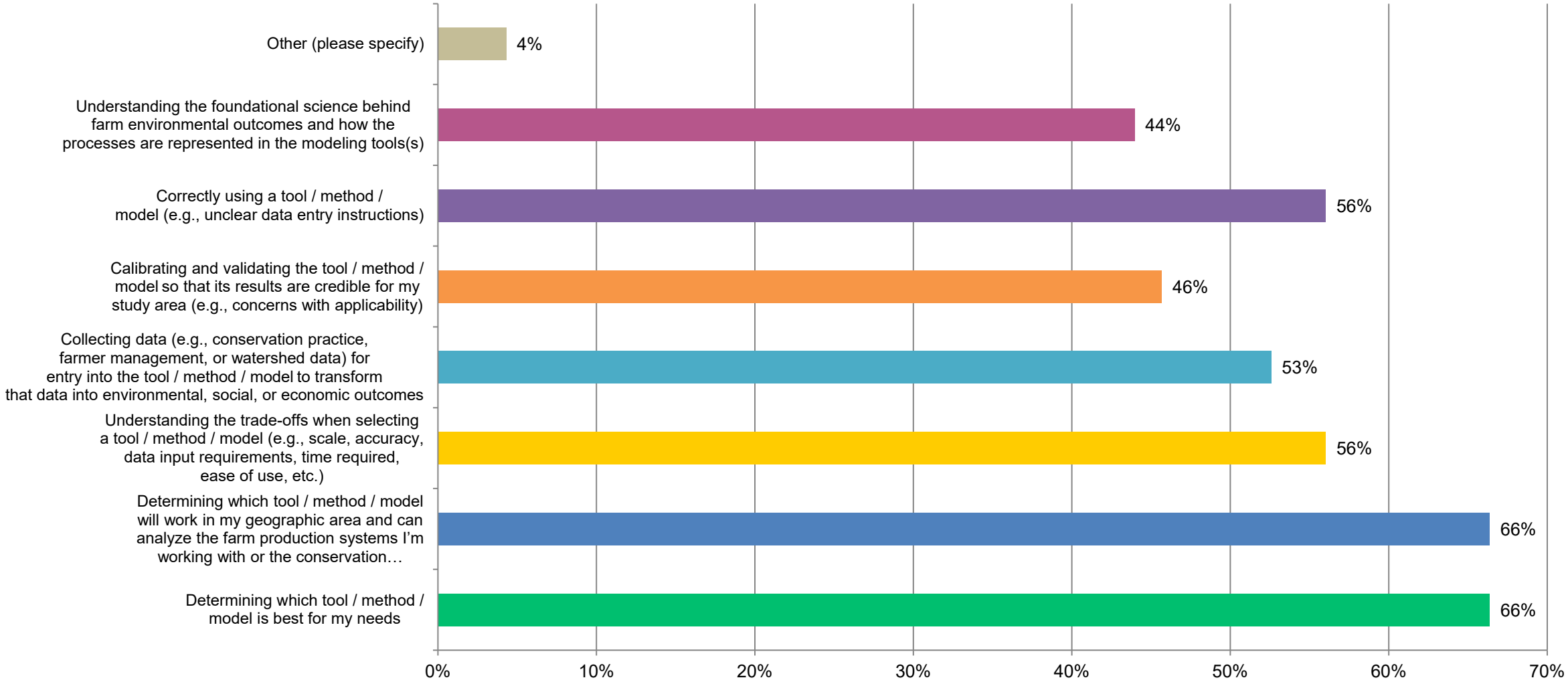
American Farmland Trust



American Farmland Trust

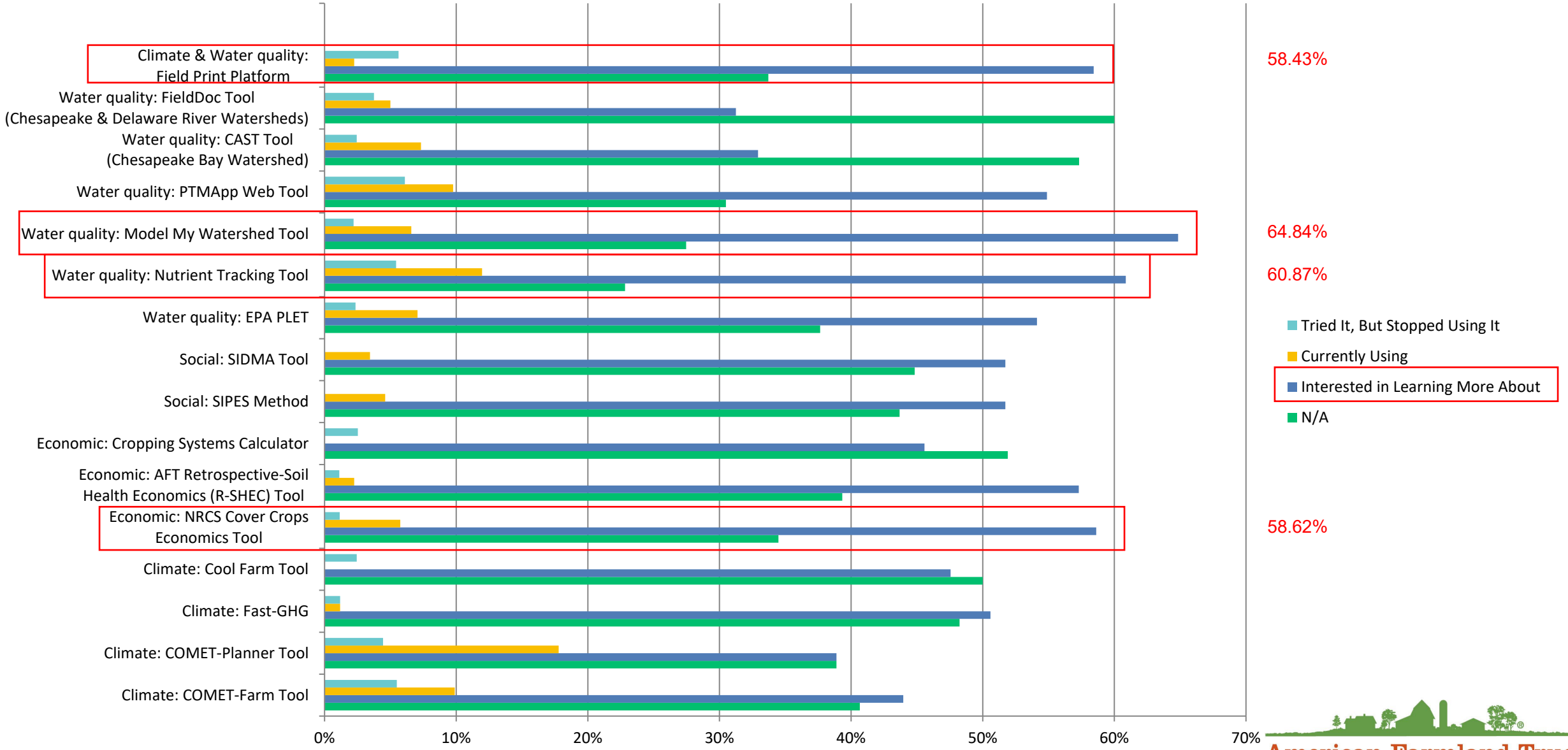
From the list below, please select the skill sets you need help with to quantify outcomes. You may choose more than one option and/or write in a response.

n=116

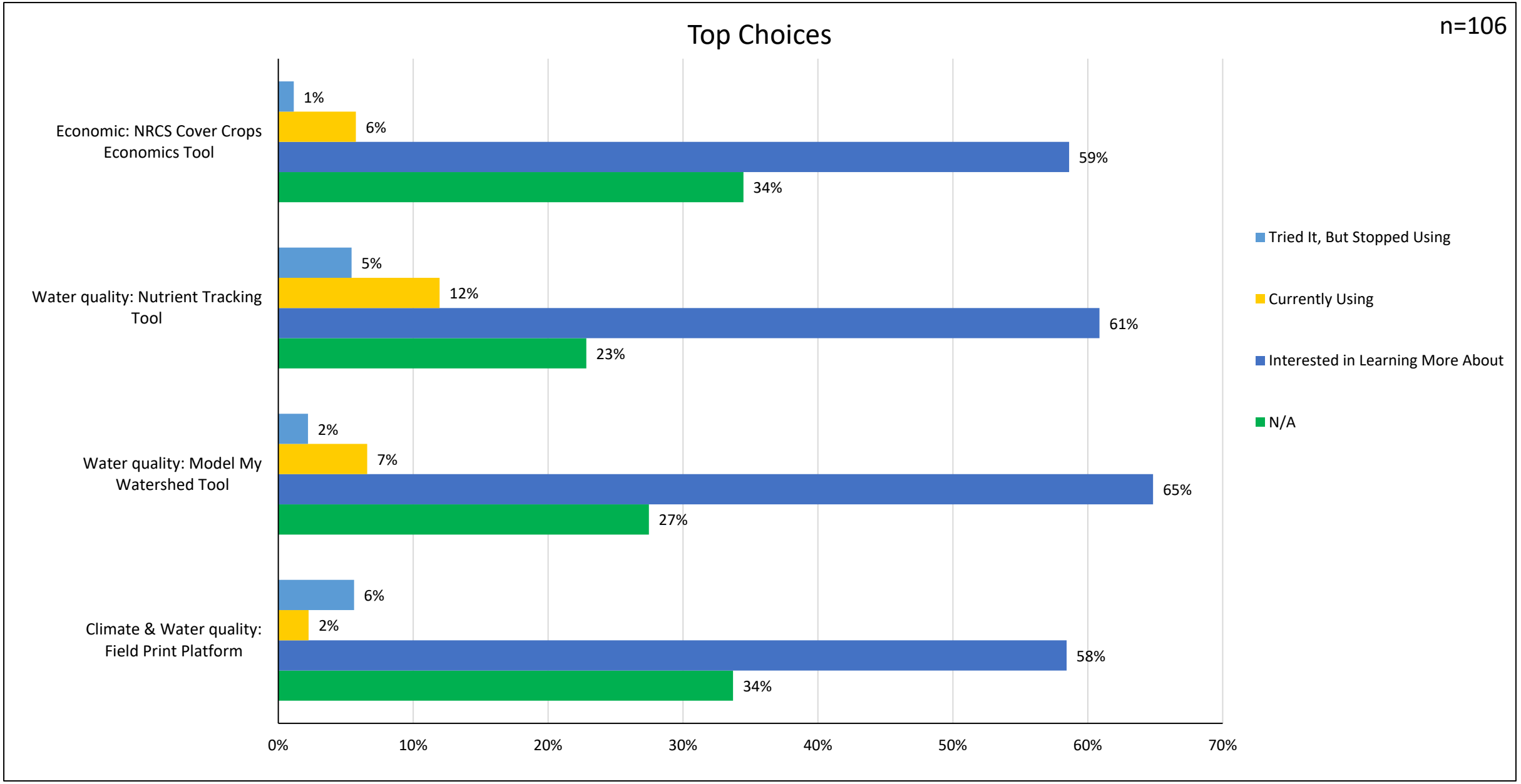


American Farmland Trust

Please select a response reflecting your interest and/or experience with the following outcomes estimations tools or methods. Additional tools not listed here can be added / discussed / reviewed in the next question.



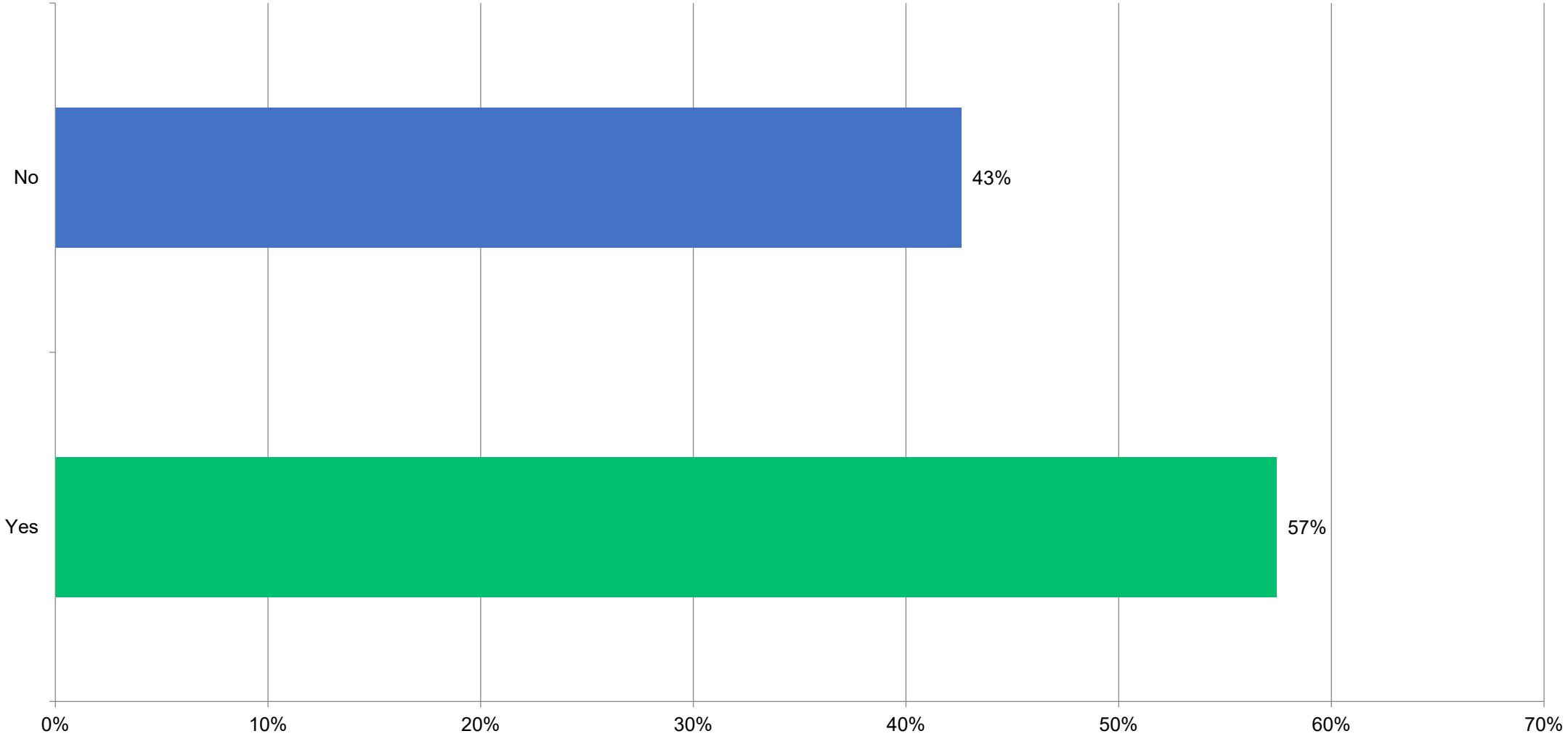
American Farmland Trust



American Farmland Trust

Are you interested in assisting the tool developer(s) in improving the accuracy of the tool(s) in your project area?

