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2021-2025 Conquering Cover Crops Coast-to-Coast National On-Farm Demonstration Trial: Social Science Data Results & Lessons Learned

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Field day event at Kentucky on-farm demonstration trial farm in 2024 (Photo credit: Mistv Phillips)

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Executive Summary

This report presents a comprehensive social science analysis of a five-year on-farm demonstration trial conducted by American Farmland Trust (AFT) from 2021 to 2025. The project, titled "Conquering Cover Crop Challenges from Coast-to-Coast," evaluated the effects of cover crop implementation on soil health, economic, and social indicators. We aimed to address barriers to cover crop adoption across a diversity of U.S. cropping systems and ecosystems that are technical, economic, and social in nature. Technical barriers include species selection, timing, nutrient and water management, and economic barriers include funding new practice expenses and minimizing cash crop yield impacts during the transition. While various social barriers include the need for supportive networks that allow for information exchange among farmers and other supportive community members to facilitate the adoption transition. The trial network supported 15 farmers across California, Kentucky, Connecticut, Massachusetts, and New York to experiment with innovative cover crop practices, sometimes combined with no-till, nutrient management, or compost application. Support included an annual stipend, technical assistance, emergency funds for significant negative yield impacts, educational gatherings (field days and workshops), soil and economic data collection, and annual reports. The trials were co-designed with farmers to reflect their unique needs and cropping systems, resulting in diverse trial layouts and controls, including both no cover crop and business-as-usual cover crop controls.

The social science component involved multi-faceted data collection tools to assess how this demonstration trial impacted key social indicators, including changes in knowledge, attitude, and behavior. We conducted social indicator surveys of the 15 participating farmers in Years 1, 3, and 5 of the project; virtual focus groups with the participating farmers in the final year; virtual internal AFT staff focus groups in Years 1, 3, and 5; and field day exit surveys at nine public field days hosted throughout the project. Qualitative and quantitative data were triangulated to provide insights into the social impacts of program participation.

Our results found that participants valued the long-term nature of the program, the opportunity for peer learning, and recognized the critical role of timely planting and termination of cover crops. They acknowledged that cover crop benefits require multi-year observation and expressed openness to alternative methods and continuous improvement. The project demonstrated that even early-adopter farmers benefit from on-farm demonstration trials through improved attitudes, knowledge, and capacity regarding cover crops. Knowledge exchange between staff and farmers was a critical benefit of the project. While the five-year timeframe limited measurable soil and economic outcomes, social indicators suggest strong farmer commitment to continuing and innovating with their cover crop practices. Future programs should consider longer durations and strategies to include a broader range of farmers (e.g., new adopters and producers who face barriers to assistance access) and to increase the likelihood of capturing changes in the soil and economic data results.

I. Project Overview

American Farmland Trust (AFT) conducted a five-year On-Farm Conservation Innovation Trial Conservation Innovation Grant (CIG) project (2021-2025) addressing the effects of cover crop implementation on soil health, economic, and social indicators titled, "Conquering Cover Crop Challenges from Coast-to-Coast." AFT developed this program to address the low national cover crop adoption rate by supporting, evaluating, and showcasing farmer-driven transitions to improving soil health through the adoption of cover crops or modification of cover crop management. Economic, soil, and social data were collected annually.

Cover crops fulfill the soil health principles defined by the Natural Resources Conservation Service (NRCS), which include maximizing soil cover, maximizing living roots, maximizing biodiversity, and minimizing disturbance. When added to an annual cropping system, cover crops provide soil cover and add living roots during what would otherwise be a bare fallow period. Cover crops also add biodiversity by adding a new crop species to a rotation and supporting soil organism diversity. Cover crops, when managed with reduced tillage and low-disturbance planting and termination methods, may indirectly reduce soil disturbance by reducing weed pressure. Yet barriers remain to the adoption of cover crops across the country. These barriers include selecting the right cover crop species, timing of cover crop establishment and termination in short and changing growing seasons, managing plant-available nutrients and soil-water, and minimizing cash crop yield impacts. This project addressed those barriers through technical and financial assistance and data collection to better understand and evaluate those barriers to adopting cover crops.

For this on-farm demonstration trial, AFT worked closely with 15 farmers across the country to implement a variety of innovative cover crop practices that addressed the specific needs and curiosities of these farmers. This trial included either adding cover crops alone or in combination with no-till, nutrient management, or compost application. In some cases, the producers wanted to test unique cover crop termination strategies. Each trial design addresses individual and regional barriers in the four states in this project (CA, KY, CT, MA, NY) as shown in Figure 1. Every year, AFT and the farmers compared management and soil test results between business-as-usual control and one or two treatment fields or plots. Each farmer received annual reports summarizing the soil and economic results.

Because the demonstration trials are on working farms, farmers had to adjust management and, at times, even treatments to support production and their farm business. We worked with farmers to troubleshoot, adapt, and compensate for losses using a flexible program model. We offered a net loss guarantee payment that paid farmers for any catastrophic yield losses. Seven farmers agreed to be featured in case studies (published on AFT's website) presenting their aggregate soil and economic results. The purpose of this report is to share our results and lessons learned from social surveys and focus groups.

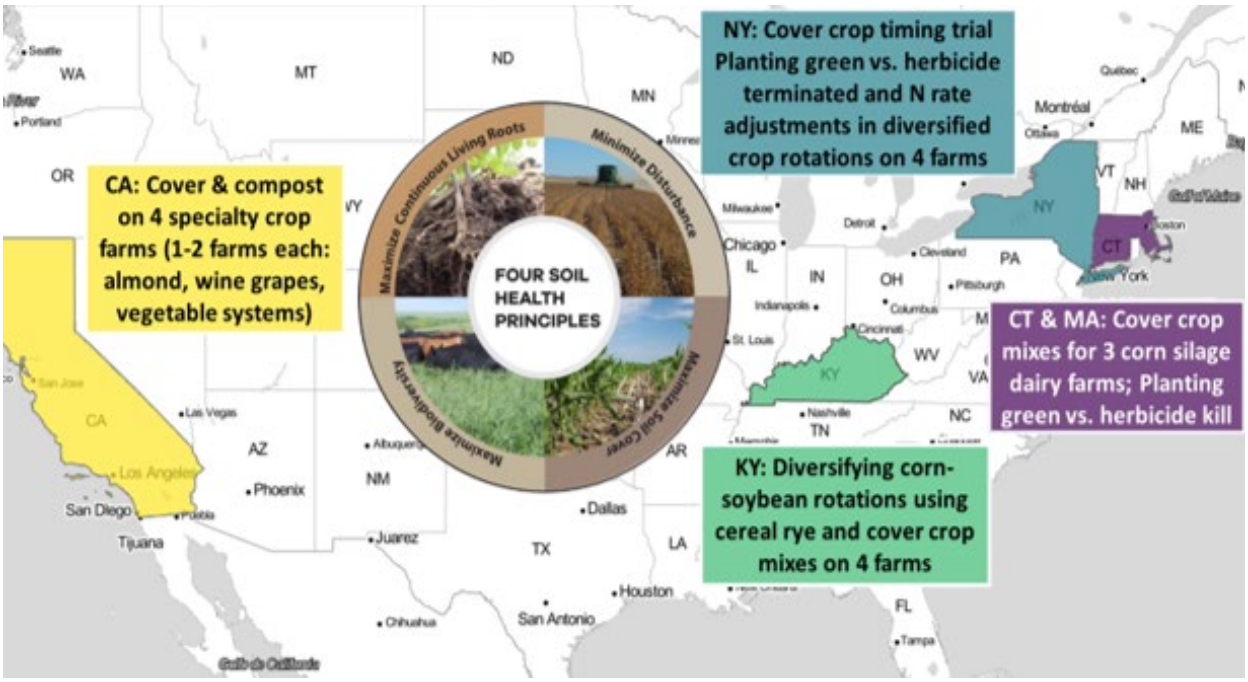

Figure 1. *American Farmland Trust map of on-farm demonstration trial showing farm locations and trial design overview (Map source: Google Maps)*

II. Social Science Data Collection Background & Methods

A critical and unique piece of the CIG On-Farm Conservation Innovation Trials is for awardees to evaluate not only the environmental and financial impacts of implementing innovative approaches, but also the social impacts. We developed a multi-faceted approach to capture social data that includes both quantitative and qualitative data to answer the following **social science research questions:**

- **How has participation in this program affected (or been affected by) farmer characteristics, awareness, attitudes, constraints, capacity, and knowledge related to the adoption of cover crops or different cover crop management strategies?**
- **How has participation in this project influenced their willingness to continue practice implementation after the project and practice payments end?**
- **How have field day events encouraged other area "soil health curious" farmers to adopt similar practices?**
- **What project administration lessons were learned by AFT staff?**

We implemented the following data collection tools to answer these questions:

1) **Social indicator & program evaluation surveys of the participating farmers** (Years 1, 3, and 5) to track changes in key indicators over time alongside program evaluation. See Appendix A for a copy of the surveys.

2) **Virtual focus group with the participating farmers** (Year 5) to gain additional qualitative insights from participants**.** See Appendix B for a copy of the farmer focus group guiding questions.
3) **Internal virtual focus groups with AFT staff** (Years 1, 3, and 5) to allow for iterative program evaluation and improvements over time**.** See Appendix C for a copy of the internal focus group guiding questions.
4) **Field day exit surveys** (Years 2, 3, and 4) were deployed for events hosted at the participating farms to capture feedback from attendees. See Appendix D for a copy of the field day exit survey.

Our social science team triangulated qualitative data from the focus groups and open-ended survey questions with the quantitative survey data from participating farmers and field day attendees. This rich triangulation of data provides a nuanced ability to explore and better answer these questions.

III. Who are these Participating Farmers?

To better understand the social results and lessons learned in implementation, a foundational understanding of our participating farmers is needed first. Table 1 provides a breakdown of each participating farmers' location, cropping system, trial layout, and trial design.

As shown in Table 1, eight of the 15 trials tested a control without a cover crop. For the other seven trials, the control reflects business-as-usual cover crop operations, **as many of these farmers had previous experience with cover crops to some degree** (as shown in Figure 2). In some cases, those trials with a no cover crop control did not necessarily reflect business-as-usual, meaning the farmer was cover-cropping to a certain degree already, but they wanted to have a "no cover crop" control. The variation in trial designs resulted from co-creating trials with each host farmer to ensure they addressed their individual cover crop management questions and aligned with the production systems. **With that flexibility and diversity in trial design, we sacrificed comparability between farms.** On the other hand, this diversity adds depth to our social data analysis when similarities are identified despite these differences.

Photo 1. *Cover crop residue comparison between control and two treatments (shown left to right, respectively) on a Massachusetts farm trial (photo credit: Caro Roszell).*

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Table 1. *Overview of demonstration trials by state, including cropping system and trial design.*

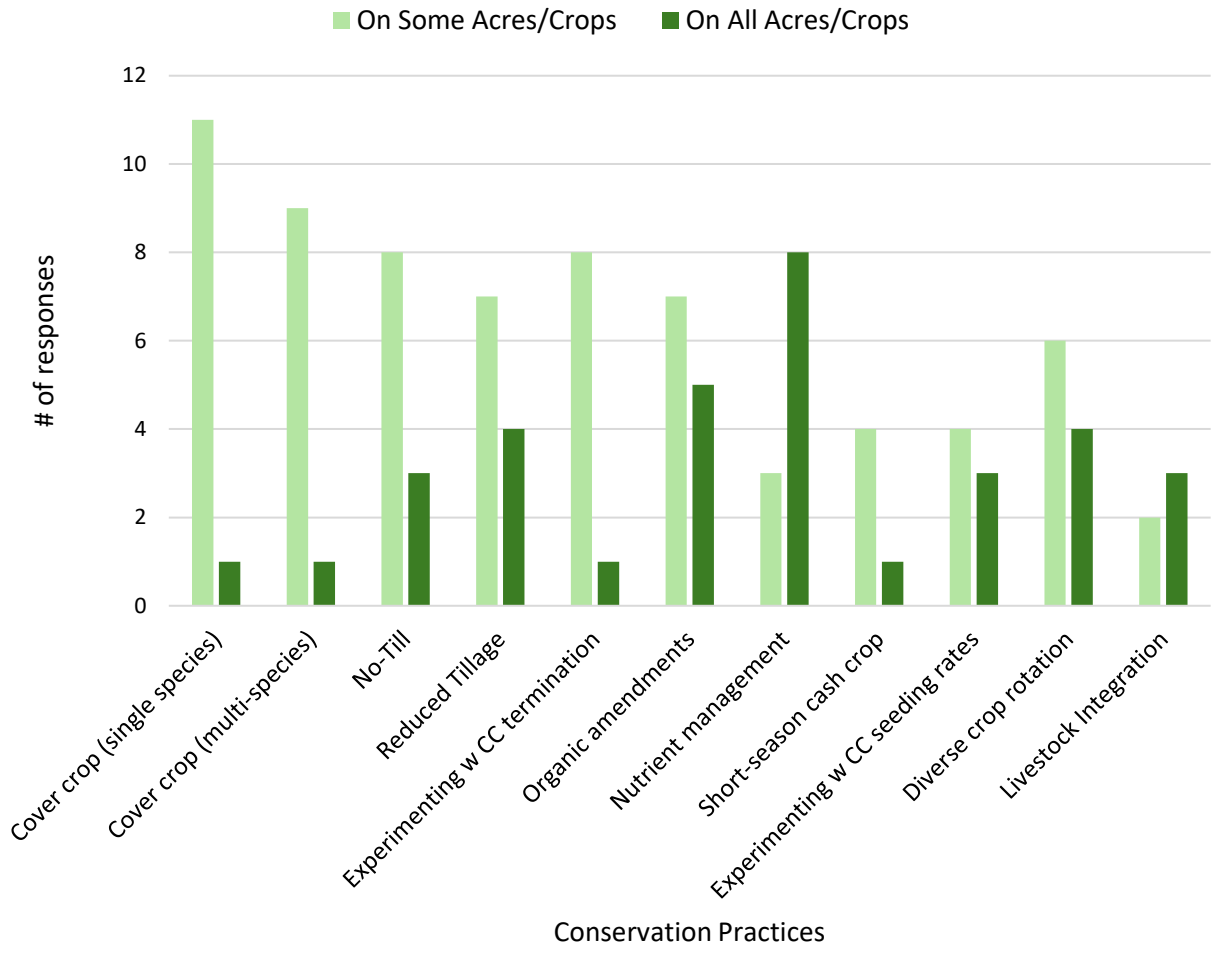
State	Crop(s)	Trial layout*	Control	Treatment A	Treatment B (optional)
CA	Tomatoes-sunflowers-cucumbers	Side-by-side, non-replicated	No cover crop	Cover crop (bean, peas, vetch mix)	
CA	Almonds		No cover crop	Cover crop (triticale, bean, peas)	
CA	Wine grapes		No cover crop	Cover crop (clover mix) & reduced tillage	
CA	Cabbage-radish		No compost**	Compost**	
CT	Corn silage	Side-by-side, non-replicated	Cover crop, traditional tillage termination	Cover crop, green chop, no-till cash crop	Cover crop, roller crimp termination, no-till cash crop
CT	Corn silage	Side-by-side, non-replicated	Cover crop, traditional herbicide termination	Cover crop, green chop, no-till cash crop	
KY	Organic corn-soybean-rye-sunflower-hay	Replicated	Cover crop, traditional seeding rate & tillage termination	Cover crop, increased seeding rate & conventional tillage termination	Cover crop, roller crimp termination, no-till cash crop
KY	Corn-wheat-soybean (double-cropped)	Side-by-side, non-replicated	No cover crop	Cover crop after soybeans	
KY	Corn-wheat-soybean (double-cropped)	Two fields, non-replicated	Cover crop after soybeans	Yearly cover crop	
KY	Corn-wheat-soybean (double-cropped)	Replicated	Winter cover crop	Summer cover crop mix	
MA	Corn silage	Side-by-side, non-replicated	Cover crop, traditional tillage termination	Cover crop, strip tillage & herbicide termination	Cover crop, herbicide termination after cash crop planted green
NY	Corn-wheat-soybean (double-cropped)	Replicated	No cover crop	Cover crop, traditional herbicide termination	Cover crop, herbicide termination after cash crop planted green
NY	Corn-wheat-soybean (double-cropped)		No cover crop	Cover crop, traditional herbicide termination	Cover crop, herbicide termination after cash crop planted green
NY	Corn silage		Cover crop, traditional herbicide termination	Cover crop, roller crimp + herbicide termination, no-till cash crop	Cover crop, roller crimp termination
NY	Organic corn-soybean-triticale		No cover crop	Cover crop, traditional tillage termination	Cover crop, roller crimp termination

**Trial layout refers to the layout of the control and treatment plots on the farm. Side-by-side means a field was split into halves or thirds, without treatment replications. Replicated means that a field was divided into numerous randomized strips of control and treatments in order to account for in-field variability in statistical analysis. See Appendix E for examples of trial designs.*

***Due to cover crop trial recruitment and implementation issues, the CA team ended up working with a producer who has faced systemic barriers to access trial compost instead of cover crops on a cabbage-radish vegetable farm.*

In our baseline participant survey, we asked what conservation practices (from a list of 11) they were already doing before joining this demonstration trial network. As shown in Figure 2, all but one participant had experience with cover crops, with 12 of our participating farmers already planting cover crops on some of their acres/crops and 2 on all of their acres. Overall, 12 of the 15 participants had adopted at least five of the listed conservation practices. With the remaining 3 participants having adopted at least one of the listed conservation practices. **The key takeaway is that the majority of our participating farmers are early adopters of soil health practices, specifically cover crops.**

Figure 2. *Participants' baseline conservation practices selected in response to Year 1 survey question: "What were you doing BEFORE participating in this project? Select all that apply" (n=15)*



In addition to diversity in locations, cropping systems, trial design, and cover crop experience, there was some demographic variation. **Key demographic results are highlighted here:**

- **Gender:** 3 female; 12 male
- **Race:** 80% self-identify as white
- **Age:** 53% between 25 & 44 years old; 47% more than 44 years old
- **Farming experience:** 80% have farmed for >10 years
- **Total land owned/operated/leased (acres):** 18-8,500 acres (2,388 average)

- **Land owned:** 0-100% (Average = 56%; Median = 73%)
- **Succession plan:** 60% have a farm succession plan
- **Percent income from farming:** 0-100% (Average = 67%; Median = 91%); three respondents selected 0-1% of income from farming

One farmer recruitment-related lesson learned was the need for adequate time to recruit farmers who had less or no experience with cover crop adoption and to ensure better representation of farmers with diverse lived experiences, including producers who have faced barriers to assistance access. For future on-farm demonstration trials, we will plan for more farmer-recruitment time.

Photo 2. *Field day event at one of the Kentucky on-farm demonstration farms in 2024 (Photo credit: Kendra Farris)*

IV. Social Indicator Survey Results

As a commitment to participation, each participating farmer responded to the social indicator surveys every other year. Those who joined in Year 1 (14 farmers) responded to all three surveys: Year 1, Year 3, and Year 5. One farmer joined the trial network in Year 2 and only responded to the baseline and final survey due to their shorter participation window. Here we present key results, in aggregate, for all three social indicator surveys. For some survey questions, where we have equivalent questions, comparisons were made across years to see how responses changed.

We have organized results by questions or question sets with tables/figures provided for key sections of the survey. These sections include Motivations, Soil Health Outcomes, Persistence, Change in Knowledge & Confidence, Programmatic Input, and Final Survey Reflections.

A. Motivations for Adopting Practices

In response to the Year 5 survey, participating farmers' selected the following **top three motivations for adopting a new cover crop practice: (1) to improve crop yields/increase profitability, (2) to increase resilience to drought, and (3) to reduce erosion** (Table 2). Across all three years, improving crop yields was the top motivation, but **the percentage of responses selecting this motivation to improve crop yields declined from 73% to 60%** between Year 1 and Year 5, even dipping to 50% in Year 3. **This may be due to the participants' learning of additional benefits that cover crops can provide.** The distribution of top motivations is larger in Year 5, supporting this inference, however the differences in distribution are not significant ($p=0.13$; $Y1_{variance} = 9$; $Y2_{variance} = 5$).

Beyond the consistent top motivation of increasing crop yields, the second and third top motivations varied year-to-year. **Increasing resilience to drought** was the second top motivation (47%) selected in Year 1, dipping down to 21% in Year 3, then back up to 40% in Year 5, tying as the **second top motivation in Year 5**, despite being 7% lower compared to Year 1. The motivation to **reduce erosion increased over time** (from 20% to 40%), tying as the **second top motivation** by Year 5. **Reduced erosion was one of the most frequently observed soil health outcomes by participants** as presented in the following section.