n=108



American Farmland Trust

ABOUT THIS OUTCOMES ESTIMATION TOOLS TRAINING WEBINAR SERIES

About Aysha Tapp Ross

- AFT Water and Soil Health Scientist
- PhD Student with University of Louisville Biology Department: Soil microbe communities in biochar amended soils
- Owner of a small farmstead and apiary

Development of the OET Guide

Federally-funded projects	
Estimated #	**Types of project**
600	EPA 319
400	RCPP
47	MRBI (implementation phase)
19	MRBI (planning phase)
?	NWQI
1066	***Estimated Total***

- Over 1000 projects with the potential for outcome estimation needs
- Starting with the 2014 Farm bill RCPP project managers are expected to quantify outcomes
- Project managers struggle to quantify project outcomes

American Farmland Trust

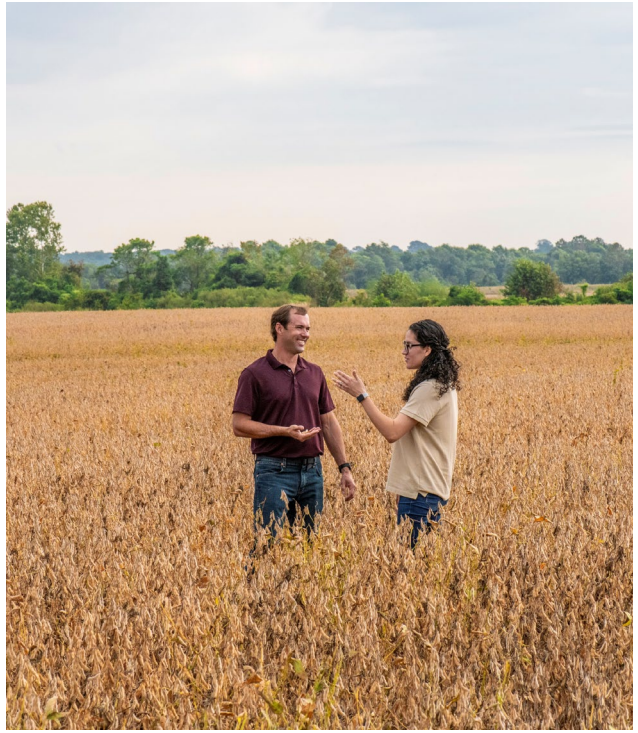
Outcomes Estimation Tools Guide Webinar 2021

In the exit survey we asked:

Which of these next steps are you interested in (select as many as that apply):

a. Hearing presentations by tool/method developers
b. Having outcomes quantification coaching conversations with AFT
c. Helping to move report recommendations forward

Responses:
60%
39%
38%



American Farmland Trust

Outcomes Estimation Tools Guide Webinar 2021

Recommendations for Project Managers:

1. Connect with the tool developer to
   a. Make sure the tool will work for you
   b. Seek individualized training
   c. Request individualized coaching

2. Use back of the envelope or other simple methods to estimate water quality & social outcomes

3. Signal to NRCS, EPA, states, the foundation, and the sustainability supply chain communities that you need more guidance

Tools in 2023 Trainings*

May 3: Webinar Launch & PCOC

June 7: Model My Watershed (water quality)

July 5: Nutrient Tracking Tool (NTT) (water quality)

August 2: NRCS Cover Crop Economics Tool (economic)

September 6: TBD

October 4: AFT Retrospective-Soil Health Economics (R-SHEC) Tool (economic)

November 1: PTMApp Web Tool (water quality)

December 6: TBD

Tools in 2024 Trainings*

January 10: SIPES Method/SIDMA Tool (social)

February 7: Fast-GHG (climate)

March 6: Cool Farm Tool (climate)

April 3: Cropping Systems Calculator (economic)

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

June 5: CAST Tool (water quality)

July 3: TBD

*Subject to change

Two tools – initially missed in the report – are included in the webinar series

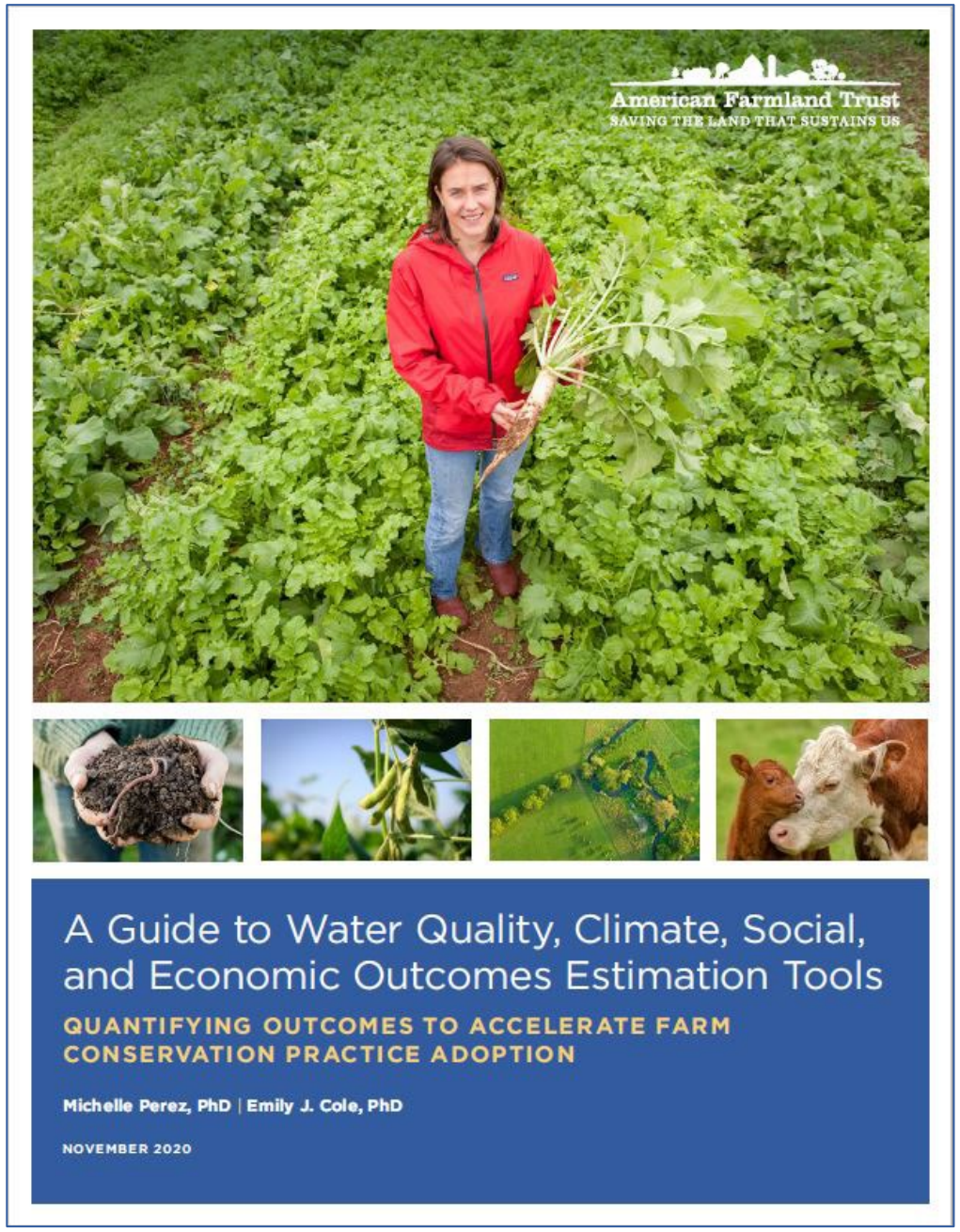
American Farmland Trust

A WALK THRU OF THE GUIDE TO OUTCOMES ESTIMATION TOOLS

American Farmland Trust

About Michelle Perez

- AFT Water Initiative Director
- Formerly with World Resources Institute, Environmental Working Group, & Alliance to Save Energy
- PhD in Environmental Policy from University of Maryland: 3-state comparison of nutrient management plan regulations (Enjoy the Journal of Environmental Quality article)



A Guide to Water Quality, Climate, Social, and Economic Outcomes Estimation Tools

Michelle Perez, PhD
Water Initiative Director

Aysha Tapp Ross
Water & Soil Health Specialist

May 3, 2023

Keyword search: "AFT outcomes tools"

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

Agenda

Provide an overview of Guide

Compare & contrast tools & methods

Share tips to select a tool or a method that might work for you

WHAT ARE PROJECT-LEVEL OUTCOMES & WHY QUANTIFY THEM?

American Farmland Trust

Outcomes defined by “RCPP Expectations” (NRCS, 2020)

“Outcomes are the measurable environmental, economic and social impacts of RCPP project activities. Examples of outcomes are pounds of nitrogen runoff avoided, tons of carbon sequestered, cost savings to producers, number of neighboring producers adopting a practice, decision factors leading to producer adoption of a soil health management system, etc.”

American Farmland Trust

Outcomes quantification is required for RCPP & EPA 319 projects

2014 RCPP Announcement for Public Funding

"…generate near-term results that are measurable from environmental, economic, and social perspectives."

Excerpt from 2018 Farm Bill

(E) conduct an **assessment of**—

(i) **the progress made by the project in achieving each conservation benefit** defined in the partnership agreement, including in a **quantified form** to the extent practicable; and

(ii) as appropriate, **other outcomes of the project**; and

(F) at the **conclusion of the project, report to the Secretary on its results** and funds leveraged.

How many farm conservation projects are there?

Federally-funded projects	
Estimated #	**Types of project**
600	EPA 319
400	RCPP
47	MRBI (implementation phase)
19	MRBI (planning phase)
?	NWQI
1066	**Estimated Total**

How many others?

- ❑ State-led/funded?
- ❑ County-led/funded?
- ❑ Corporate sustainability?
- ❑ 100 new Partnership for Climate Smart Commodities (PCSC) projects
- ❑ Overlap?

FIGURE 10. SOME USES OF OUTCOMES QUANTIFICATION TOOLS

1

Educate farmers about the outcomes they are already achieving from current practice use.

2

Offer more interesting education and outreach activities that feature such outcomes quantification results.

3

Improve farmer conservation decision-making and help farmers "get to yes" by running "what if" conservation scenarios that generate estimated outcomes.

4

Evaluate results of farmer participation in government-funded conservation project.

5

Evaluate farmer credits for participation in water quality or climate markets.

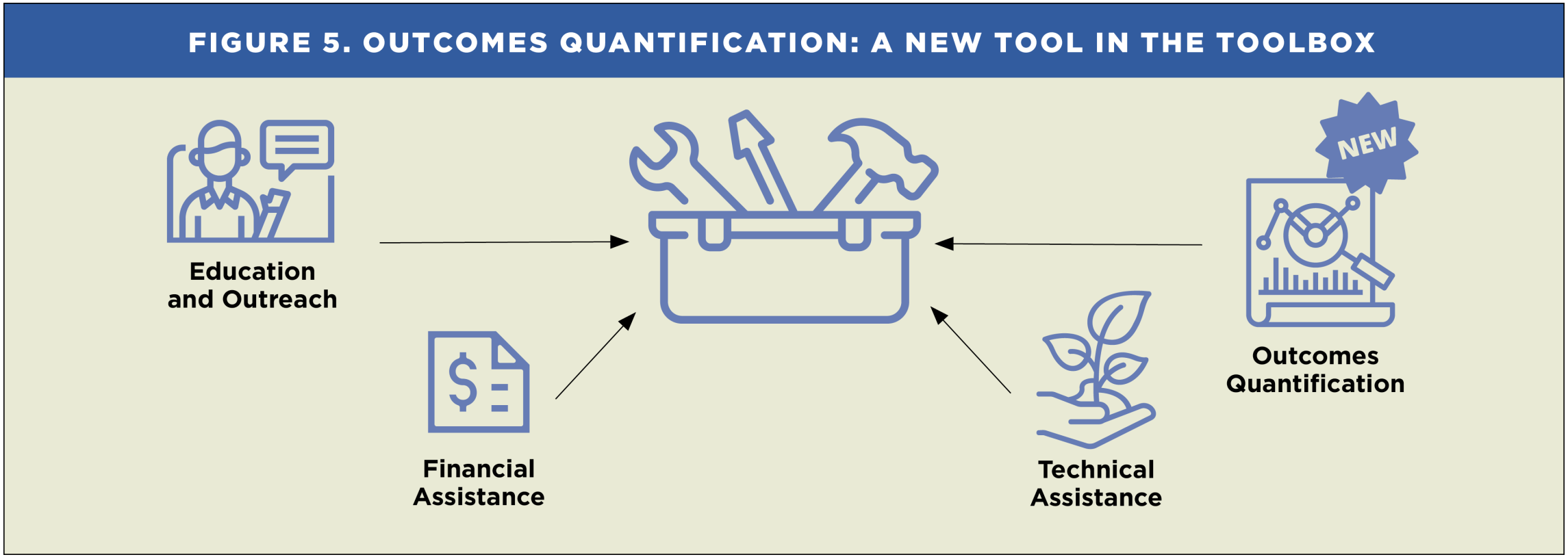
6

Evaluate results of farmer participation in corporate supply chain sustainability programs.

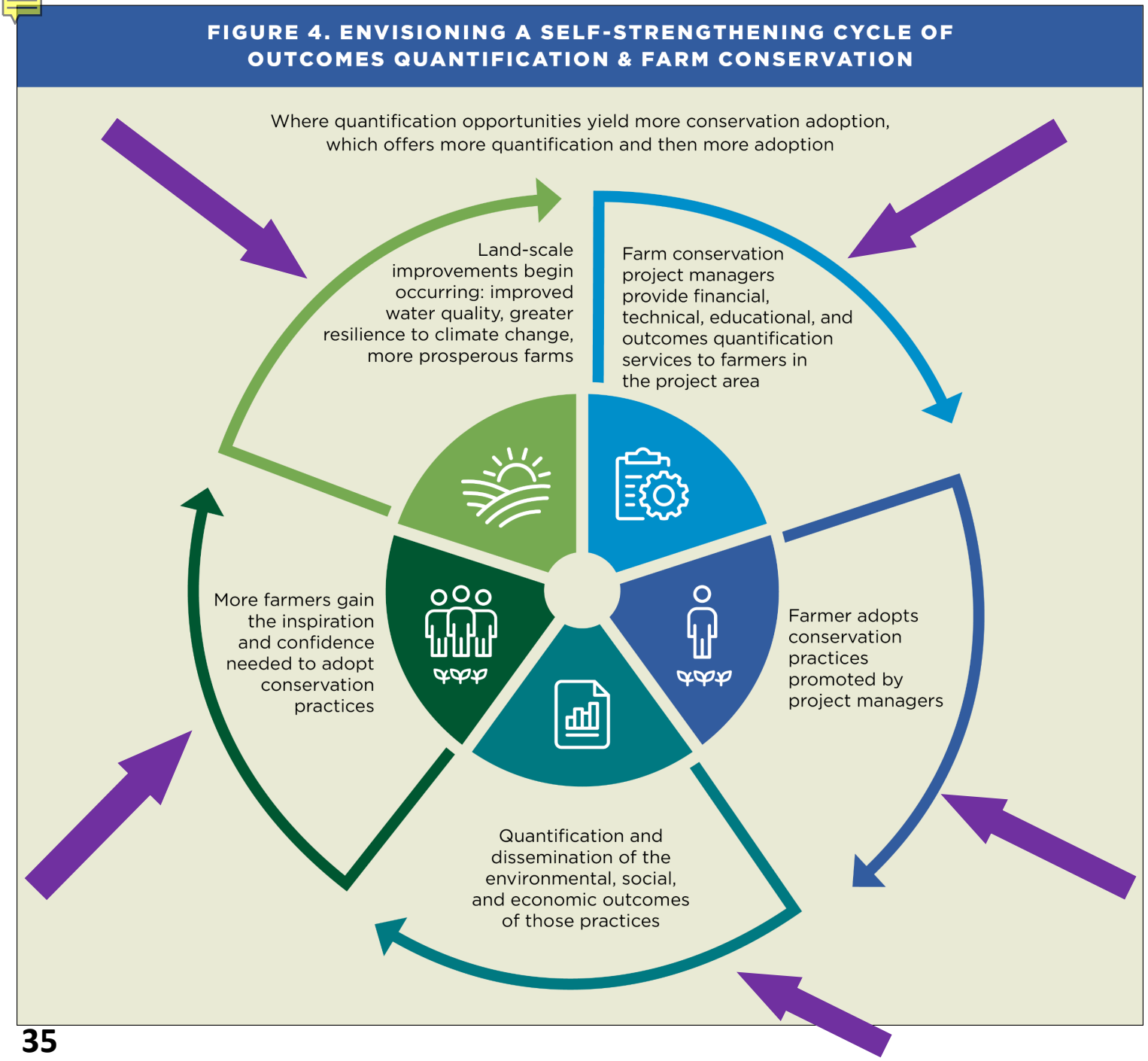
Several terrific reasons to quantify outcomes

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

Goal of the Guide: Enable conservationists to add outcomes quantification to their conservation toolbox



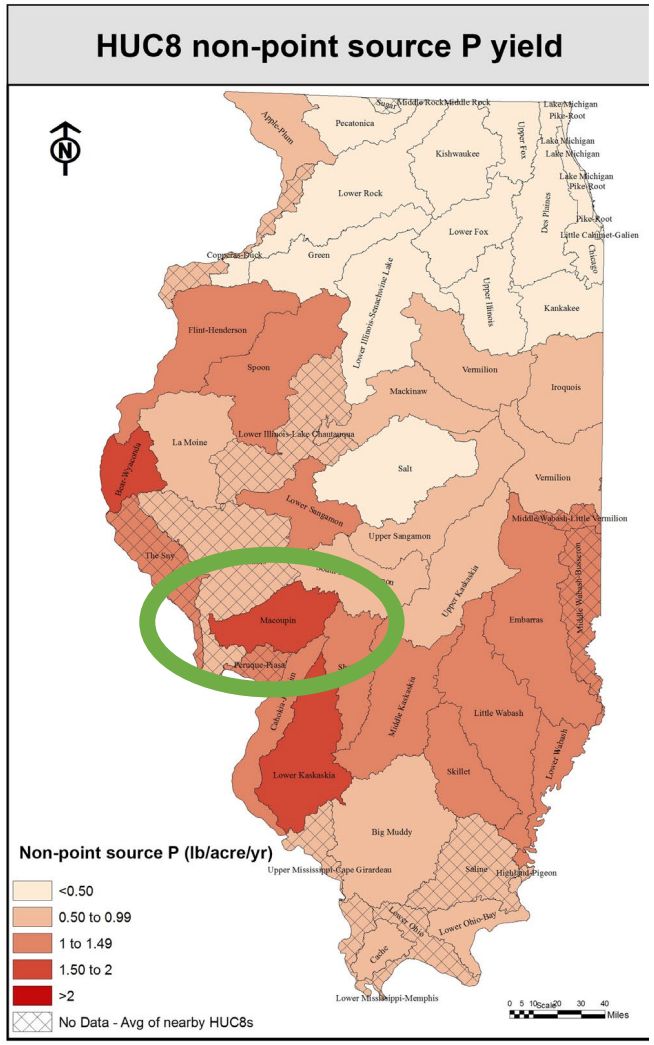
American Farmland Trust

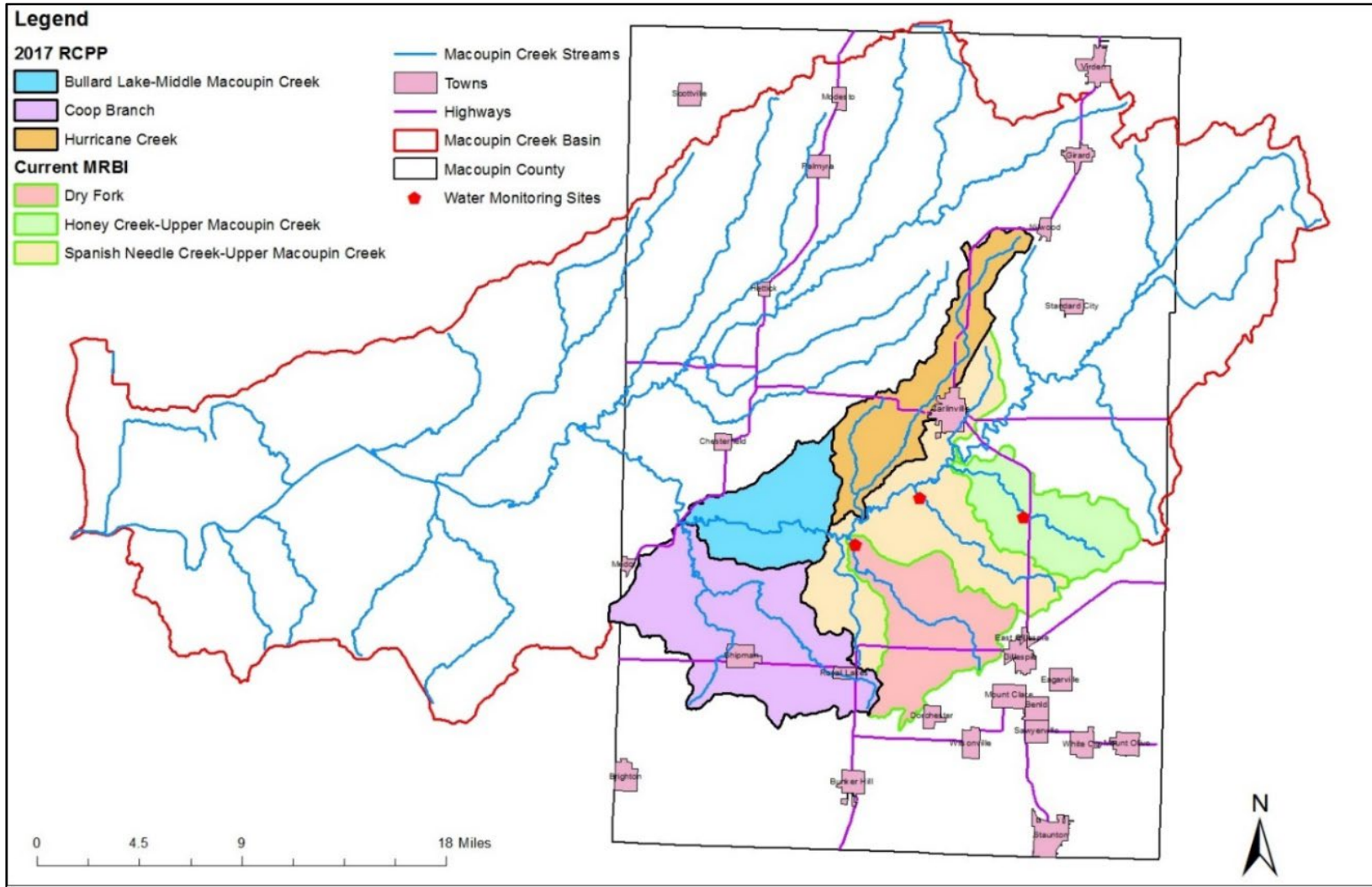


Envisioning a Self-Strengthening Cycle:

Outcomes quantification will lead to more conservation adoption, which will lead to more outcomes quantification, which will lead to more conservation adoption

AFT's IL Upper Macoupin Creek RCPP Project : 6 HUC12s within Macoupin Watershed (HUC8)





Scope, Methods, & Resources

Scope & Methods of the Report

- Focused solely on water quality, GHG, social, & economic outcomes
  - Excluded water quantity, air quality, & wildlife
- Focused on options for modeling
- Limited evaluation
- Extensive research
- Tool developer interviews
- See Acknowledgements for reviewers

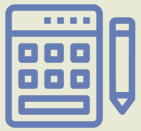
Resources in the Appendix

- See Appendix A for additional papers reviewing models & tools
- See Appendix B for resources on monitoring, in-stream, edge-of-field, tile drain, & soil health
- See Appendix C for summaries of 18 excluded tools
- See Appendix D for summaries of 17 excluded models

FIGURE 8. CRITERIA FOR OUTCOMES QUANTIFICATION TOOLS

1

Provide quantitative estimates of water quality, climate, social, or economic outcomes associated with agricultural conservation practice adoption.



2

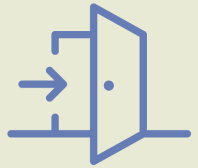
Available to the public, either free or for a fee.

3

Meant for direct use by conservationists or farmers.

4

Do not require users to have a modeling background.



5

Available to users in more than one state.

American Farmland Trust

TABLE 1. FEATURED OUTCOMES QUANTIFICATION TOOLS AND METHODS	
Seven Water Quality Tools and One Method	
EPA's PLET - Pollutant Load Estimation Tool	MN BWSR's PTMApp-Web—Prioritize, Target, & Measure Application Tool (MN & ND)
EPA's Region 5 Tool Officially discontinued	EPA & CBP CAST—Chesapeake Assessment Scenario Tool (Chesapeake Bay Watershed)
USDA's NTT—Nutrient Tracking Tool	The Common's FieldDoc (Chesapeake Bay & Delaware River Watersheds)
Stroud Center's ModelMW—Model My Watershed	S.T.A.R.—Saving Tomorrow's Agricultural Resources Method
Three Climate Tools	
USDA's COMET-Farm	USDA's COMET-Planner
Field to Market's Fieldprint Platform	
One Social Tool and One Method	
SIDMA—Social Indicators Data Management and Analysis Tool	SIPES—"Social Indicator Planning and Evaluation System (SIPES) for Nonpoint Source Management: A Handbook for Watershed Projects" Method
Three Economic Tools	
NRCS's Cover Crops Economics Tool	LSP's Cropping Systems Calculator (MN & IL)
AFT's R-SHEC—Retrospective Soil Health Economic Calculator	

TABLE 1. FEATURED OUTCOMES QUANTIFICATION TOOLS AND METHODS	
Seven Water Quality Tools and One Method	
EPA's PLET - Pollutant Load Estimation Tool	MN BWSR's PTMApp-Web—Prioritize, Target, & Measure Application Tool (MN & ND)
EPA's Region 5 Tool Officially discontinued	EPA & CBP CAST—Chesapeake Assessment Scenario Tool (Chesapeake Bay Watershed)
USDA's NTT—Nutrient Tracking Tool	The Common's FieldDoc (Chesapeake Bay & Delaware River Watersheds)
S	S
lima	
U	U
Field to Market's Fieldprint Platform	
One Social Tool and One Method	
SIDMA—Social Indicators Data Management and Analysis Tool	SIPES—"Social Indicator Planning and Evaluation System (SIPES) for Nonpoint Source Management: A Handbook for Watershed Projects" Method
Three Economic Tools	
NRCS's Cover Crops Economics Tool	LSP's Cropping Systems Calculator (MN & IL)
AFT's R-SHEC—Retrospective Soil Health Economic Calculator	