Table 2. *Participating farmers' motivations for new cover crop practice adoption in response to Years 1, 3, and 5 surveys. Answers are sorted in descending order by Year 5 percentage of responses by answer; dotted line indicates the top three motivations based on the Year 5 survey.*

Motivations	Year 1 (n=15)	Year 3 (n=14)	Year 5 (n=15)	Change from Yr 1 to Yr 5
Improve crop yields/increase productivity on my farm	73%	50%	60%	↓
Increase my resilience to drought	47%	21%	40%	↓
Reduce erosion on my farm	20%	36%	40%	↑
Improve biodiversity on my farm	0%	29%	20%	↑
Save money by reducing input costs (e.g., fertilizer, fuel, livestock feed)	33%	7%	20%	↓
Sequester carbon in my soils	40%	36%	20%	↓
Boost the profitability of my farm	27%	43%	20%	↓
Increase my resilience to excess precipitation events (e.g., flooding)	20%	36%	20%	=
Reduce the time I spend in the field	7%	0%	13%	↑
Other (please specify)	7%	14%	13%	↑
Improve pollinator and beneficial insect habitat	13%	21%	13%	↓
Reduce negative water quality impacts from my farm	0%	0%	7%	↑
Reduce greenhouse gas emissions from my farm	7%	0%	7%	=
Reduce labor costs	7%	7%	7%	=

B. Soil Outcome Motivations

Farmers were also asked about their motivations for adopting new cover crop practices specific to desired soil health outcomes (Table 3). **The top four desired soil health outcomes by Year 5 were boosting soil organic matter (67%), reducing compaction and improving soil structure (67%), improving habitat for soil organisms and beneficial microbes (40%), and improving soil-water holding capacity (40%).** Both "boosting soil organic matter" and "reducing compaction and improving soil structure" were top desired soil health outcomes across all three surveys, with **boosting soil organic matter consistently the number one desired soil health outcome**. Reducing compaction was the second top desired soil health outcome in Year 1 and Year 5, but captured 14% more responses in Year 5. Closely related to the top two motivations of reducing compaction and boosting soil organic matter is the motivation to **"reduce sediment loss due to erosion", which was not in the top four selected responses, but showed the greatest increase in response rate between Year 1 and Year 5, increasing by 26%.**

Table 3. *Participating farmers' desired soil health outcomes through practice adoption from Years 1, 3, and 5 surveys. Answers are sorted in descending order by Year 5 percentage of responses by answer; dotted line indicates the top three motivations based on the Year 5 survey.*

Desired Soil Health Outcomes	Year 1	Year 3	Year 5	Change from Y1 to Y5
Boost my soil organic matter.	67%	64%	67%	=
Reduce compaction and improve soil structure.	53%	43%	67%	↑
Improve habitat for soil organisms and beneficial microbes.	40%	57%	40%	=
Improve my soil water holding capacity.	40%	36%	40%	=
Reduce sediment loss due to soil erosion	7%	14%	33%	↑
Increase plant available soil nutrients	60%	43%	33%	↓
Reduce ponding and improve water infiltration rates.	13%	29%	13%	=
Reduce nutrient loss due to soil erosion	7%	14%	7%	=
Other (please specify)	13%	0%	0%	↓

There were minimal changes between Year 1 and Year 5 survey responses for the majority of the desired soil health outcomes answer choices (Table 3). There was no change in response rate for five of the eight provided soil health outcomes. This may be due to the participating farmers having previous experience with cover crops, resulting in **their soil health outcome expectations varying minimally from year to year, alongside their trial designs having minor variations between treatments**. For example, cover crop pre-plant herbicide termination versus cover crop post-plant herbicide termination (planting green), which only contributed a few weeks of additional cover crop growth, resulted in marginal contributions to soil health regeneration.

Despite some trial participants having minor differences between their control and treatments, resulting in minor changes in soil and economic data results, when we asked participants the open-ended question: **"Did you observe these soil health outcomes? What soil health outcomes did you observe?"** they provided several interesting observations, including:

- *"Yes, the cover crop helps reduce sediment loss due to erosion (which also reduces nutrient loss). I can see where increasing organic matter will improve soil water holding capacity."*
- *"Grew more of a crop than I expected with less inputs."*
- *"Yes, I think we eliminated erosion in that field, and I think yields increased every year. I think we identified compaction and then started to improve it."*
- *"Compaction problem is worse than I thought, tillage radish and all. But microbiology was robust."*
- *"Definitely an increase in organic matter and soil erosion control."*

Reduction in soil erosion and compaction, and improved soil structure were anecdotally observed by at least six of the participating farmers based on the above open-ended results. This may explain why the **motivation to "reduce compaction and improve soil structure" increased by 14%** and the **motivation to "reduce sediment loss due to soil erosion" increased by 26%** between Year 1 and Year 5 survey results.

Photo 3. *Soil sample with mycorrhizal hyphae present (Photo credit: Asyha Tapp Ross)*

C. Persistence

In each survey, we asked our respondents, "How likely are you to continue implementing the conservation practices you are currently experimenting with as part of this program when our project is over?" They selected an answer from a 5-point Likert scale from "very likely" to "very unlikely".

All the respondents reported in Year 5 that they are very likely (60%) or likely (40%) to continue implementing the conservation practices they are experimenting with when the project is over (Table 4). As shown in Table 4, there was a **27% increase in the number of farmers who selected**

"very likely" from Year 1 to Year 5. When we look at the aggregate number of farmers who selected very likely or likely to persist with their trial practices, the total increased by 20% from 80% in Year 1 to 100% in Year 5. One farmer went so far as to add, "*I plan to implement the trial practices across the whole [operation].*" **A takeaway from this result is that even early adopters of cover crops have room to grow their management of this practice, resulting in fewer doubts around the benefits of cover crops despite the additional cost.**

Table 4. *Participating farmers' willingness to persist with the trial practices beyond life of project in Year 1 (n=15), Year 3 (n=14), and Year 5 (n=15) presented as percentage of responses by answer by year.*

Likelihood to Persist with Trial Practices	Y1 (%)	Y3 (%)	Y5 (%)	Y1 to Y5 % change
Very likely	33%	79%	60%	+27%
Likely	47%	21%	40%	-7%
Neither likely nor unlikely	13%	0%	0%	-13%
Unlikely	0%	0%	0%	=
Very unlikely	0%	0%	0%	=
*Other (please specify)**	7%	0%	0%	-7%

**One respondent selected "Other" in Year 1 survey, noting: "if successful, very likely".*

Table 5. *Participating farmers' likelihood to adopt additional soil health practices or make further refinements to their soil health management beyond life of project in Year 3 (n=14) and Year 5 (n=15). Responses are based on the percentage of responses by answer.*

Likelihood to Adopt Additional Practices	Y3 (%)	Y5 (%)	Y1 to Y5 % change
Very likely	79%	60%	-12%
Likely	14%	40%	+19%
Neither likely nor unlikely	7%	0%	-7%
Unlikely	0%	0%	0%
Very unlikely	0%	0%	0%
Other (please specify)	0%	0%	0%

In the Year 3 and Year 5 surveys, we asked **how likely respondents were to implement additional conservation practices** or make further refinements to their soil management beyond the timeframe of this project. As shown in Table 5, in Year 3, 13 out of 14 respondents said they were "likely" (14%) or "very likely" (79%) to do so, with only one person saying they were "neither likely nor unlikely" at this time. By Year 5, the one respondent that selected "neither likely or unlikely" in Year 3 selected "very likely" in the Year 5 survey. However, 12% of farmers' responses shifted from "very likely" in Year 3 to just "likely" in Year 5. In all, **by Year 5, all 15 participating farmers selected they were "likely" or "very likely" to adopt additional conservation practices (Table 5).**

In summary, 100% of participating farmers believed by Year 5 that they were likely to persist with aspects of the trial practices (Table 4) and likely to adopt additional practices (Table 5). We can't confidently say that the respondents' participation in this demonstration trial is the only reason why they are likely to persist with conservation practices, especially since our

participants are primarily early adopters with previous experience with a variety of conservation practices and even aspects of their trial treatment(s). But the program may have positively influenced their willingness to persist.

In the Year 3 and Year 5 surveys, we asked a follow-up, open-ended question regarding anything else they wanted to share about their intentions to continue or discontinue use of conservation practices to help us understand the reasoning and nuance behind some of the above persistence responses. Table 6 presents the question and some of the respondents' answers. **The major theme that emerged was the need to refine and expand upon each farmers' trial soil health practices**, acknowledging that there were aspects of their trial that they are considering discontinuing or continuing.

Table 6. *A selection of participating farmers' open-ended responses to intentions around continuing soil health practices in Year 3 (n=6) and Year 5 (n=11).*

Survey question: Anything you would like to share regarding your intentions around continuing or discontinuing your soil health practices or approaches as explored in the questions above?
Year 3 survey responses:
• *"I think **we will continue to fine tune** our no-till practices but learn how to balance them with the heavy manure application."* • *"If I hadn't made money elsewhere, this would be economic folly. But I did, and I can...though I'm **running out of patience**."* • *"I plan to implement the trial practices **across the whole** vineyard."*
Year 5 survey responses:
• *"I will very **likely experiment** with no-till planting into standing cover crops."* • *"I think **we'll continue the practices**. The project was **beneficial** because it wasn't your typical 1-year window."* • *"I **gave up** on the roller crimper."* • *"Many practices are part of our regular farming system and **will be continued**, some areas where we are **pushing the boundaries** of our system include how we manage the cover crop, the mixes we choose, integrating grazing to terminate, and switching to off-ground harvest to allow for more orchard floor vegetation."* • *"Most of these practices are **already being used** on our operation but may **fine tune** how we use them."* • *"I would like to continue applying compost to my soil, **depending on the funding** availability to purchase it."*

In Year 5, we asked a more specific question: **"What did you like or dislike about your cover crop treatment(s)?"** All farmers provided an answer, but below are some of the most illustrative responses:

- *"I wish I had used a multi-species cover crop mix every year. That is my fault, not the program's fault. I was too late in cover crop planting to achieve the best results."*
- *"Zone tillage treatment alleviated compaction in the strip and improved population compared to the no-till treatment. I liked that the no till and zone tilled treatments were able to be driven on by the harvest truck in a really wet harvest season while the control was too muddy."*

- *"There was confusion about how many pounds of rye we were to plant for the roller crimper, which resulted in more passes on those strips. But the roller crimper just isn't workable. Tried it in several other fields, successful in roll-down, seeding rate, etc. The weeds were not suppressed."*
- *"We like the soil erosion control, however, on crimping we did see a yield drag."*
- *"Data takes time to collect but is worth it in the end."*
- *"Preferred harvesting triticale as it is available feed."*
- *"It is a challenge to get a good cover crop established behind double-crop soybeans in our area because the soybeans aren't harvested until November."* – Kentucky farmer
- *"Increased species diversity of cover, cover crop mixes were good for multiple goals of soil health and pollinator habitat."*
- *"Did have some stand issues at times in the planting green."*
- *"Disliked waiting until rye matures enough to terminate with a crimper."*
- *"I did not implement cover cropping; I applied compost. What I liked the most was I was able to reduce my fertilizer usage."*

Again, a major theme to emerge from these quotes is the need to refine their approach as they learned more about what worked and didn't work with their trial cover crop practices.