Tool: a technical device intended to make the task of estimating outcomes easier

Method: a systematic procedure for accomplishing the task of estimating outcomes

TABLE 4. WATER QUALITY OUTCOMES QUANTIFICATION TOOLS

	Tool	Developer	Format	Scale Options for Analysis	Quantified Outcomes (Degree of Specificity)
NATIONALLY AVAILABLE	**PLET**	EPA	Web	**Primary**: Project & Watershed **Secondary:** Field	Sediment loss, N, P, & BOD (Generalized estimates)
	Discontinued				
	Nutrient Tracking Tool	USDA & Tarleton State University	Web	**Primary:** Field **Secondary:** Project & Watershed	Sediment loss, TN, TP, & crop yield differences (Field-specific estimates)
	Model My Watershed	Stroud Water Research Center	Web	**Primary:** Project & Watershed	Run-off, infiltration, sediment, TN, & TP (Generalized estimates)
REGIONALLY SPECIFIC	**PTMApp** (MN & ND)	MN Board of Water & Soil Resources	Web	**Primary:** Field, Project & Watershed	Run-off, sediment, TN, TP, & cost (Generalized estimates)
	CAST (Chesapeake Bay)	Devereux Consulting	Web	**Primary:** Project & Watershed	TSS, TN, TP, & BMP costs (Generalized estimates)
	FieldDoc (Chesapeake Bay & Delaware River Basins)	The Commons	Web	**Primary:** Field & Project **Secondary:** Watershed	TSS, TN, & TP (Generalized estimates)

Acronyms: BOD = biological oxygen demand, N = nitrogen, P = phosphorous, TN = total nitrogen, TP = total phosphorus, TSS = total suspended solids

TABLE 4. WATER QUALITY OUTCOMES QUANTIFICATION TOOLS

	Tool	Developer	Format	Scale Options for Analysis	Quantified Outcomes (Degree of Specificity)
NATIONALLY AVAILABLE	**PLET**	EPA	Web	**Primary**: Project & Watershed **Secondary:** Field	Sediment loss, N, P, & BOD (Generalized estimates)
	ntinued				
	Nutrient Tracking Tool	USDA & Tarleton State University	Web	**Primary:** Field **Secondary:** Project & Watershed	Sediment loss, TN, TP, & crop yield differences (Field-specific estimates)
	Model My Watershed	Stroud Water Research Center	Web	**Primary:** Project & Watershed	Run-off, infiltration, sediment, TN, & TP (Generalized estimates)
REGIONALLY SPECIFIC	**PTMApp** (MN & ND)	MN Board of Water & Soil Resources	Web	**Primary:** Field, Project & Watershed	Run-off, sediment, TN, TP, & cost (Generalized estimates)
	CAST (Chesapeake Bay)	Devereux Consulting	Web	**Primary:** Project & Watershed	TSS, TN, TP, & BMP costs (Generalized estimates)
	FieldDoc (Chesapeake Bay & Delaware River Basins)	The Commons	Web	**Primary:** Field & Project **Secondary:** Watershed	TSS, TN, & TP (Generalized estimates)

Live links

Acronyms: BOD = biological oxygen demand, N = nitrogen, P = phosphorous, TN = total nitrogen, TP = total phosphorus, TSS = total suspended solids

TABLE 4. WATER QUALITY OUTCOMES QUANTIFICATION TOOLS

	Tool	Developer	Format	Scale Options for Analysis	Quantified Outcomes (Degree of Specificity)
NATIONALLY AVAILABLE	**PLET**	EPA	Web	**Primary**: Project & Watershed **Secondary:** Field	Sediment loss, N, P, & BOD (Generalized estimates)
	Discontinued				
	Nutrient Tracking Tool	USDA & Tarleton State University	Web	**Primary:** Field **Secondary:** Project & Watershed	Sedime loss, TN, TP, & crop yield diff nces (Field-spec estimates)
	Model My Watershed	Stroud Water Research Center	Web	**Primary:** Project & Watershed	Run-off, infiltra n, sediment, TN, & TP (Generalized estim)
REGIONALLY SPECIFIC	**PTMApp** (MN & ND)	MN Bo & Soil			
	CAST (Chesapeake Bay)	Devere Consu			
	FieldDoc (Chesapeake Bay & Delaware River Basins)	The C			

FIELD-SCALE
Working with individual farmers; running "what if" planning scenarios to estimate how their on-farm water quality or GHG losses might be reduced by adopting conservation practices

PROJECT-SCALE
Tracking multiple farmers adopting conservation practices, working towards project-scale environmental goals that may occur across one or more counties or watersheds

WATERSHED-SCALE
Working towards goals established for a specific waterbody, within a watershed, or a group of watersheds

Acronyms: BOD = biological oxygen demand, N = nitrogen, P = phosphorous, TN = total nitrogen, TP = total phosphorus, TSS = total suspended solids

TABLE 4. WATER QUALITY OUTCOMES QUANTIFICATION TOOLS

	Tool	Developer	Format	Scale Options for Analysis	Quantified Outcomes (Degree of Specificity)
NATIONALLY AVAILABLE	**PLET**	EPA	Web	**Primary**: Project & Watershed **Secondary:** Field	Sediment loss, N, P, & BOD (Generalized estimates)
	Discontinued				
	Nutrient				
	Model M				(Generalized estimates)
REGIONALLY SPECIFIC	**PTMApp** (MN & ND)	MN Board of Water & Soil Resources	Web	**Primary:** Field, Project & Watershed	Run-off, sediment, TN, TP, & cost (Generalized estimates)
	CAST (Chesapeake Bay)	Devereux Consulting	Web	**Primary:** Project & Watershed	TSS, TN, TP, & BMP costs (Generalized estimates)
	FieldDoc (Chesapeake Bay & Delaware River Basins)	The Commons	Web	**Primary:** Field & Project **Secondary:** Watershed	TSS, TN, & TP (Generalized estimates)

FIELD-SPECIFIC

Farmer production and management data inputs; outcomes only applicable to field of interest

SITE-SPECIFIC

Location-based environmental data inputs (e.g. soil type); outcomes are only applicable to that location

GENERALIZED

Watershed-scale or county-scale data inputs; outcomes are broadly applicable within watershed or county of interest

Acronyms: BOD = biological oxygen demand, N = nitrogen, P = phosphorous, TN = total nitrogen, TP = total phosphorus, TSS = total suspended solids

TABLE 4. WATER QUALITY OUTCOMES QUANTIFICATION TOOLS

	Tool	Developer	Format	Scale Options for Analysis	Quantified Outcomes (Degree of Specificity)
NATIONALLY AVAILABLE	**PLET**	EPA	Web	**Primary**: Project & Watershed **Secondary:** Field	Sediment loss, N, P, & BOD (Generalized estimates)
	Discontinued				
	Nutrient Tracking Tool	USDA & Tarleton State University	Web	**Primary:** Field **Secondary:** Project & Watershed	Sediment loss, TN, TP, & crop yield differences (Field-specific estimates)
	Model My Watershed	Stroud Water Research Center	Web	**Primary:** Project & Watershed	Run-off, infiltration, sediment, TN, & TP (Generalized estimates)
REGIONALLY SPECIFIC	**PTMApp** (MN & ND)	MN Board of Water & Soil Resources	Web	**Primary:** Field, Project & Watershed	Run-off, sediment, TN, TP, & cost (Generalized estimates)
	CAST (Chesapeake Bay)	Devereux Consulting	Web	**Primary:** Project & Watershed	TSS, TN, TP, & BMP costs (Generalized estimates)
	FieldDoc (Chesapeake Bay & Delaware River Basins)	The Commons	Web	**Primary:** Field & Project **Secondary:** Watershed	TSS, TN, & TP (Generalized estimates)

Acronyms: BOD = biological oxygen demand, N = nitrogen, P = phosphorous, TN = total nitrogen, TP = total phosphorus, TSS = total suspended solids

“Back-of-the-Envelope” Water Quality Estimation: Try the S.T.A.R. Method

FIGURE 12. THE S.T.A.R. METHOD

In addition to the quantification tools we have featured, there is a back-of-the-envelope method developed by AFT as an option for a coarse yet reasonable approach to quantifying project-scale water quality and climate outcomes, which may be modifiable for application to projects. Originally developed to quantify our Illinois Upper Macoupin Creek RCPP project outcomes, our Midwest Science Director Dr. Emily Bruner further developed this methodology to quantify the outcomes associated with practice adoption tracked by the statewide Illinois Saving Tomorrow’s Agriculture Resources (S.T.A.R.) Initiative.

This method can easily be applied at the project scale (defined by either county or watershed boundaries) to estimate outcomes and “provide an estimate of practice level performance” (S.T.A.R., 2020). The S.T.A.R method uses total acres enrolled in the program; GHG reductions using COMET-Planner; BMP efficiencies from the Illinois Nutrient Loss Reduction Strategy; Illinois HUC8 nonpoint source (NPS) nutrient loading data; HUC8 and county boundaries using geospatial data; 2017 Census of Agriculture information; and the average annual sediment load per county to calculate nutrient and sediment load reductions.

While this method may be less sophisticated than site-specific, online dynamic modeling tools, it does incorporate recent regionally specific and watershed and county-level NPS data. Thus, it may provide a realistic picture of what is going on across the landscape. It should be pointed out that before project leaders can use this method, they must first ascertain whether the county or watershed level baseline nutrient and sediment loss information and reduction efficiencies for conservation practices are available.

The S.T.A.R. Method is published in the report listed below (on pages 13–15):

S.T.A.R. (2020). *S.T.A.R. Annual Report. Crop Year 2019. Improving Conservation One Field At A Time.* Saving Tomorrow’s Agriculture Resources. img1.wsimg.com/blobby/go/45c3f789-47fb-40df-9bb7-3dc4d7bf6c2f/downloads/Star%20report%20FINAL%202020.pdf?ver=1597671964705

- Attain baseline nutrient & sediment loss data for your watershed or county
- Attain reduction efficiency values for conservation practices

TABLE 5. GREENHOUSE GAS OUTCOMES QUANTIFICATION TOOLS

Tool	Developer	Format	Scale Options for Analysis	Quantified Outcomes (Degree of Specificity)
COMET-Farm	NRCS & Colorado State University	Web	**Primary:** Field **Secondary:** Project	Soil organic carbon, biomass carbon, CO, CO_2, N_2O, and CH_4, all presented in metric tons of CO_2 equivalents per field (or parcel) annually (Field-specific estimates)
COMET-Planner	NRCS & Colorado State University	Web	**Primary:** County & State-level	CO_2, N_2O, CH_4, and total CO_2 reduction estimates are all presented in metric tons of CO_2 equivalents annually (Generalized estimates)
Fieldprint Platform	Field to Market	Web	**Primary:** Field **Secondary:** Project	CO_2, N_2O, and CH_4 emissions presented in lbs. of CO_2 equivalent per acre annually (Field-specific estimates)

Acronyms: CO = carbon monoxide, CO_2 = carbon dioxide, N_2O = nitrous oxide, and CH_4 = methane

Excerpt of economic outcomes definition from 2020 NRCS “RCPP Expectations”

“Economic indicators can quantify the financial impacts of conservation practices on a farm, ranch or forestland.” (Three examples include:)

- **Conservation cost effectiveness**
- **Economic/financial benefits**
- **Valuation of ecosystem benefits**

TABLE 6. ECONOMIC OUTCOMES QUANTIFICATION TOOLS

Tool	Developer	Format	Conservation Practices	Quantified Outcomes
Cover Crops Economics Tool	NRCS	Excel	Cover crops	Total costs, total benefits, and net benefit for short-term and long-term analysis ($/ac) of cover crop use
Retrospective—Soil Health Economic Assessment Calculator	American Farmland Trust	Excel	No-till, reduced till, cover crops, conservation cover, nutrient management, mulching, and compost application	Partial budget analysis table showing benefits, costs, impact on net income, and return on investment of already adopted soil health practices
Cropping Systems Calculator	Land Stewardship Program	Excel	Conservation crop rotation, cover crops, and grazing options	Average yearly costs and returns on a per acre and total basis to compare the original crop rotation to the alternative crop rotation

Social Tool & Method

Social Indicators Data Management & Analysis (SIDMA) Tool

- Developed by Purdue & Michigan State Universities + EPA Region 5
- Aids in water quality project managers in survey generation & results coding & analysis
- Tool is based on the SIPES Handbook
- Alternatives to SIDMA: MS Forms & Google Forms though no guardrails

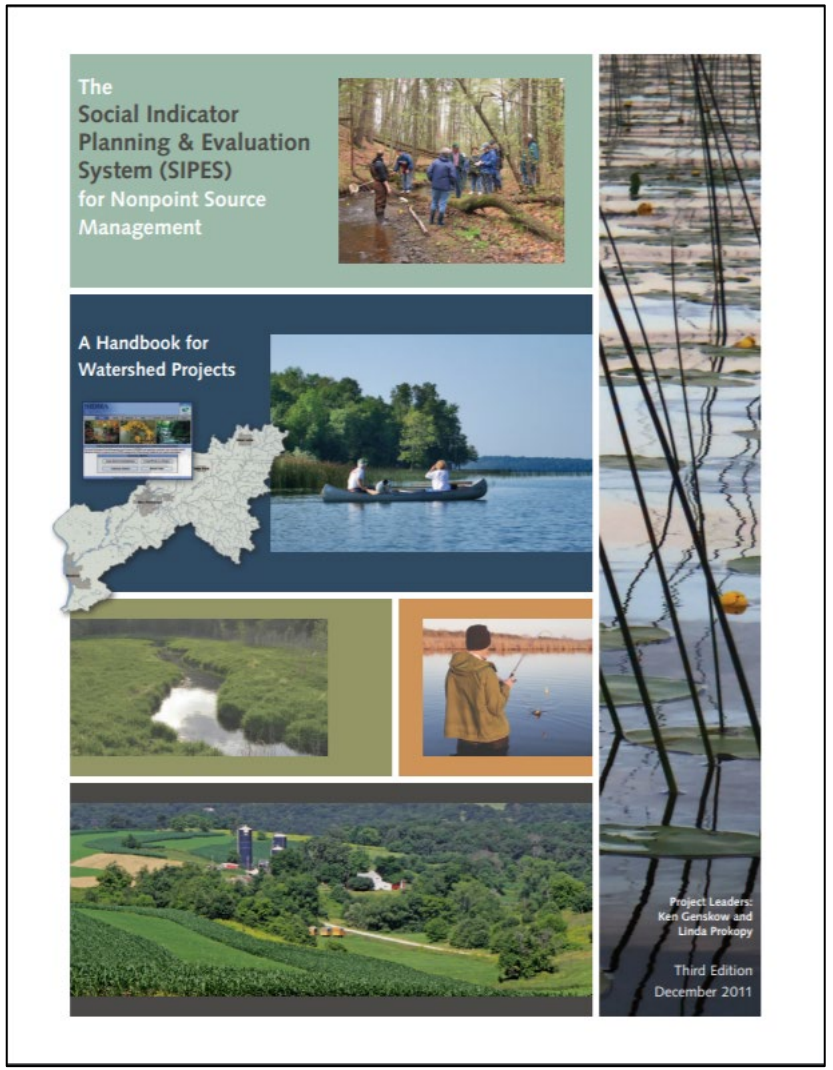


FIGURE 13. SIPES METHOD HANDBOOK SECTIONS

A. Steps for Using the SIPES
   1. Review Project Plan
   2. Collect & Enter Pre-Project Survey Data
   3. Review Data & Refine Social Outcomes
   4. Monitor Social Data Throughout Project
   5. Collect & Enter Post-Project Survey Data
   6. Collect & Enter Additional Post-Project Data
   7. Review Data & Use Results