D. Change in Knowledge & Confidence

In the Year 3 and Year 5 surveys, we asked participants if their understanding of the economic and soil impacts of adopting soil health practices improved, as well as how confident they are in speaking about soil health, as a result of participating in this demonstration trial project. **Every year, we provided each participant with a demonstration trial report with the soil and economic data results from the previous year.** These reports presented soil health indicator levels and field operations' estimated economic costs and crop yield revenue. Also, each year, the participants had the option to host and/or participate in a field day, where the economic and soil impacts of their trial practices were discussed.

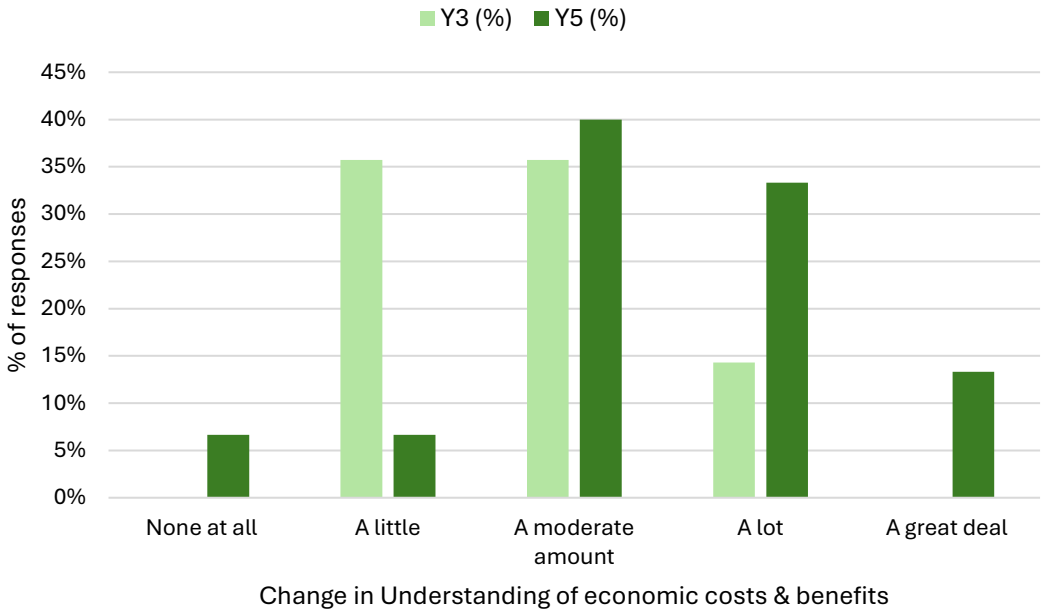
Photo 4. *AFT's Caro Roszell speaking to soil sample results at a Massachusetts field day (Photo credit: Maya Rappaport).*

i. Economic Costs and Benefits of Soil Health Practices

Participating farmers were asked to share how their understanding of economic costs and benefits improved as a result of participating in this project in Year 3 and again in Year 5**. The largest portion of respondents selected that they had "a moderate amount" (36% in Year 3; 40% in Year 5) of improvement in their understanding of the economic costs and benefits of adopting soil health practices as a result of this project** (Figure 3). This moderate change may be explained by the fact that a majority of our participating farmers had previous experience with cover crops and other soil health practices as early adopters and so had a **strong baseline understanding before joining this project.** One farmer alludes to this in their Year 3 survey: "*I was already aware. This project enhances my thoughts and makes me aware of other options I can use for soil health.*"

Despite the majority of these participants having a strong baseline understanding of soil health practices, **when comparing the distribution of responses in Year 3 versus Year 5, the data reflect a continued increase in understanding of the economics of soil health practices** (Figure 3). A lower percentage selected "a little" in Year 5 than Year 3, and a larger percentage selected "a lot" by Year 5. **By Year 5, many increased their understanding of economic costs and benefits by "a lot" (33%) or even "a great deal" (13%) despite many of these farmers being early adopters with a strong baseline knowledge.**

Figure 3. *Participating farmers' responses regarding how their understanding of economic costs and benefits improved as a result of participating in this project in Year 3 (n=14) and Year 5 (n=15). Responses are presented as the percentage of responses by answer choice.**

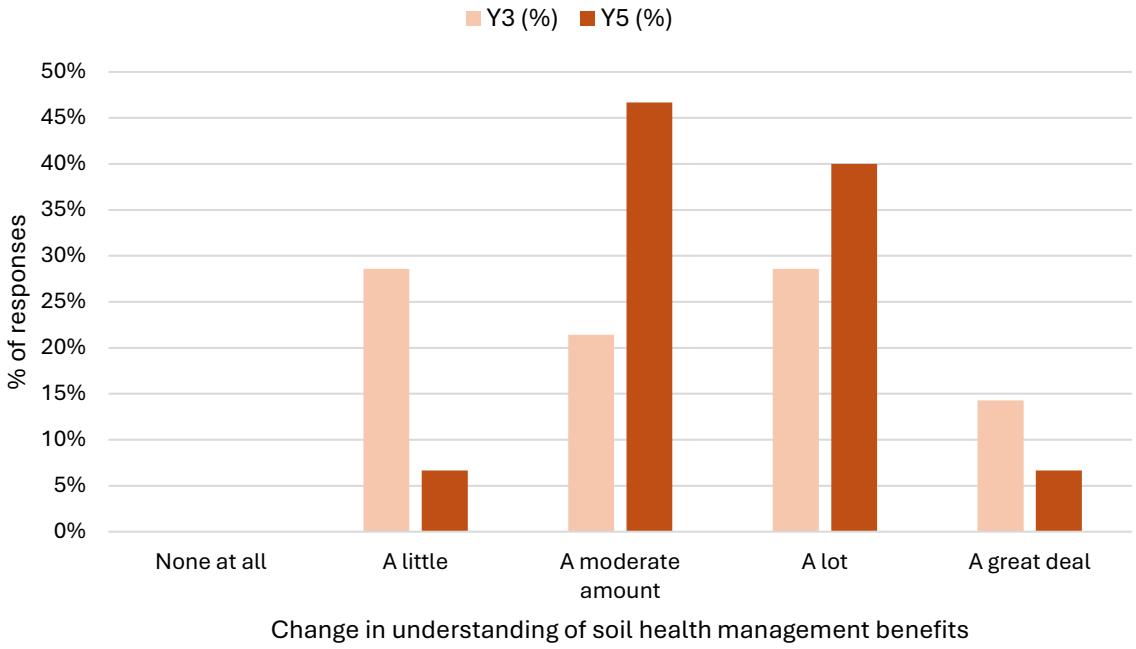


**Two respondents selected "Other" in Year 3 survey, stating "I was already aware. This project enhances my thoughts and makes me aware of other options I can use for soil health" and "too soon to know".*

ii. Soil Health Benefits

Respondents were then asked how their understanding of the benefits of soil health management improved. By Year 5, Figure 4 illustrates that, similar to their understanding of economics, the **majority had noted: "a moderate amount" (47%, increased by 25% from Year 3) or "a lot" (40%, increased by 11%) of improvement in their soil benefit knowledge**. This potentially reflects a substantial increase in understanding, despite the majority of these participants being early adopters with a strong baseline understanding of soil health benefits. One respondent shared specifically that, *"the AFT soil sampling and data analysis process was very comprehensive and helpful. As participants, we received very good and helpful reports."* These reports may have directly contributed to the improvement in soil health benefits knowledge shown in Figure 4. On the other hand, there was a decrease in those who selected "a great deal" between Year 3 and Year 5, possibly reflective of the kind of transition that happens with a focus on a specific topic that allows an individual to see how much more there is to learn.

Figure 4. *Participating farmers' responses regarding how their understanding of soil health management benefits improved as a result of participating in this project in Year 3 (n=14) and Year 5 (n=15). Responses are presented as the percentage of responses by answer choice.**



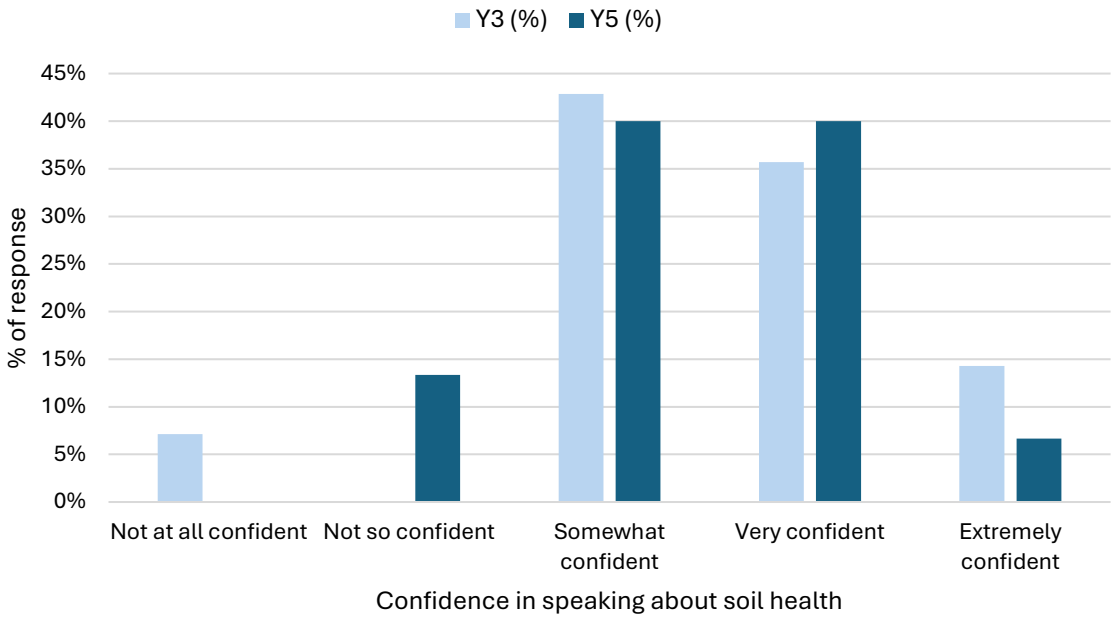
*One respondent selected "Other" in Year 3 survey, stating "too soon to know".

iii. Change in Confidence Speaking about Soil Health

We also asked participants in Year 3 and Year 5, as a result of participating in this project, how confident they feel in speaking about soil health to a broader community of fellow farmers, farm community, or family**. In both Year 3 and Year 5 surveys, the majority of respondents selected somewhat to very confident when speaking about soil health**

(Figure 5). The shift in confidence from Year 3 to Year 5 was more variable compared to the change in understanding of economic and soil benefits (Figures 3 & 4).