B. NPS Project Planning: Setting the Stage for Working with Target Audiences

C. Getting Started with SIDMA—the Online Social Indicators Data Management & Analysis Tool

D. Choosing a Survey Method & Sample Size

E. Developing Your Social Indicators Questionnaire

F. Administering the Social Indicators Questionnaire

G. Features of SIDMA

H. Using Survey Results to Develop Education and Outreach

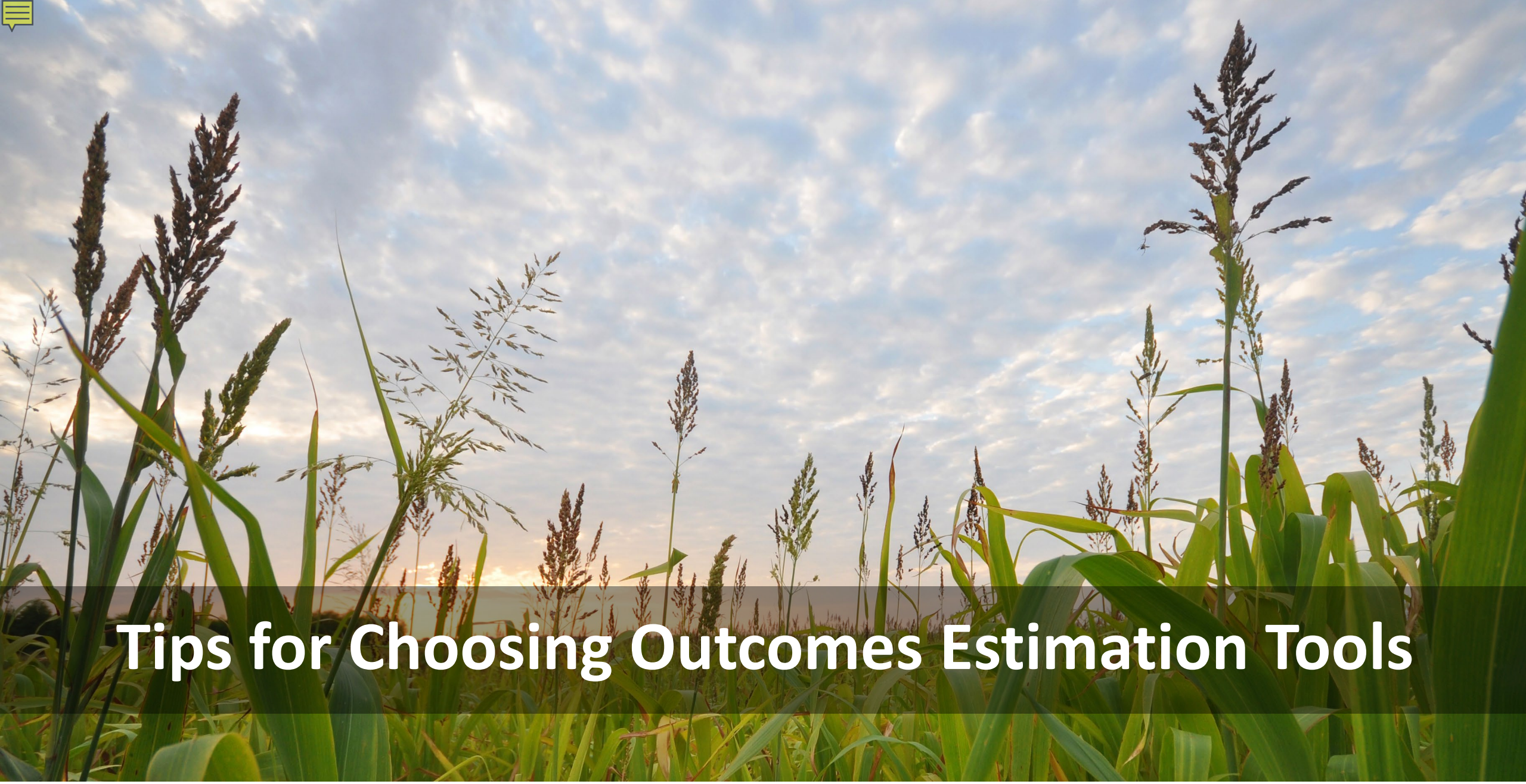
I. Evaluating Outreach Activities During Project Implementation

J. Collecting & Analyzing Data at the End

Excerpts of definition of social outcomes from 2011 SIPES Handbook

"Social outcomes are broadly defined as the social changes needed to bring about and sustain the environmental conditions you are trying to achieve in your project area." (Examples include:)

- **Increased awareness**
- **Changed attitudes**
- **Reduced constraints**
- **Increased capacity**
- **Increased adoption of practices**



Tips for Choosing Outcomes Estimation Tools

FIGURE 11. WHAT PURPOSE DID THE TOOL DEVELOPERS INITIALLY BUILD THE TOOL TO SATISFY?

Colored box location signifies the initial intended purpose (field-focused outcomes estimation versus project focused outcomes estimation) of the tool.

Initial Intended Scale

Field- or Farm-Focused Outcomes Estimation	Does Both	Project/County/Program/State Focused Outcomes Estimation
Cover Crops Economics		CAST (Chesapeake states)
Cropping Systems Calculator (Minnesota & Illinois)		ModelMW
R-SHEC		S.T.A.R. Method
		COMET-Planner
		SIPES Method / SIDMA Tool
COMET-Farm		
NTT		
Region 5		
	STEPL	
	FieldDoc (Chesapeake & Delaware watersheds + western Pennsylvania & Virgina)	
	PTMApp-Web (Minnesota & North Dakota)	

Requires External Summation

Potential Use at Additional Scale(s)

Documented Use at Additional Scale

LEGEND

Solid arrows indicate our review of projects using the tool at an additional scale.

Dotted arrows indicate our awareness that there may be projects using the tool in this capacity, but we have not yet found examples of this use to review.

Users must add up outcomes estimated outside of the tool to arrive at project scale outcomes.

Types of Tools

- Economic Tools
- Social Tools
- Greenhouse Gas Tools
- Water Quality Tools

American Farmland Trust

Tool Column with Live links

Getting In

Getting Started

Relative number of steps to estimate outcomes for cover crop adoption

TABLE 3. GETTING INTO THE TOOL, GETTING STARTED, AND GETTING TO THE FINISH LINE

	TOOL	GETTING IN (Gaining Access)	GETTING STARTED (Setting Up)	GETTING TO THE FINISH LINE (Steps Involved)
WATER QUALITY	**STEPL** (Pages 30–32)	Download the Excel tool	Collect non-ag & ag sources of pollutant loads & land uses from the tool's Data Input Server (or identify your own data inputs)	3
	Region 5 (Pages 32–34)	Download the Excel tool	Select state & county from dropdown boxes	2
	NTT (Pages 34–37)	Create a free account	Secure interview with farmer for field-specific production & conservation practice data to build "before" & "after" conservation scenarios	5
	ModelMW (Pages 38–39)	Create a free account	Zoom into the map & select watershed or outline the field	2
	PTMApp-Web (MN & ND) (Pages 40–42)	Create a free account, then wait for account approval		3
	(Pages 42–45)	Create a free account	Create scenario: Enter scenario name, geographic scale, location, BMP & cost profile from drop down menus	2
	FieldDoc (Chesapeake Bay & Delaware River Basins) (Pages 45–47)	Create a free account, then wait for account approval	Select your funder (If not a grantee, select "NFWF" or "CACBTF" & turn on privacy settings)	3
	S.T.A.R. Method (Page 47)	Download S.T.A.R. report & read the methodology	Collect baseline water quality data for your watershed(s) or county(ies) & practice reduction efficiency values	4
USE GAS	**COMET-Farm** (Pages 49–51)	Create a free account	Secure interview with farmer for the past 20 years of field-specific production & conservation practice data to build "before" and "after" conservation scenarios	5
			Select state & county from dropdown boxes	1
GREE	**Fieldprint Platform** (Page 53–56)	Create a free account	Secure interview with farmer for field-specific production & conservation practice data for the current crop year	4
SOCIAL	**SIPES Method** (Page 57–58)	Download and read the report	Proceed through the tool to develop and mail a survey for project farmers by accepting pre-developed survey questions, modifying them, or adding questions	1
	SIDMA (Page 58–60)	Create a free account, then wait for account approval		3
ONOMIC	**Cover Crops Economics Tool** (Page 63–64)	Download the Excel tool	Secure interview with farmer for field- or rotation-specific production & conservation practice data to build "before" & "after" conservation scenarios	4
	R-SHEC (Page 65–67)	Complete form to immediately gain download access		5
	(Page 68–70)	download access		4

LEGEND: A conceptual Likert scale representing the relative number of steps involved in achieving an estimate of outcomes associated with cover crop adoption

1 2 3 4 5

Very few steps — Very many steps

Do project staff and farmers have the time to gather and process data?

Do project staff have access to additional necessary data?

How experienced are project staff at using models and tools and in interpreting input and results data?

TABLE 3. GETTING INTO THE TOOL, GETTING STARTED, AND GETTING TO THE FINISH LINE

	TOOL	GETTING IN (Gaining Access)	GETTING STARTED (Setting Up)	GETTING TO THE FINISH LINE (Steps Involved)
WATER QUALITY	**STEPL** (Pages 30–32)	Download the Excel tool	Collect non-ag & ag sources of pollutant loads & land uses from the tool's Data Input Server (or identify your own data inputs)	1 2 **3** 4 5
	Region 5 (Pages 32–34)	Download the Excel tool	Select state & county from dropdown boxes	1 **2** 3 4 5
	NTT (Pages 34–37)	Create a free account	Secure interview with farmer for field-specific production & conservation practice data to build "before" & "after" conservation scenarios	1 2 3 4 **5**
	ModelMW (Pages 38–39)	Create a free account	Zoom into the map & select watershed or outline the field	1 **2** 3 4 5
	PTMApp-Web (MN & ND) (Pages 40–42)	Create a free account, then wait for account approval		1 2 **3** 4 5
	CAST (Chesapeake Bay) (Pages 42–45)	Create a free account	Create scenario: Enter scenario name, geographic scale, location, BMP & cost profile from drop down menus	1 **2** 3 4 5
	FieldDoc (Chesapeake Bay & Delaware River Basins) (Pages 45–47)	Create a free account, then wait for account approval	Select your funder (If not a grantee, select "NFWF" or "CACBTF" & turn on privacy settings)	1 2 **3** 4 5
	S.T.A.R. Method (Page 47)	Download S.T.A.R. report & read the methodology	Collect baseline water quality data for your watershed(s) or county(ies) & practice reduction efficiency values	1 2 3 **4** 5
GREENHOUSE GAS	**COMET-Farm** (Pages 49–51)	Create a free account	Secure interview with farmer for the past 20 years of field-specific production & conservation practice data to build "before" and "after" conservation scenarios	1 2 3 4 **5**
	COMET-Planner (Pages 51–52)	Immediate, online start	Select state & county from dropdown boxes	**1** 2 3 4 5
	Fieldprint Platform (Page 53–56)	Create a free account	Secure interview with farmer for field-specific production & conservation practice data for the current crop year	1 2 3 **4** 5
SOCIAL	**SIPES Method** (Page 57–58)	Download and read the report	Proceed through the tool to develop and mail a survey for project farmers by accepting pre-developed survey questions, modifying them, or adding questions	**1** 2 3 4 5
	SIDMA (Page 58–60)	Create a free account, then wait for account approval		1 2 **3** 4 5
ECONOMIC	**Cover Crops Economics Tool** (Page 63–64)	Download the Excel tool	Secure interview with farmer for field- or rotation-specific production & conservation practice data to build "before" & "after" conservation scenarios	1 2 3 **4** 5
	R-SHEC (Page 65–67)	Complete form to immediately gain download access		1 2 3 4 **5**
	CSC (MN & IL) (Page 68–70)	Complete form to immediately gain download access		1 2 3 **4** 5

LEGEND: A conceptual Likert scale representing the relative number of steps involved in achieving an estimate of outcomes associated with cover crop adoption

1 **2** **3** **4** **5**

Very few steps — Very many steps

	TOOL	GETTING IN (Gaining Access)	GETTING STARTED (Setting Up)	GETTING TO THE FINISH LINE (Steps Involved)
WATER QUALITY	**STEPL** (Pages 30–32)	Download the Excel tool	Collect non-ag & ag sources of pollutant loads & land uses from the tool's Data Input Server (or identify your own data inputs)	1 2 **3** 4 5
	Region 5 (Pages 32–34)	Download the Excel tool	Select state & county from dropdown boxes	1 **2** 3 4 5
	NTT (Pages 34–37)	Create a free account	Secure interview with farmer for field-specific production & conservation practice data to build "before" & "after" conservation scenarios	1 2 3 4 **5**
	ModelMW (Pages 38–39)	Create a free account	Zoom into the map & select watershed or outline the field	1 **2** 3 4 5
	PTMApp-Web (MN & ND) (Pages 40–42)	Create a free account, then wait for account approval		1 2 **3** 4 5
	CAST (Chesapeake Bay) (Pages 42–45)	Create a free account	Create scenario: Enter scenario name, geographic scale, location, BMP & cost profile from drop down menus	1 **2** 3 4 5
	FieldDoc (Chesapeake Bay & Delaware River Basins) (Pages 45–47)	Create a free account, then wait for account approval	Select your funder (If not a grantee, select "NFWF" or "CACBTF" & turn on privacy settings)	1 2 **3** 4 5

14 Featured Tool Write-ups

is using the three practices on. COMET-Farm tool estimates that Niemeyer's use of the three soil health practices have resulted in a 494% reduction in total GHG emissions corresponding to taking 17 cars off the road.