Figure 5. *Participating farmers' responses regarding their level of confidence speaking about soil health to their community of fellow farmers, farm community, or family as a result of participating in this project in Year 3 (n=14) and Year 5 (n=15). Responses are presented as the percentage of responses by answer choice.*



E. Programmatic Input

In the Year 3 and Year 5 surveys, we asked participants what elements of the demonstration trial they were most satisfied with (Table 7). Respondents were asked to rank each program element between "not satisfied at all" and "very satisfied". The **top two elements of our program that participants were most satisfied with** in both Year 3 and Year 5, based on the weighted average rank of this five-point Likert scale, were:

- **Soil health testing and data assessment**
- **Technical assistance provided by American Farmland Trust staff.**

By Year 5, across all program elements, farmers were at least satisfied (>4) with every element listed (Table 7). This is a slight increase in satisfaction compared to Year 3 results. The largest increase in satisfaction was with the "Financial support in the form of net loss guarantee" (+13%). This is most likely due to more farmers experiencing this aspect of the program by Year 5, as it was only offered if there was a cash crop failure or large negative impact due to the demonstration trial treatments.

***Table 7**. Participating farmers' level of satisfaction with program elements in Year 3 (n=14) versus Year 5 (n=15). Weighted average is based on answers to a five-point Likert scale. A rating of 1 indicated that they were not satisfied at all, and 5 indicated that they were very satisfied. Program elements are listed in descending order based on Year 5 survey response rate.*

Program elements	Y3 (avg rank)	Y5 (avg rank)	Y3 to Y5 % change
Soil health testing and data assessment	4.4	4.6	5%
Technical assistance provided by American Farmland Trust staff	4.4	4.4	0%
Financial support in the form of net income loss guarantee	3.8	4.3	13%
Field day events	4.0	4.3	6%
Technical assistance provided by others involved in this project	4.1	4.3	3%
Financial support in the form of soil health practice payments	4.3	4.3	0%
Economic information	4.1	4.2	2%
Opportunities to engage and educate new farmers	3.9	4.1	5%

In the Year 5 survey, we asked an open-ended question, **"Is there anything else you would like to share with us about your participation in this project?"** We received five responses:

- *"I really enjoyed and found benefit in the in-person meetings with the other participants."*
- *"Best support team and farmer network experience I have ever had!"*
- *"I'm working with you guys on the biochar project now and will continue looking for innovative things until I keel over. My grandson is coming into the farm, and we've got to get him engaged."*
- *"All the staff was great to work with."*
- *"I think it should continue for another 5 years."*

i. Challenges

We also asked farmers what their biggest challenges have been since participating in this project in Year 3 and Year 5, including both programmatic and trial implementation challenges. **The top three selected challenges in both Year 3 and Year 5 were weather-related challenges, challenges with filling out the field operations worksheet, and none of the above (Table 8)**.

***Table 8.** Participating farmers' selected challenges associated with participating in the AFT On-Farm Demonstration Trial in Year 3 (n=14) versus Year 5 (n=15). Responses are sorted in descending order based on Year 5 response rate.*

Challenges*	Y3	Y5	Y3 to Y5 % change
Weather-related challenges	36%	53%	+17%
Challenges with filling out the Field Operations Worksheet	21%	33%	+12%
None of the above	36%	27%	-9%
Insufficient technical assistance	14%	13%	=
Other (please specify)	14%	13%	=
Labor challenges	7%	13%	+6%
Insufficient incentives	0%	7%	+7%
Communicating with the AFT team	0%	7%	+7%

**Answer choices not shown due to having zero responses in both Year 3 and Year 5 are: invasive species, pest management, getting access to farmer reports & other relevant data from this project, and coordinating farm access with AFT staff.*

ii. Future Support

We also asked them in both the Year 3 and Year 5 surveys what else AFT could do to support their success in this project (or future programs), giving them a list of answer choices to choose from. **By Year 5, the resounding largest response was "providing additional funding for new practices, equipment, etc." (53%), a 24% increase from Year 3 (Table 9).**

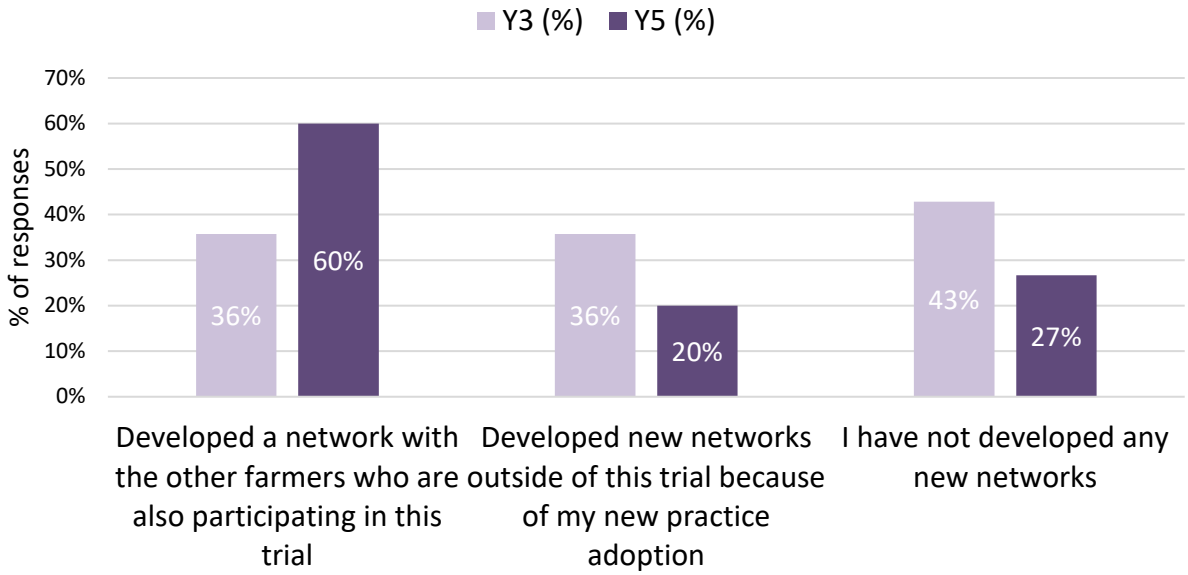
Table 9. *Participating farmers' selected ways to improve the program in response to Year 3 (n=14) and Year 5 (n=15) surveys. Responses are sorted in descending order based on Year 5 response rate.*

Answer Choices	Y3 (%)	Y5 (%)	Y3 to Y5 % change
Provide additional funding for new practices, equipment, etc.	29%	53%	+24%
None of the above	57%	33%	-24%
Provide more guidance and troubleshooting on how to complete the Field Operations Worksheet	7%	20%	+13%
Provide more technical assistance	21%	20%	=
Improve our communications with you and your team	0%	13%	+13%
Help connect me with other specialists	7%	7%	=
Other (please specify)	7%	0%	-7%

iii. Social/Peer Network Impact

In Year 3 and Year 5 surveys, we asked the participants to respond to whether their engagement with networks of other farmers or service providers has changed since participating in our project, using a multiple-choice format. Between Year 3 and Year 5, there was a **24% increase in those who developed a network with the other farmers who are also participating in this trial (Figure 6)**. There was a decrease in the number of farmers who developed new networks outside of this trial.

Figure 6. *Participating farmers' selected responses to the question "how has your engagement with networks of other farmers or service providers changed since participating in this project?" in Year 3 (n=14) and Year 5 (n=15) surveys. Responses are presented as the percentage of responses by answer choice.*



F. Final Reflections from the Survey

A key takeaway from these survey results is that on-farm demonstration trials are beneficial even for early-adopter farmers who have tried a variety of new soil health practices themselves or implemented aspects of the trial treatments already (e.g., implementing cover crops across their farm, but not different termination methods). Here are some quotes from the open-ended survey questions that highlight this takeaway:

- *"[I'm] more open to alternative methods."*
- *"There is a greater probability that we'll plant more cover crops."*
- *"We are always looking for ways to improve, and this has helped us move that along faster."*
- *"I'd like to continue experimenting with cover crops but there is no silver bullet. Each year is different."*
- *"Some of the practices may not look the best, but that doesn't mean they weren't the most profitable."*

In the Year 5 survey, we gave our participants an opportunity to share what their **biggest learnings** were from participating in this trial. Some of the **major themes** out of the open-ended responses were:

- **The trial wasn't long enough – more than 3-4 full crop years are needed.**
- **Participants really enjoyed the meetups with the other participating farmers to learn from each other.**
- **Timing of planting and termination of cover crops is crucial to success.**

Here are some quotes that highlight these main takeaways:

- *"I really enjoyed and found benefit in the in-person meetings with the other participants."*
- *"Best support team and farmer network experience I have ever had!"*
- *"Cover crops do work. Timely planting is especially important when using multi-species cover crops."*
- *"Cover crops are worth every penny. The earlier the better when it comes to planting in the fall."*
- *"Need more time to experiment."*
- *"I think the biggest takeaway is that you have to look at things long term – that was the best thing about this trial. So many other corn trials are short term – but soil health indicators take longer to see changes.*
- *"Try on small scale first, it will take time [to learn what works], and every year has different challenges."*

One of the biggest takeaways is that farmers value networks and learning from each other, and future programming will be improved by including mechanisms for connecting farmers with the resources and guidance needed to discuss their experience with others, both inside and outside of program trial networks. This takeaway is supported by the results in Figure 5 and Figure 6, respectively, regarding participants' change in confidence speaking about soil health and engagement with others outside of the trial, neither of which were explicit goals of

this project. We saw minimum increase in confidence or growth of new peer networks outside of the project between Year 3 and Year 5 as a result of participating in this project, revealing that there is the opportunity to provide explicit guidance or resources to our participants for speaking about their experience with soil health management with others outside of this trial network. We also intend to provide resources to teach others to conduct their own demonstration trials. For future programs, these additions will help amplify value to farmers and their networks, and thus increase adoption.