AFT conducted a summary analysis of all the featured farmers and found total greenhouse gas emission reductions for five of the six crop farms averaged 217% and was 28% for the two almond growers, which corresponds to taking between ¾ of a car to 17 cars off the road each year. AFT decided to publish the percent change figures rather than the baseline, reduction, or change in emissions in tonnes of CO_2-equivalent figures given the sensitivity surrounding individual farmer field estimates of GHG emissions.

F. SUPPORTING INFORMATION

Video tutorials are available at comet-farm.com/HelpPage and range from introductory presentations to in-depth instructions for assessing outcomes for differing types of agriculture. The most recent video was posted in 2020. There are many pdf tutorials, demonstration projects, an extensive FAQ page, and online support desk at cometfarm.freshdesk.com/support/home. Users can email questions or feedback to: appnrel@colostate.edu or directly through the helpdesk widget in the bottom right corner of the COMET-Farm page.

COMET-Farm was updated to version 2.43 in September, 2020, to include an updated soil N_2O method, improved model throughput and faster tool response, addition of the state of Hawaii, more available options for fertilizers and organic matter additions, and an improved animal agriculture module allowing modeling of multiple livestock herds over multiple years on a flexible baseline.

9. COMET-Planner

A. ABOUT THE TOOL

COMET-Planner is a quick and easy online planning tool that estimates GHG changes, at the county and state level, as associated with NRCS conservation practices applied to annual and woody perennial cropland and grazing lands. Launched in 2015, this tool is not intended for field-specific simulation (like COMET-Farm) but for broader planning purposes during project development to produce generalized estimates of project outcomes. It was developed by Colorado State University and NRCS with additional support from NGOs, private donors, and state agencies. This is a free tool available for use nationally. Further, the full dataset underlying the tool can now be downloaded as an Excel spreadsheet from the website.

B. SITE-SPECIFIC INPUTS AND BMP ANALYSIS OPTIONS

There are only four data entries made by the user in COMET-Planner. Users choose the state, county, and area (in acres) of their planned project and then choose a single practice or a combination of practices (also broken down by acres) to simulate implementation and estimate GHG emission reductions. The included conservation practices are those that have been identified to mitigate GHG emissions. In total, there are 35 NRCS conservation practices that fall under the five broader categories of:

- Cropland management;
- Grazing lands;
- Cropland to herbaceous cover;
- Woody plantings; and
- Restoration of disturbed lands.

In the most recent update of COMET-Planner, developers improved the practice combination flexibility, allowing users to choose from a variety of common combinations.

The site-specific modeling used to generate regional average estimates of GHG changes in COMET-Planner used several datasets to capture soil properties, weather, cropping systems, and typical agricultural management. Details on the specific datasets and how they were used can be found in the COMET-Planner Report (planner-prod-dot-comet-201514.appspot.com/static/media/COMET-Planner_Report_Final.3de20776.pdf), linked from the Help page on the tool website. The only data entered by users are the state, county, and area to which they would apply the conservation practice(s).

C. WHICH OUTCOMES ARE QUANTIFIED?

COMET-Planner presents GHG emissions as compared to the baseline scenario using an estimated range (minimum and maximum) for GHG changes and relies on the COMET-Farm modeling platform (i.e., the DayCent model and a suite of empirical models). The GHG outcomes estimated include CO_2, N_2O, CH_4, and total CO_2. Equivalent reduction estimates are all presented in metric tons of CO_2 equivalents annually. Negative estimates indicate that the "what if" scenario results in greater emission of CO_2 while positive estimates indicate a reduction of emissions. It is noted on the COMET-Planner site and in the accompanying report that "carbon dioxide reductions reported should be viewed as average values over a 20-year duration."

Results are presented in a simple tabular form, and the more detailed calculations can be displayed by choosing "Click to Show Detailed Emission Reductions." This provides greater detail in regard to the source or sink of C and N_2O, by providing the emission reduction coefficients of the chosen practice (or practices) on soil carbon, biomass carbon, fossil CO_2, biomass burning CO_2, biomass burning CH_4, liming, and soil N_2O, in tonnes CO_2 equivalent per acre per year. The maximum and minimum total emissions reduction estimates are also provided. Standard errors, representing modeled variability, are included in the downloadable Excel spreadsheet of results.

D. TOOL STRENGTHS AND LIMITATIONS

One of COMET-Planner's greatest strengths is also its limitation: with just a few clicks, the tool provides a very easy user experience to produce generalized GHG outcome estimates of conservation practices. However, for projects or farmers who want a site-specific estimate of GHG emissions and "what if" scenarios that capture their soils, management, and cropping history, the COMET-Farm will satisfy their need. Despite the easy user experience, CSU staff provide examples during their training videos of outcomes estimates generated by COMET-Farm and by COMET-Planner for the same baseline and "what if" scenarios that reveal similar results. See here for the training video: cometfarm.freshdesk.com/support/home.

A recent update to COMET-Planner improved the underlying models' spatial resolution of the CO_2 equivalents estimate. COMET-Planner is suitable for project planning and could also be used to provide project managers with quick and easy, generalized estimates of their project's GHG outcomes. Results and COMET-Planner datasets are both downloadable.

E. WHO'S USING THIS TOOL?

There is no information about projects that have used COMET-Planner on the tool's website, although the developers report that COMET-Planner is used within NRCS, state agencies, and resource conservation districts for conservation planning purposes to dialogue with farmers about the benefits of certain practices and to run "what if" scenarios. The developers also report that NGOs are using COMET-Planner to do broadscale analyses, and states are using it to design and administer soil health programs. For example, COMET-Planner was adapted to support the California Healthy Soils Program, providing estimates of GHG reductions of practices supported by program payments. All applicants to the program must complete an analysis in COMET-Planner and include their results in their application.

For example, in the 2020 California Healthy Soils Program solicitation by the California Department of Food and Agriculture, 578 applicants used the COMET-Planner Healthy Soils tool.

F. SUPPORTING INFORMATION

COMET-Planner was last updated in August 2020. There is a six-minute introductory video at the top of the home page that briefly gives an overview of the tool and walks users through its four steps. A 141-page companion report is accessible via the "help" link. The original version of the tool has been retired, but users may still access the original report, which contains all coefficients (based on meta-analyses and simple empirical models), from the Help page. Users with questions or feedback are encouraged to contact Amy.Swan@colostate.edu.

a. About the Tool

b. Site-specific Inputs & BMP Analysis Options

c. Which Outcomes Are Quantified?

d. Tool Strengths and Limitations

e. Who's Using This Tool?

f. Supporting Information

American Farmland Trust

9. COMET-Planner

a. About the Tool

- Who developed the tool, for what purpose, and at what scale does it operate (e.g., field, farm, county, watershed, project, state, etc.)?
- Does this tool directly or indirectly estimate project scale outcomes? If indirectly, what process should the user follow to estimate project scale outcomes?
- Who are the intended users—conservation project members, farmers, and farm advisors or persons with a modeling background?
- How is this tool made available? Is it free or is there a fee to use it?
- Where geographically can this tool be used? And for what land-use types?
- Is the tool meant to run "what if" scenarios with a farmer to explore potential, future outcomes of conservation practices that the farmer has been considering?

A. ABOUT THE TOOL

COMET-Planner is a quick and easy online planning tool that estimates GHG changes, at the county and state level, as associated with NRCS conservation practices applied to annual and woody perennial cropland and grazing lands. Launched in 2015, this tool is not intended for field-specific simulation (like COMET-Farm) but for broader planning purposes during project development to produce generalized estimates of project outcomes. It was developed by Colorado State University and NRCS with additional support from NGOs, private donors, and state agencies. This is a free tool available for use nationally. Further, the full dataset underlying the tool can now be downloaded as an Excel spreadsheet from the website.

9. COMET-Planner

B. SITE-SPECIFIC INPUTS AND BMP ANALYSIS OPTIONS

There are only four data entries made by the user in COMET-Planner. Users choose the state, county, and area (in acres) of their planned project and then choose a single practice or a combination of practices (also broken down by acres) to simulate implementation and estimate GHG emission reductions. The included conservation practices are those that have been identified to mitigate GHG emissions. In total, there

are 35 NRCS conservation practices that fall under the five broader categories of:

- Cropland management;
- Grazing lands;
- Cropland to herbaceous cover;
- Woody plantings; and
- Restoration of disturbed lands.

In the most recent update of COMET-Planner, developers improved the practice combination flexibility, allowing users to choose from a variety of common combinations.

The site-specific modeling used to generate regional average estimates of GHG changes in COMET-Planner used several datasets to capture soil properties, weather, cropping systems, and typical agricultural management. Details on the specific datasets and how they were used can be found in the COMET-Planner Report (planner-prod-dot-comet-201514.appspot.com/static/media/COMET-Planner_Report_Final.3de20776.pdf), linked from the Help page on the tool website. The only data entered by users are the state, county, and area to which they would apply the conservation practice(s).

b. Site-specific Inputs & BMP Analysis Options

- What underlying model is this tool built upon? What types of data and datasets does it use? How does it work?
- Does this tool require significant data input by users? Is the required information readily available to all users?
- Which conservation practices can the tool estimate the environmental, social, or economic outcomes for?

9. COMET-Planner

c. Which Outcomes Are Quantified?

- What water quality and climate change resource concerns can the tool estimate? In what units of measurement?
- Is the quantification focused on estimating the field- or farm-scale outcomes of conservation practices adopted by an individual farmer or landowner? Or is the quantification focused on estimating the cumulative outcomes of practice adoption by multiple participants in the project, which may be delineated by watershed, county, state, or other boundaries?
- Does this tool quantify outcomes with a high degree of specificity or as a generalized estimate? A highly specific estimate of outcomes might reflect field-specific data such as farmer production and conservation data inputted into the tool, as well as site-specific data, such as soil type, weather, and slope. A generalized estimate of outcomes might reflect watershed-scale or county-scale data recognized by the tool.
- Does the tool provide confidence intervals reflecting the possible range of values that most likely contains the true value?
- How are results presented to the user–in a table or are graphs also provided?

C. WHICH OUTCOMES ARE QUANTIFIED?

COMET-Planner presents GHG emissions as compared to the baseline scenario using an estimated range (minimum and maximum) for GHG changes and relies on the COMET-Farm modeling platform (i.e., the DayCent model and a suite of empirical models). The GHG outcomes estimated include CO_2, N_2O, CH_4, and total CO_2. Equivalent reduction estimates are all presented in metric tons of CO_2 equivalents annually. Negative estimates indicate that the "what if" scenario results in greater emission of CO_2 while positive estimates indicate a reduction of emissions. It is noted on the COMET-Planner site and in the accompanying report that "carbon dioxide reductions reported should be viewed as average values over a 20-year duration."

Results are presented in a simple tabular form, and the more detailed calculations can be displayed by choosing "Click to Show Detailed Emission Reductions." This provides greater detail in regard to the source or sink of C and N_2O, by providing the emission reduction coefficients of the chosen practice (or practices) on soil carbon, biomass carbon, fossil CO_2, biomass burning CO_2, biomass burning CH_4, liming, and soil N_2O, in tonnes CO_2 equivalent per acre per year. The maximum and minimum total emissions reduction estimates are also provided. Standard errors, representing modeled variability, are included in the downloadable Excel spreadsheet of results.

9. COMET-Planner

D. TOOL STRENGTHS AND LIMITATIONS

One of COMET-Planner's greatest strengths is also its limitation: with just a few clicks, the tool provides a very easy user experience to produce generalized GHG outcome estimates of conservation practices. However, for projects or farmers who want a site-specific estimate of GHG emissions and "what if" scenarios that capture their soils, management, and cropping history, the COMET-Farm will satisfy their need. Despite the easy user experience, CSU staff provide examples during their training videos of outcomes estimates generated by COMET-Farm and by COMET-Planner for the same baseline and "what if" scenarios that reveal similar results. See here for the training video: cometfarm.freshdesk.com/support/home.

A recent update to COMET-Planner improved the underlying models' spatial resolution of the CO_2 equivalents estimate. COMET-Planner is suitable for project planning and could also be used to provide project managers with quick and easy, generalized estimates of their project's GHG outcomes. Results and COMET-Planner datasets are both downloadable.

d. Tool Strengths and Limitations

- What are the pros and cons of the tool?
- Does it have GIS (i.e., mapping) features?
- Can data and results be downloaded for further analysis or to generate report graphs and tables?
- Has the tool been verified in a peer-reviewed journal or undergone some other form of thorough review?

9. COMET-Planner

E. WHO'S USING THIS TOOL?

There is no information about projects that have used COMET-Planner on the tool's website, although the developers report that COMET-Planner is used within NRCS, state agencies, and resource conservation districts for conservation planning purposes to dialogue with farmers about the benefits of certain practices and to run "what if" scenarios. The developers also report that NGOs are using COMET-Planner to do broadscale analyses, and states are using it to design and administer soil health programs. For example, COMET-Planner was adapted to support the California Healthy Soils Program, providing estimates of GHG reductions of practices supported by program payments. All applicants to the program must complete an analysis in COMET-Planner and include their results in their application.

For example, in the 2020 California Healthy Soils Program solicitation by the California Department of Food and Agriculture, 578 applicants used the COMET-Planner Healthy Soils tool.

e. Who's Using This Tool?

- Which project leaders have used or are using this tool?
- What outcomes have been quantified for which practices adopted by how many farmers?
- Is there evidence that the tool has helped project managers increase conservation practice adoption?

9. COMET-Planner

f. Supporting Information

- What background or training materials are provided to aid use of the tool?
- Do users need to create an account?
- Is there a point of contact for the tool for users to interact with for trouble-shooting questions?
- When was the latest version of this tool released?

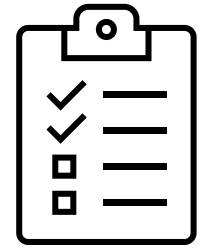
F. SUPPORTING INFORMATION

COMET-Planner was last updated in August 2020. There is a six-minute introductory video at the top of the home page that briefly gives an overview of the tool and walks users through its four steps. A 141-page companion report is accessible via the "help" link. The original version of the tool has been retired, but users may still access the original report, which contains all coefficients (based on meta-analyses and simple empirical models), from the Help page. Users with questions or feedback are encouraged to contact Amy.Swan@colostate.edu.