V. Farmer Participants Focus Group Results

During August and September of 2025, AFT's Social Science team hosted two 1.5-hour listening sessions with the participating cover crop demonstration trial farmers. We had a total of **thirteen farmers participate** between the two focus groups – six in our first discussion and seven in our second discussion, with **one additional farmer who provided their input via a one-on-one interview with their regional lead**. We asked questions connected to both 1) programmatic aspects of the project, in terms of what worked well and what was challenging about trial implementation, and 2) cover crops and soil health generally, including an assessment of whether or how farmers plan to continue experimenting with cover crops on their operations.

The core findings center around a few high-level takeaways, which include:

- **Farmers had an overall positive experience working on the project and valued opportunities for knowledge exchange, particularly as they considered how to boost soil health on their farms.**
- **Integrating cover crops is still challenging and requires creativity and support to maintain the practice even for those experienced with cover crops.**
- **Farmers had thoughtful ideas on ways to improve these on-farm demonstration trials for future projects, such as extending the timeline (more than 3-4 growing seasons) to see more demonstrable soil health benefits.**

Below are some illustrative quotes that capture the sentiment of these high-level takeaways:

- *"The fact that AFT coordinated the soil sampling and the soil test…and analysis taking place at a reputable lab and we got a lot of hard data to use. …Basically, you know, as I said a few times, we've been experimenting with cover crops for many years and a lot of it has been sort of just sticking our thumb in the wind trying to say whether or not this, whether or not there was a true benefit or not because our own staff, we just don't have the horsepower to do this in-depth analysis and get the samples taken at the right time and all the soil, you know, all the data put together. So having AFT do all that stuff for us, to me was a big benefit to actually put some hard numbers with some of the things that we've been doing."*

- *"One important thing I learned during this project was that improving soil health can help reduce the dust problems on my farm. The AFT staff explained that practices such as compost application, cover cropping, and reduced tillage increase soil organic matter and help soil particles bind together, making the surface less prone to wind erosion. In addition, healthy soils retain more moisture, which prevents them from drying out and breaking into fine dust."*
- *"And then the second part was not only just sharing the information with me, but having the field days. We had two, two separate days on our site and they were really well attended. And you know... if AFT and the farms are going to do the work, it's nice to share."*
- *"I think there's real value in AFT's unbiased, you know, approach this. The industry has changed so much over the years and now most of the research is funded by companies selling you things, and it's refreshing to have, you know, somebody out there that's, you know, letting us try to do experiments, helping us do the experiments and connecting us with other people."*
- *"I feel like five years is not enough to really see the benefits of incorporating this cover crop. So that would be my main feedback for the entire project is I wish that it could be 10 years long or something. I just feel like five years is not enough to really see the full benefits."*

VI. Field Day Survey Results

An exit survey was deployed at nine field day events hosted at participating farms between 2022 and 2024. The exit survey closely mirrored the social indicator survey but assessed the impacts of our demonstration trial network on other farmers and agricultural professionals to gauge how effective the information shared may be at encouraging practice adoption by farmers in the region and improving capacity by ag professionals. In the survey, we asked farmers and agricultural professionals a subset of different questions.

In Table 10, we present the number of attendees, farmer survey versus service provider responses, and response rate by year and by state. There were approximately 262 people in attendance at these field days. This count is based on a mixture of staff-reported headcounts and sign-in/registration lists.

Table 10: *American Farmland Trust On-Farm Demonstration Trial field day attendees and survey responses count by year by location (2022-2024)*

			Attendance	Total Survey Responses		% survey responses of total attendees
Year	**State**	**Farm**	**# attendees**	**# farmer survey responses**	**# ag professional responses**	**Response Rate**
2022	New England	Virtual	20	8	2	50%
2022	New York	Swede Farm	35	11	11	63%
2023	New York	Branton Farm	60	8	8	27%
2023	Kentucky	Pierce Farm	20	5	2	35%
2023	California	Gemperle Farms	23	8	0	35%
2023	Connecticut	Cushman Farm	20	4	5	45%
2024	Massachusetts	Bar-Way Farm	40	4	5	23%
2024	Kentucky	Roberts Farm	9	5	3	89%
2024	California	Bullseye Farm	35	7	13	57%
		Totals	**262**	**60**	**49**	

For the farmer field day exit survey, we included two of the same questions as those received by demonstration trial host farmers on motivations and desired soil health outcomes relating to the adoption of new soil health practices.

Both the demonstration trial host farmers and field day farmer survey respondents shared similar top motivations for adopting new soil health practices, such as cover crops (see Table 2 for reference). **Farmer survey respondents' top four motivations were:**

- **Improve crop yields/increase productivity on my farm (n=46)**
- **Increase my resilience to drought (n=38)**
- **Increase my resilience to excess precipitation events (e.g., flooding) (n=35)**
- **Improve biodiversity on my farm (n=34)**

In terms of soil benefits**, field day farmer survey respondents had the same top four desired soil health outcomes as the demonstration trial farmers** (see Table 3 for reference):

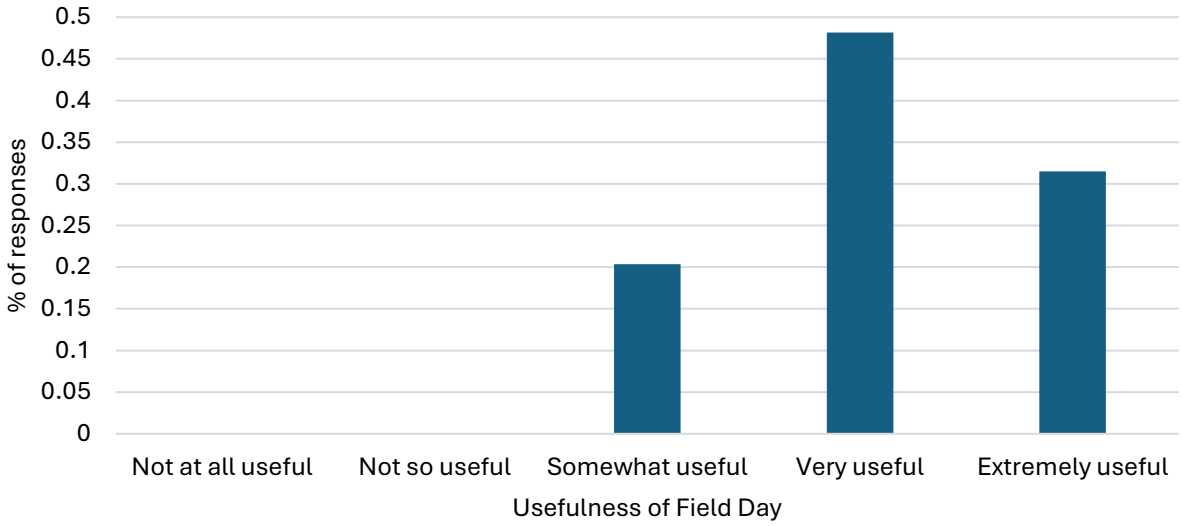
- **Boosting soil organic matter (n=54)**

- **Improving soil-water holding capacity (n=42)**
- **Reducing compaction and improving soil structure (n=41)**
- **Improving habitat for soil organisms and beneficial microbes (n=39)**

Another question we asked of farmers in attendance at our field days is **"what are your concerns about adopting these new soil health practices on your farm?"** Unfortunately, the answer list varied from the demonstration trial farmers' surveys, so we can't make a direct comparison. Out of the six concerns to select from, the **top two concerns** of the field days' farmer survey respondents were **"I am concerned about resources, equipment, and know-how associated with cover crop establishment/termination and cash crop planting/harvest"** (n=33) and **"I am worried about the added costs associated with new practices and how they might affect my operating expenses and return on investment"** (n=28).

Overall feedback from farmers attending field days was very positive. **Of the 54 farmers that responded to the question "How useful was the content of the field day?", all of them ranked the field day's usefulness between "somewhat useful" to "extremely useful"** using a 5-point Likert scale from not at all useful to extremely useful. The majority of the respondents selected very useful (48%), as shown in Figure 7.

Figure 7. *Field day attendees' (farmers-only) survey responses to the question "how useful was the content of the field day?" (n=54) presented as the percentage of responses by answer choice.*



Some farmers went on to share more about their thoughts about and experience at the field day they attended in response to an open-ended question. **The major themes that emerged were a strong appreciation for farmer-to-farmer networking and in-field tutorials at the field days,** such as equipment demonstration and soil sampling. Below are some quotes from these responses reflecting these major themes around the usefulness of the field days:

- *"It was great to see how the root growth differed between trials, especially given how the above-ground growth was so similar."*
- *"I found the varying presentations helpful in seeing how farming techniques' mindset is gradually moving forward. It was interesting to hear the reasons why some presenters did/did not want to continue using the Roller Crimper. Thank you for your viewpoints and presentations. Thank you!"*
- *"It was very informative and nice to round table with other farmers and their farms practices."*
- *"Great information was provided, and having real farmers was great to hear from."*
- *"Thankful for the opportunity to learn hands-on and network with other locals to see what they are doing or not doing and why."*
- *"Great field session – liked the demonstration of the roller crimper and tutorial on using the digital penetrometer."*

Ag professionals were also given the opportunity to share in an open-ended response about their field day experience. Similar to the farmers that responded to our field day survey, **ag professionals also shared a strong appreciation for the field day being a farmer-centered event and giving them the opportunity to network with growers and other professionals.** The following quotes highlight this:

- *"Good information. Good field day and practical knowledge. Acknowledgment of negatives and positives. Great grower presence."*
- *"I really enjoyed the farmer-led presentation of the trial and the opportunity to make our own observations in the field! I am excited to relay some of these findings to other dairy farmers I work with."*
- *"For me, the more valuable aspect of these events is the new connections and building interpersonal relations among service providers."*
- *"It is very helpful to attend these events and have an opportunity to engage with farmers and service providers directly, in the field. I intend to attend more of these events in future and greatly appreciate AFT's efforts in hosting such events."*

We asked both farmers and ag professionals for **feedback for future field days.** We asked farmers, "For future field days/workshops, what topics might interest you?", selecting from six answer choices. We asked resource professionals, "What other resources might you need to further support conservation practice adoption in your region?" providing seven answer choices to choose from.