American Farmland Trust

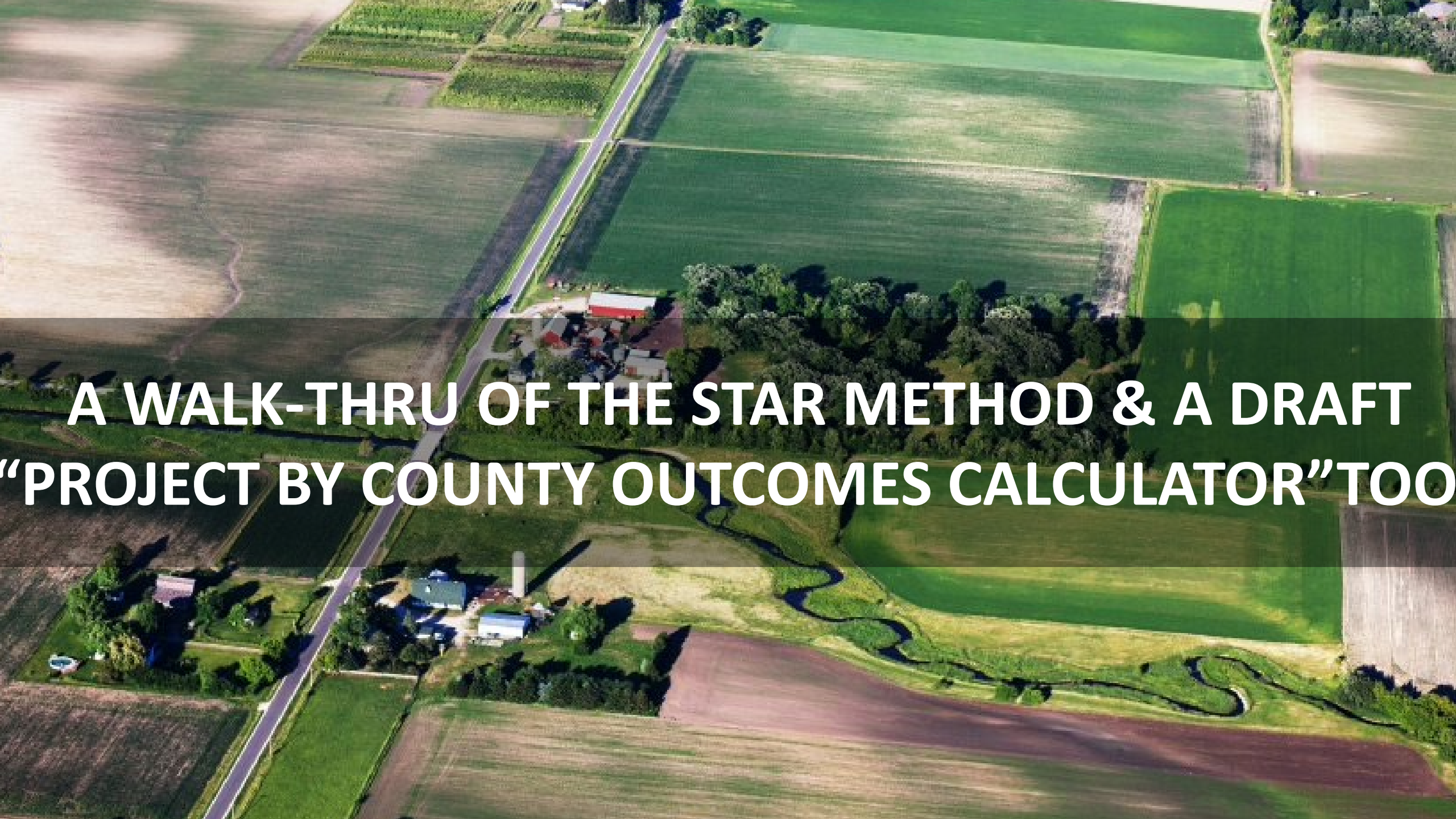
Next steps in our outcomes quantification journey

- ❑ Join the next set of tools training webinars the first Wednesday of each month – or check the recordings the following Monday
- ❑ Fill out a 7-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:
mperez@farmland.org

American Farmland Trust



A WALK-THRU OF THE STAR METHOD & A DRAFT "PROJECT BY COUNTY OUTCOMES CALCULATOR"TOO

About Jean Brokish

- AFT Midwest Deputy Director
- Grew up on Wisconsin Dairy Farm
- BS in Agronomy; MS in Soil Science
- Agricultural career has included living / working in Wisconsin, Indiana, Ohio, Lesotho (Africa), Michigan, Hawai'i, New York, and Illinois

American Farmland Trust

Outcomes Estimation Tools
~ In Action ~

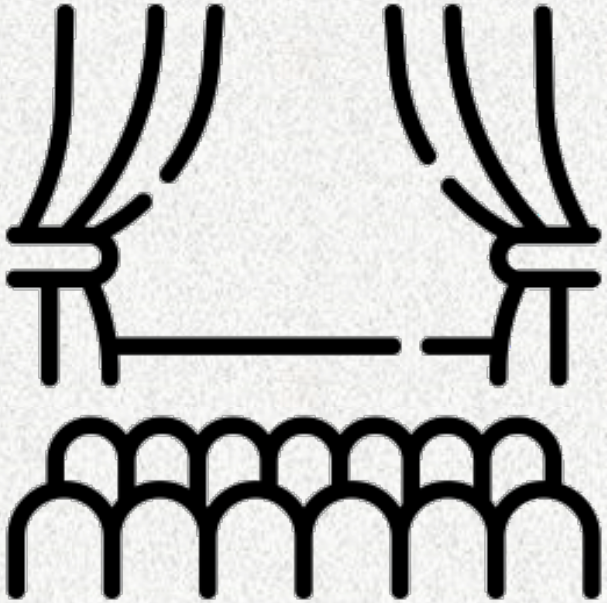
Project by County Outcomes Calculator




American Farmland Trust

Goal

Transform practices into water quality and climate outcomes



Today is the Premier Showing

- ACT I – Origin
- ACT II – Data
  - Assembly
  - Analysis
- ACT III – Transformation
- ACT IV – Demonstration

Origin: STAR Method

- Back of the envelope calculation
- Project scale water quality and climate outcomes

FIGURE 12. THE S.T.A.R. METHOD

In addition to the quantification tools we have featured, there is a back-of-the-envelope method developed by AFT as an option for a coarse yet reasonable approach to quantifying project-scale water quality and climate outcomes, which may be modifiable for application to projects. Originally developed to quantify our Illinois Upper Macoupin Creek RCPP project outcomes, our Midwest Science Director Dr. Emily Bruner further developed this methodology to quantify the outcomes associated with practice adoption tracked by the statewide Illinois Saving Tomorrow's Agriculture Resources (S.T.A.R.) Initiative.

This method can easily be applied at the project scale (defined by either county or watershed boundaries) to estimate outcomes and "provide an estimate of practice level performance" (S.T.A.R., 2020). The S.T.A.R method uses total acres enrolled in the program; GHG reductions using COMET-Planner; BMP efficiencies from the Illinois Nutrient Loss Reduction Strategy; Illinois HUC8 nonpoint source (NPS) nutrient loading data; HUC8 and county boundaries using geospatial data; 2017 Census of Agriculture information; and the average annual sediment load per county to calculate nutrient and sediment load reductions.

While this method may be less sophisticated than site-specific, online dynamic modeling tools, it does incorporate recent regionally specific and watershed and county-level NPS data. Thus, it may provide a realistic picture of what is going on across the landscape. It should be pointed out that before project leaders can use this method, they must first ascertain whether the county or watershed level baseline nutrient and sediment loss information and reduction efficiencies for conservation practices are available.

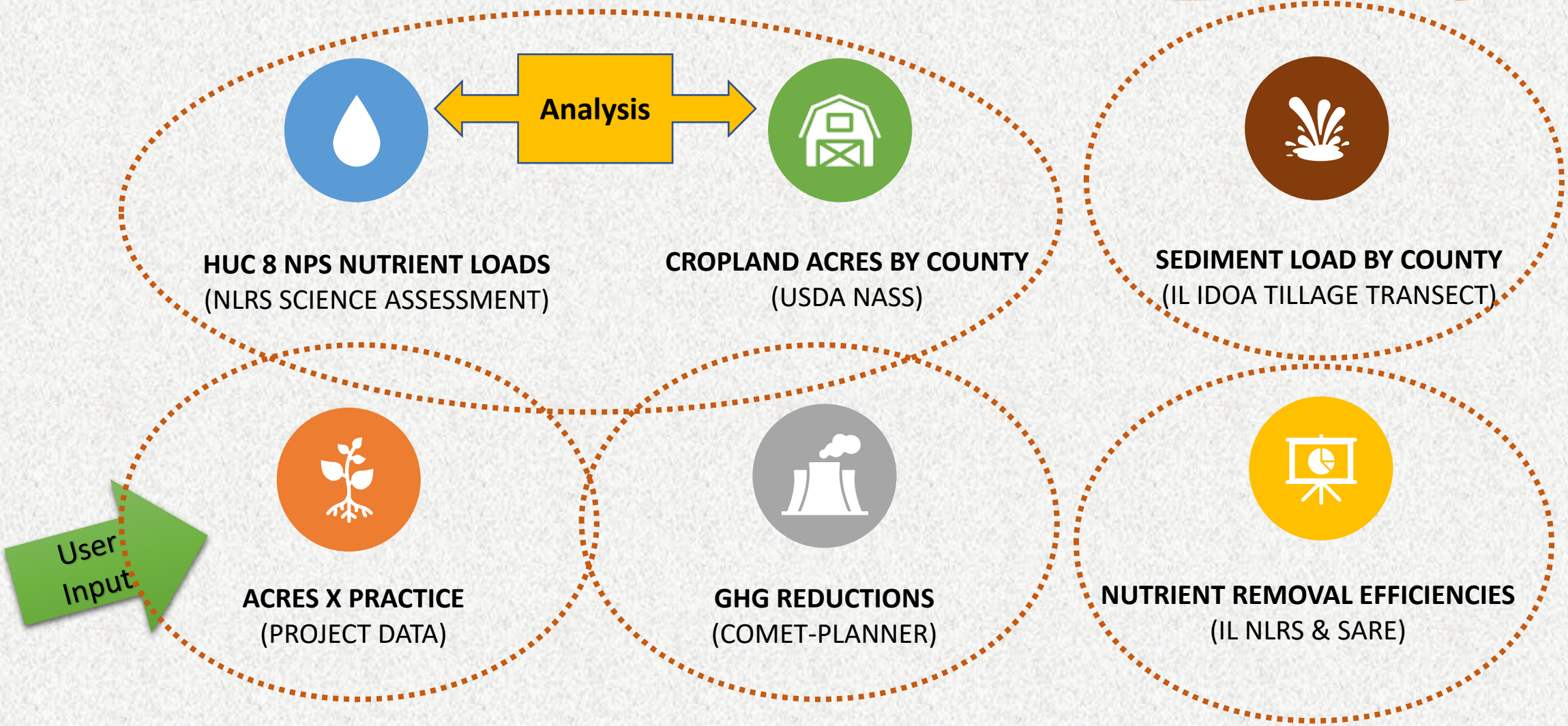
The S.T.A.R. Method is published in the report listed below (on pages 13–15):

S.T.A.R. (2020). *S.T.A.R. Annual Report. Crop Year 2019. Improving Conservation One Field At A Time.* Saving Tomorrow's Agriculture Resources. img1.wsimg.com/blobby/go/45c3f789-47fb-40df-9bb7-3dc4d7bf6c2f/downloads/Star%20report%20FINAL%202020.pdf?ver=1597671964705