The **farmers predominantly selected "nutrient management strategies to maximize cover crop benefits" (n=42)** and **"advanced cover crop management strategies" (n=41**) as the topics they are interested in hearing about at future field days. While the **ag professionals requested "more targeted economic information to help farmers see the potential benefits of conservation practices" (n=31)**, which would help them further support conservation practice adoption in their region.

Some respondents provided feedback around future topics to cover at field days in an open-ended format. Below are some of the pieces of advice shared:

- *"I was hoping the program would address market garden operations and not only agronomic systems."*
- *"I think that the presentations were good for the service providers that made up most of the crowd. I also think we need to find ways to get producers to these meetings. I am not sure what the best answer is there, but a lot of the people that we work with that do not have cover crop experience are interested in trying them but they do not know where to start. Maybe some more simple workshops geared towards those people could be beneficial, where you review the economic benefits of cover crops, discuss adjust to nutrient and weed management, and show off some of the equipment used to plant and terminate."*
- *"I would like more information on the equipment/implements, their costs for purchase, cost to contract out work and their pros and cons. Also, info on timing of planting and the best soil moisture and temperature conditions."*
- *"Would love to see more images or video for example demonstration, and have more concrete plans to execute on as part of the learning."*

Photo 5. *Field day event at one of the participating demonstration trial farms (Photo credit: Caro Roszell)*

VII. Internal Staff Focus Groups Results

AFT hosted three internal listening sessions with project leads and state leads in July 2022, January 2024, and October 2025. We had nearly full participation by the internal staff. The internal focus group questions explored two major topics of interest. The first topic is the structure and administration of the trial network, including what could be improved and what worked. The second topic of interest being focused on what the team has learned about cover crop adoption and soil health maintenance while working with farmer participants. Below, we summarize the results from these three internal focus groups.

The team reflected on a lot of shared themes about what worked well each year of the project, and by the end of the project, many people reflected on the fact that **programming and communications improved over the course of the project**. The group learned to work better together and evolve over time with regard to project data collection, communication, and coordination. Several people liked the farmer reports and appreciated the consistency of those. Participants were eager to celebrate the solidity of the team and reflected on genuinely enjoying working with each other, illustrated by this quote:

"It has been a joy to get to know and to work with this team—we are so lucky to get to work with such great people! In particular, I want to appreciate Aysha for how organized and hard-working she is, how dedicated, and how skilled she is as a communicator."

Participants did reflect on some of the ways that the project could be improved moving forward, most of which really centered on the idea of **challenge of balancing** the needs of **enacting a rigorous demonstration project** with associated data collection and reporting with the **practical realities** of regional staff who are working directly with farmers who are dealing with a complex set of factors influencing their decision making and management of each trial within a commercial operation's environment. This represents the **tension between what is feasible on the farm, what can be adaptable and changeable from farm to farm, and what requires trial network-defined consistency.** Additionally, just about everyone echoed the scientific consensus that **five years simply wasn't enough time to detect meaningful changes in soil health**. One example of this tension between scientific and practical goals and needs was reflected in a quote from a regional lead:

"Several [farmers] have commented that they're disappointed that they're not seeing greater soil gains, you know, [in…] nutrient availability, soil organic matter …"

That said, project leads were interested, along the way, in how the economic case studies and the economic benefits of conservation can support farmers in maintaining cover crop adoption, as described in this illustrative quote:

"I was surprised, really, as this has gone on, and doing the economic case studies, how, because the farmers I've picked are innovative farmers, they're doing good practices, they've been doing

them for a long time, but to really hear out of their mouth that you know, mostly doing this because they know that it pays off, they are not necessarily doing it for the greater good of society."

In general, the project leads, across all divisions, had a lot of reflections over the years about what they learned about how to improve soil health and support farmers in adopting cover crops, with a big reflection on the **need to foster knowledge exchange** to support cover crop management challenges and goals.

Most of the regional leads said that they were **going to continue their work with farmers on cover crops**, although the extent will be driven by funding. There is **great enthusiasm** for doing more of this work and keeping up momentum with new and existing networks. However, project leads and regional implementation team members also noted that we need to do more to **get newly adopting farmers participating** so that we can truly measure some of the changes on farms that have never used cover crops, compared to working with early adopters who have already been experimenting with cover crops, whose soils are healthier and have less room to improve with changes in management.

VIII. Overall Key Takeaways

The social science findings from this project are fundamentally important to inform our ability to address social, economic, and technical barriers in order to achieve widespread adoption of cover crops within the context of soil health management systems. We sought to better understand how participation in an on-farm cover crop trials network might affect the adoption of and persistence with cover crops by farmers, and what soil and economic learnings can come of a 5-year trial.

In broad terms, our report illustrates that **farmers' attitudes towards cover crops improved, and the project also improved knowledge and capacity to manage cover crops on their operations**. Broader reflections suggest that **there was really important knowledge exchange among AFT staff/partners and farmer participants**. This knowledge exchange went beyond the expected sharing of soil and economic annual results to include in-field management learnings, such as the pros and cons of different cover crop termination techniques and timing.

It is important to note that, given that many of the farmer participants were already innovators and experimenting with cover crops prior to hosting this trial, **our results may not fully speak to some of the challenges and limitations associated with farmers who are not yet using cover crops**. Participating farmers appreciated the risk sharing provided by the project, but it seems that the sharing of knowledge across social, economic, and soil data was often more important to participating farmers. **Our findings underscore that supportive social networks and peer learning play a central role in helping farmers troubleshoot challenges, refine management strategies, and maintain motivation in adopting soil health practices.**

The vast **majority of participants reported they are likely or very likely to continue cover crop implementation** beyond the life of the project. Many also expect to be more innovative in their implementation and plan to continue working with AFT where and when aligned opportunities are available. **One of the key limitations of this project is that five years is simply not long enough to measure some of the economic and environmental benefits of cover crop adoption**, but **social indicators suggest that farmers still saw substantial value in participating in short-term on-farm trials such as these**.

At the same time, farmers expressed a desire for additional technical resources on advanced adaptation of cover crop management, including weather-based adaptations, nutrient management, termination methods, and establishing cover crops in narrow planting windows. Economic considerations also remain important, with additional funding for new practices and equipment emerging as a top need for sustaining adoption momentum.

Building on survey and focus group findings, future programming will be built to more intentionally integrate mechanisms for farmer-to-farmer learning (peer networks), provide explicit support for farmers to gain comfort speaking to other farmers and their community about soil health and management decisions, and offer technical resources that help farmers conduct their own on farm demonstration trials. Future efforts will continue to emphasize strengthening economic and technical support farmers benefit from, including mechanisms for reducing risk, managing integration of practices, and building further opportunities for hands-on learning through farmer-centered and farmer-led field days and demonstrations. Such additions will strengthen the technical, economic, and social supports necessary to address the barriers identified throughout by this project and help accelerate broader adoption.

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Appendix

Appendix A: Social indicator survey

Cover Crop On-Farm Demo Trial:

Final Year Social Indicator Participant Survey, Year 5 (CLM-21)

On behalf of American Farmland Trust, we are grateful for your agreement to participate in the five-year Soil Health Demonstration Trial: Conquering Cover Crop Challenges Coast-to-Coast. One of the expectations we have of our collaborators is to participate in a social indicator survey in year 1, 3 and 5. This will help us track the impacts of this program. We thank you in advance for taking the time to respond to this survey. **We anticipate the survey taking you approximately 15 minutes to complete.**

Answers will remain confidential and only shared with the social indicator team leads. All other AFT and NRCS staff will receive aggregate level data with no personally identifying information shared. Data will be stored in a secure file on AFT's network. Please direct any questions regarding this survey to Ellen Yeatman, eyeatman@farmland.org, or you can reach out to your local project lead.

1. ***What is your first and last name?**

2. ***What state are you located in?**
   - ☐ California
   - ☐ Connecticut
   - ☐ Kentucky
   - ☐ Massachusetts
   - ☐ New York

3. ***Please choose your TOP THREE motivations for participating in this demonstration trial. Note, the following question addresses specific soil health goals. I wanted to …**
   - ☐ Improve biodiversity on my farm.
   - ☐ Improve crop yields/increase productivity on my farm.
   - ☐ Improve pollinator and beneficial insect habitat.
   - ☐ Increase my resilience to excess precipitation events (e.g., flooding).
   - ☐ Increase my resilience to drought.
   - ☐ Reduce erosion on my farm.
   - ☐ Reduce negative water quality impacts from my farm.
   - ☐ Reduce labor costs.
   - ☐ Reduce greenhouse gas emissions from my farm.
   - ☐ Reduce the time I spend in the field.
   - ☐ Save money by reducing input costs (e.g., fertilizer, fuel, livestock feed).
   - ☐ Sequester carbon in my soils.
   - ☐ Boost the profitability of my farm.
   - ☐ Other (please specify):

4. ***Choose the TOP THREE soil health outcomes you most wanted to achieve through your change in practices for this demonstration trial. Note, the following question asks about actual soil health outcomes.**

   I wanted to…

   - ☐ Boost my soil organic matter.
   - ☐ Improve my soil water holding capacity.
   - ☐ Improve habitat for soil organisms and beneficial microbes.
   - ☐ Reduce ponding and improve water infiltration rates.
   - ☐ Reduce compaction and improve soil structure.
   - ☐ Reduce sediment loss due to soil erosion
   - ☐ Reduce nutrient loss due to soil erosion
   - ☐ Increase plant available soil nutrients
   - ☐ Other (please specify):

5. **Did you observe these soil health outcomes? What soil health outcomes did you observe?**