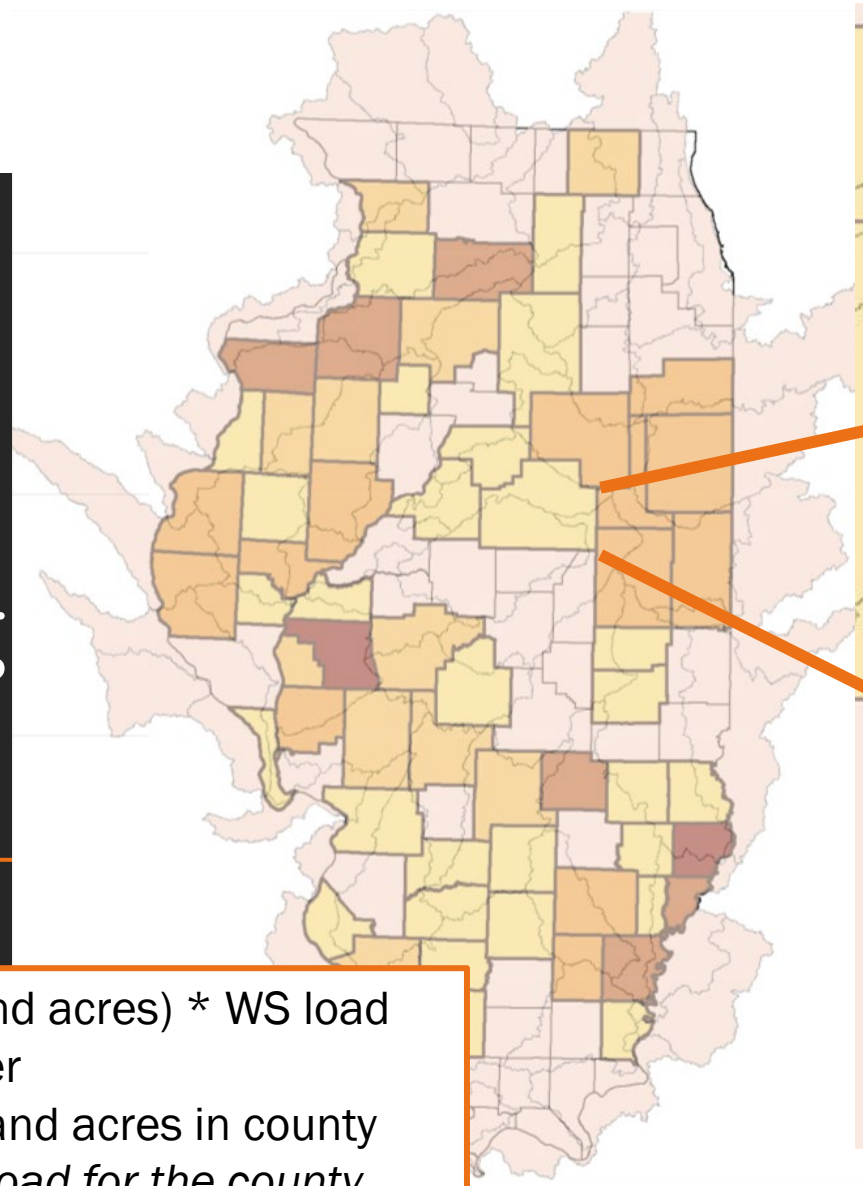
Disclosure Statement

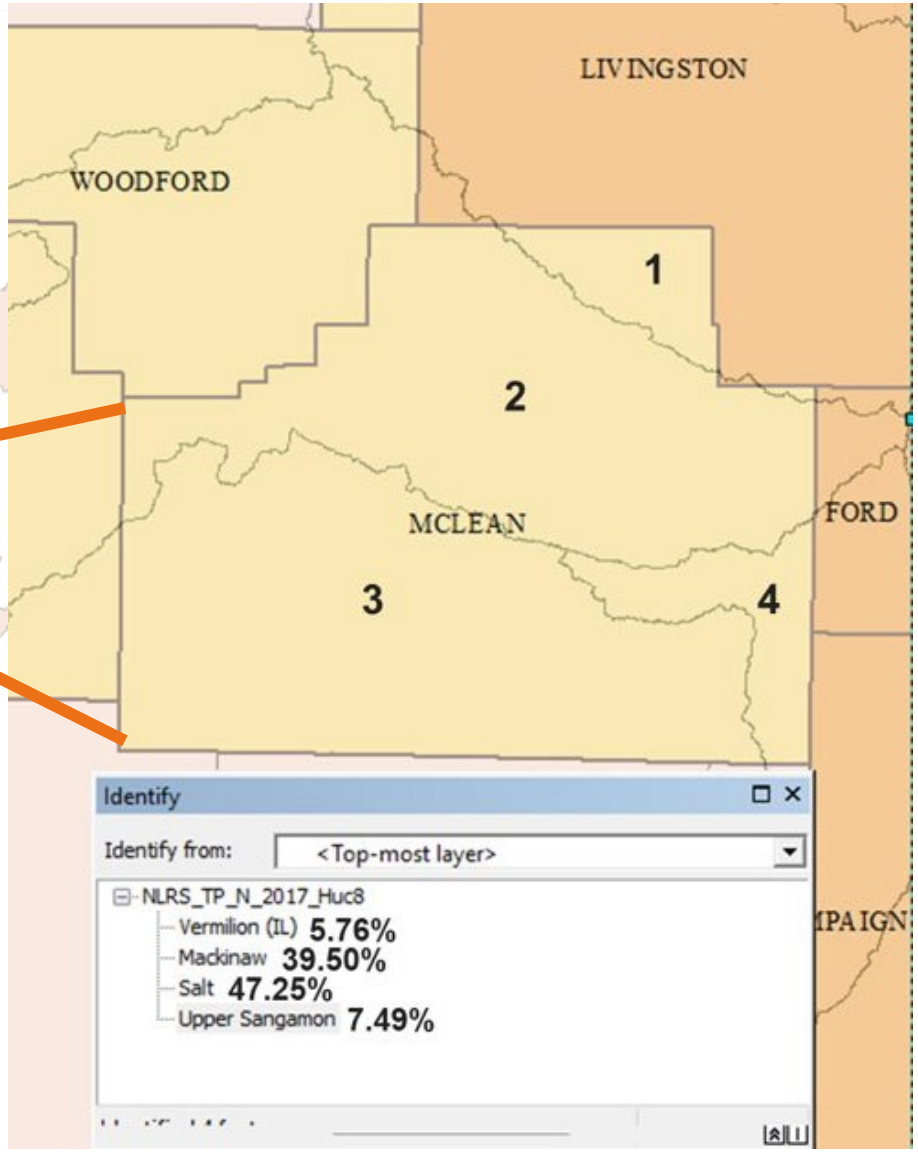
STRENGTHS	LIMITATIONS
Simple Math	Too simple?
Most of the data input is publicly available	Overestimates reductions for “stacked” practices
Expandable (subject to accessing data) - Base loads, reduction coefficients	Limited number of practices

Data Input


Analysis
HUC 8 NPS NUTRIENT LOADS
(NLRS SCIENCE ASSESSMENT)
CROPLAND ACRES BY COUNTY
(USDA NASS)
SEDIMENT LOAD BY COUNTY
(IL IDOA TILLAGE TRANSECT)
User Input
ACRES X PRACTICE
(PROJECT DATA)
GHG REDUCTIONS
(COMET-PLANNER)
NUTRIENT REMOVAL EFFICIENCIES
(IL NLRS & SARE)

Rescaling from HUC8 to county level loading estimates



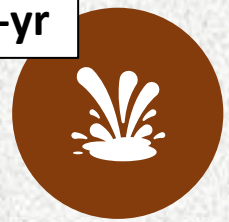


1. (Percent WS * cropland acres) * WS load
2. Summed it all together
3. Divided by total cropland acres in county
   >> *average per acre load for the county*

Data Application – Alexander County

N = 2.41 lbs / A-yr
P = 0.67 lbs / A-yr

4.93 tons / A-yr



HUC 8 NPS NUTRIENT LOADS
(NLRS SCIENCE ASSESSMENT)

CROPLAND ACRES BY COUNTY
(USDA NASS)

SEDIMENT LOAD BY COUNTY
(IL IDOA TILLAGE TRANSECT)

1200 acres cover crops

0.42 MT CO2e / A-yr

N redux = 0.3
P redux = 0.3
Sed redux = 0.4

ACRES X PRACTICE
(PROJECT DATA)

GHG REDUCTIONS
(COMET-PLANNER)

NUTRIENT REMOVAL EFFICIENCIES
(IL NLRS & SARE)

CALCULATIONS

Nitrate Nitrogen

2.41 lbs N loss/ac-yr * 1,200 acres of cover crops * 30% reduction efficiency

868 lbs of NO3-N reduced

CALCULATIONS

Nitrate Nitrogen	2.41 lbs N loss/ac-yr * 1,200 acres of cover crops ***** 30% reduction efficiency **868 lbs of NO3-N reduced**
Total Phosphorus	0.67 lbs P loss/ac-yr * 1,200 acres of cover crops * 30% reduction efficiency **241 lbs of TP reduced**

CALCULATIONS

Nitrate Nitrogen	2.41 lbs N loss/ac-yr * 1,200 acres of cover crops ***** 30% reduction efficiency **868 lbs of NO3-N reduced**
Total Phosphorus	0.67 lbs P loss/ac-yr * 1,200 acres of cover crops * 30% reduction efficiency **241 lbs of TP reduced**
Sediment	4.93 tons SED loss/ac-yr * 1,200 acres of cover crops * 40% reduction efficiency **2,366 tons of sediment reduced**

CALCULATIONS

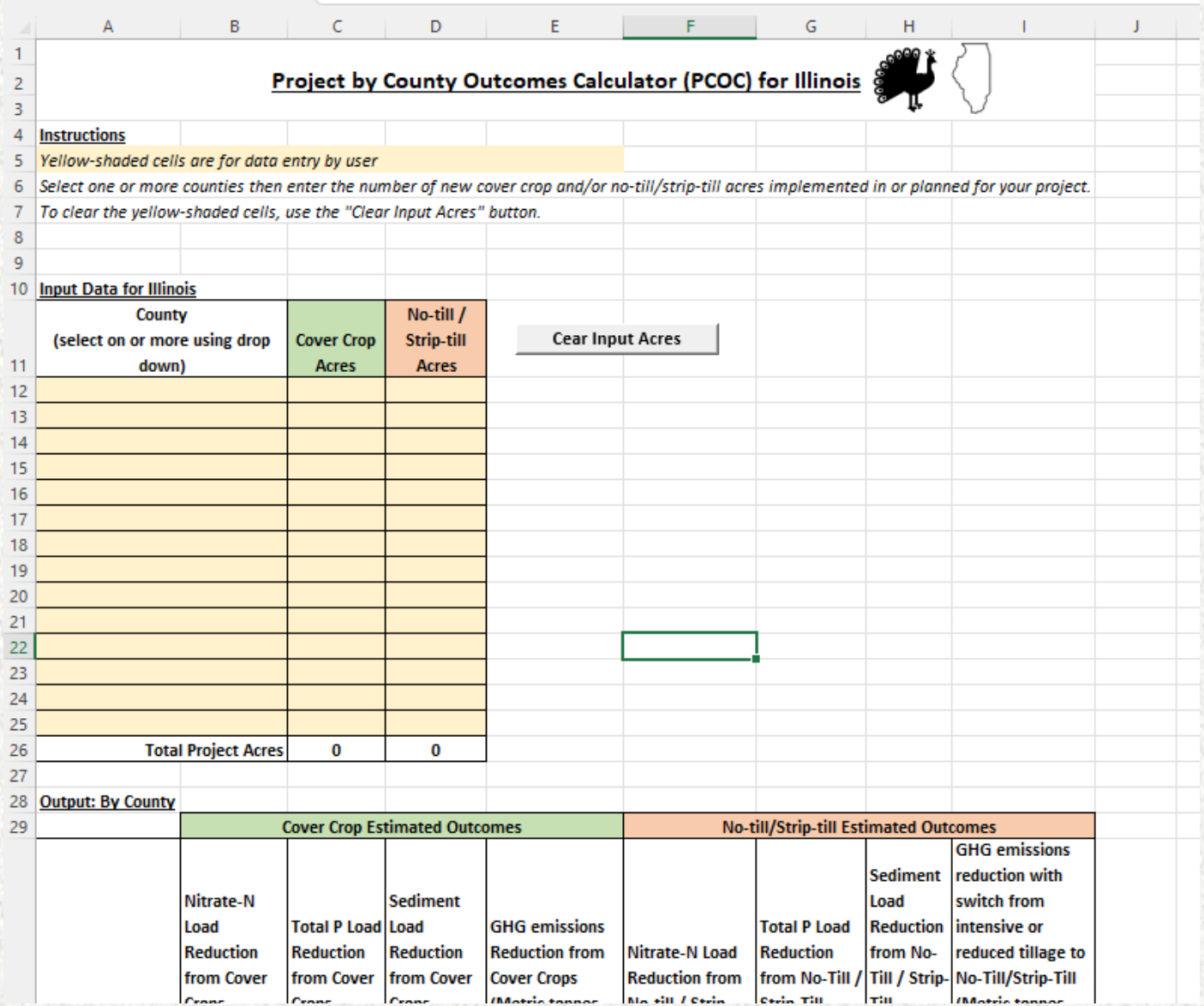
Nitrate Nitrogen	2.41 lbs N loss/ac-yr * 1,200 acres of cover crops ***** 30% reduction efficiency **868 lbs of NO3-N reduced**
Total Phosphorus	0.67 lbs P loss/ac-yr * 1,200 acres of cover crops * 30% reduction efficiency **241 lbs of TP reduced**
Sediment	4.93 tons SED loss/ac-yr * 1,200 acres of cover crops * 40% reduction efficiency **2,366 tons of sediment reduced**
Greenhouse Gas	1,200 acres of cover crops * 0.42 MT CO2e/ac-yr reduction **504 MT CO2e reduced**

Data Integration

CALCULATIONS	
Nitrate Nitrogen	2.41 lbs N loss/ac-yr * 1,200 acres of cover crops * 30% reduction efficiency 868 lbs of NO3-N reduced
Total Phosphorus	0.67 lbs P loss/ac-yr * 1,200 acres of cover crops * 30% reduction efficiency 241 lbs of TP reduced
Sediment	4.93 tons SED loss/ac-yr * 1,200 acres of cover crops * 40% reduction efficiency 2,366 tons of sediment reduced
Greenhouse Gas	1,200 acres of cover crops * 0.42 MT CO2e/ac-yr reduction 504 MT CO2e reduced

PCOC OVERVIEW

- Excel-based
- Plug-&-chug
- User Inputs
  - County
  - Practice Quantity



Project by County Outcomes Calculator (PCOC) for Illinois

Instructions

Yellow-shaded cells are for data entry by user

Select one or more counties then enter the number of new cover crop and/or no-till/strip-till acres implemented in or planned for your project.

To clear the yellow-shaded cells, use the "Clear Input Acres" button.

Input Data for Illinois

County (select on or more using drop down)	Cover Crop Acres	No-till / Strip-till Acres
Total Project Acres	0	0

Cear Input Acres

Output: By County

	Cover Crop Estimated Outcomes				No-till/Strip-till Estimated Outcomes			
	Nitrate-N Load Reduction from Cover Crops	Total P Load Reduction from Cover Crops	Sediment Load Reduction from Cover Crops	GHG emissions Reduction from Cover Crops (Metric tonnes	Nitrate-N Load Reduction from No-till / Strip	Total P Load Reduction from No-Till / Strip-Till	Sediment Load Reduction from No-Till / Strip-Till	GHG emissions reduction with switch from intensive or reduced tillage to No-Till/Strip-Till (Metric tonnes

Questions to Ask Yourself

- Would I use this tool?
- For what other practices would I be interested in estimating outcomes?
  - Current: No-till and Cover Crops
  - Nutrient management, buffers, legume v non-legume covers
- Am I interested in taking it for a test run?
- Would a corresponding PWOC be useful to me and my projects?
  - PWOC = Project by Watershed Outcomes Calculator

If not in Illinois:

- Is the baseline data available in my state?
  - Nutrient loads & sediment loss & reduction efficiency for practices
- Am I interested (and willing!) to work with AFT to locate data?
  - Email: jbrokish@farmland.org

Production Team

Project by County Outcomes Calculator

Bonnie McGill, PhD
Senior Climate and Soil Health Scientist

Michelle Perez, PhD
Water Initiative Director

Ellen Yeatman
Ag Economist & Water Research Manager

Jean Brokish
Midwest Deputy Director

American Farmland Trust

American Farmland Trust