6. ***How likely are you to continue implementing the conservation practices you are currently experimenting with as part of this program when our project is over?**

   - ☐ Very unlikely
   - ☐ Unlikely
   - ☐ Neither likely nor unlikely
   - ☐ Likely
   - ☐ Very likely
   - ☐ Other (please specify):

7. **What did you like or dislike about your cover crop treatment(s)?**

8. ***How likely are you to implement additional conservation practices or make further refinements to your soil management in the future?**

   - ☐ Very unlikely
   - ☐ Unlikely
   - ☐ Neither likely nor unlikely
   - ☐ Likely
   - ☐ Very likely
   - ☐ Other (please specify):

9. **What additional practices are you thinking of implementing on your farm in the future? Select all that apply.**

- ☐ Single species cover crops
- ☐ Multi-species cover crops
- ☐ Adaptive nutrient management
- ☐ Applying organic soil amendments (e.g., compost, manure)
- ☐ Adding biochar as a soil amendment specifically
- ☐ Reduced or Strip Tillage
- ☐ No-Till
- ☐ Short-season cash crop (e.g., early maturing corn)
- ☐ Experimenting with cover crop termination timing &/or method
- ☐ Experimenting with cover crop seeding rates
- ☐ Diversifying crop rotation/varietal selection
- ☐ Integrating livestock into cropping systems
- ☐ Other (please specify):
- ☐ None

10. **Is there anything else you would like to share regarding your intentions around continuing or discontinuing your conservation practices or approaches as explored in the questions above?**

11. **Please rate your agreement with the following statements from strongly disagree to strongly agree:**

A good farmer is one who maintains and increases their soil organic matter:
A good farmer reduces off-farm environmental impacts (e.g., water quality impacts):
A good farmer is one who works to reduce their on-farm inputs (e.g., fertilizer, pesticides, etc.):
A good farmer is one who puts long-term conservation of farm resources before short-term profits:
A good farmer is one who minimizes soil erosion:
A good farmer is one who has the highest yields per acre:
A good farmer is one who has the highest profits per acre:
A good farmer is one who gets their crops planted first:
A good farmer is one who uses the latest seed and chemical technology:
A good farmer maximizes government payments:
A good farmer improves the land for the next generation- leaves it better than when they got it:
A good farmer has clean and tidy-looking fields:
A good farmer works to maximize on-farm biodiversity:
A good farmer reads the latest university-based research to guide their farming practices:
A good farmer uses their own experience and expertise to guide their farming practices:
A good farmer is one who gives back to their community such as through food donations, mentorship, contributing to research, etc.

12. ***Please indicate your level of agreement with the following statements from strongly disagree to strongly agree:**

There is a link between water quality and farming practices:
There is a link between the health of my local watershed and farming practices in my region:

There is a link between farming practices and wildlife habitat:
There is a link between farming practices and pollinator habitat:
There is a link between crop diversity and pesticide use:
There is a link between farming practices and biodiversity:
There is a link between farming practices and climate change (e.g., GHG emissions):
There is a link between farming practices and resilience to extreme weather events (e.g., flooding and droughts):
There is a link between soil management and soil carbon sequestration:
There is a link between farming practices and human health:
There is a link between farming practices and worker satisfaction:

Part II: Programmatic Aspects

13. ***How satisfied are you with the following elements of our program?**
    - ☐ Financial support in the form of soil health practice payments
    - ☐ Financial support in the form of net income loss guarantee
    - ☐ Technical assistance provided by American Farmland Trust staff
    - ☐ Technical assistance provided by others involved in this project
    - ☐ Soil health testing and data assessment
    - ☐ Field day events
    - ☐ Opportunities to engage and educate new farmers so they will adopt new practices.
    - ☐ Economic information (e.g., treatment vs. control data, cost-benefit analysis, etc.)

14. ***How has your engagement with networks of other farmers or service providers changed since participating in this project?**
    - ☐ I have developed a network with the other farmers who are also participating in this On-Farm Demonstration Trial with American Farmland Trust.
    - ☐ I have developed new networks outside of this On Farm Demonstration Trial because of my new practice adoption/experimentation.
    - ☐ I have not developed any new networks.
    - ☐ Other (please specify):

15. ***What are the biggest challenges you have faced while working with AFT on this project? Choose all that apply.**
    - ☐ Weather-related challenges
    - ☐ Labor challenges
    - ☐ Invasive species
    - ☐ Pest management
    - ☐ Communicating with the AFT team
    - ☐ Getting access to farmer reports and other relevant data from this project
    - ☐ Insufficient incentives
    - ☐ Coordinating farm access with AFT staff
    - ☐ Insufficient technical assistance

- ☐ Challenges with filling out the Field Operations Worksheet
- ☐ Other (please specify):
- ☐ None of the above

16. *What could future programs provide to help you overcome these challenges? Choose all that apply.

- ☐ Provide additional funding for new practices, equipment, etc.
- ☐ Provide more technical assistance
- ☐ Help connect me with other specialists
- ☐ Improve our communications with you and your team
- ☐ Provide more guidance and troubleshooting on how to complete the Field Operations Worksheet
- ☐ Other (please specify):
- ☐ None of the above

17. *As a result of this project, has your understanding of the economic costs and benefits of adopting soil health practices improved?

- ☐ None at all
- ☐ A little
- ☐ A moderate amount
- ☐ A lot
- ☐ A great deal
- ☐ Other (please specify):

18. *As a result of this project, has your understanding of the benefits of soil health management improved?

- ☐ None at all
- ☐ A little
- ☐ A moderate amount
- ☐ A lot
- ☐ A great deal
- ☐ Other (please specify):

19. *As a result of participating in this project, how confident are you in speaking more about soil health to a broader community of your fellow farmers, farm community, or family?

- ☐ Not at all confident
- ☐ Not so confident
- ☐ Somewhat confident

- ☐ Very confident
- ☐ Extremely confident
- ☐ Other (please specify)

20. If you received a net income loss payment from AFT, please choose from the list of statements that best reflects your experience with the payment. Choose all that apply.

- ☐ The payment covered enough of my financial losses, making me more willing to continue implementing the trial.
- ☐ The payment hasn't changed my commitment to this project one way or the other.
- ☐ The payment was insufficient in covering my losses.
- ☐ Not applicable
- ☐ Other (please specify):

21. In the final year (year five) of this project, how are you thinking differently about your on-farm conservation goals?

22. What advice do you have for other farmers interested in adopting cover crops?

23. What was your biggest learning or takeaway from participating in this project?

24. Is there anything else you would like to share with us about your participation in this project?

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Appendix B: Farm focus group guiding questions

Purpose and Audience: Provide qualitative data to complement survey data collected in Years 1, 3, & 5 via social surveys to better understand the impact this cover crop demonstration trial had on farmers' behavior, knowledge, and attitudes towards cover crops and soil health management in general. Gather lessons learned to inform the administration of current/prospective regional demo trials, as well as for the project's final report.

Attendees: farmer participants only

Lead facilitators: Gabrielle Roesch-McNalley & Ellen Yeatman

Length of time and date: 1.5 hours; two sessions offered (Aug 13 & Sept 3)

Process Note: Meeting will be recorded to aid in social teams' analysis. No raw data will be shared beyond Gabrielle and Ellen. Notes will be anonymized and aggregated into a report, protecting the privacy of individuals.

Ground Rules: Respectful contributions, active listening, appreciative inquiry, kindness, and compassion.

Guiding Agenda & Questions

A. Farmer introductions include: name, location, crops grown, control versus treatment
B. What was the biggest thing you learned from participating in this cover crop trial?
C. What was the best part of participating in this cover crop adoption project?
    a. What specifically worked well in terms of engaging with AFT staff/systems?
        i. Probe for coordination/communication with AFT, soil sampling timing, securing cover crop seed and planting equipment, technical assistance on cover crop type and implementation, etc.
        ii. Data collection tools pros/cons
        iii. Data outputs (soil sample results, farmer reports)
        iv. Farmer engagement (field visits, field days, trial design)
D. What was the "worst" part, or what didn't work well? How could AFT improve how we do these demonstration trials again in the future?
    a. Probe for internal processes & feedback on the research specific to soil health or economics
E. What are you most worried about with continuing cover cropping on your own beyond the life of this project?
    a. How might you change your cover crop strategy?
    b. How might AFT or other organizations support you to continue implementing cover crops?
F. Do you plan on participating or want to participate in a demo trial again?
G. Finally, is there anything else relevant to what we have talked about today that you would like to share?

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Appendix C: Internal focus group guiding questions

Purpose and Audience: Examine lessons learned throughout the Conquering Cover Crop Challenges Coast-to-Coast project, and how to apply lessons learned to Biochar National CIG trial or other current/prospective regional demonstration trials.

Lead facilitator: Gabrielle

Internal team: Aysha, Bianca, Ellen, Robert, Michelle, Bianca

Regional team: Aaron, Brian, Caro, Paul, Harol, Vanessa

Length of time: 1.5 hours max

Process Note: Meeting will be recorded to aid in social science team analysis. No raw data will be shared beyond Gabrielle and Ellen. Notes will be anonymized and aggregated into a report, protecting the privacy of individuals.

Ground Rules: Respectful contributions, active listening, appreciative inquiry, kindness, and compassion.

Guiding Questions

A. What worked well this past year, and what might you have changed? Probe for:
    a. Internal project coordination/communications (meetings, 6-month reporting deadlines, soil sampling timing, Teams channels communications, CLM-21 tracker, budgeting, tracking farmer, tracking deliverables)
        i. clarity around roles and responsibilities
        ii. Data collection & outputs (i.e., annual farmer report)
    b. Farmer engagement strategies (recruitment, field visits, trial design, field days)
    c. Final year process (e.g., final payments, final data collection and reporting)
B. What lessons from this would you want us to be sure to carry forward into our future projects?
    a. How might *you* individually change your approach?
    b. How might *we* collectively work differently using what we learned?
C. What else have you learned from working with farmer participants?
D. What new insights do you have about soil health or soil health adoption that perhaps you didn't know before engaging in this cover crop project?
E. As you think about this project coming to an end, are there any resources that we want to be sure to share with farmers in our network before we officially close this project?
    a. What resources could be developed for future projects with this knowledge in mind?
F. How are you thinking about continuing to work with these participants after the project ends?
G. Finally, is there anything else relevant to what we have talked about today that you would like to share?

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Appendix D: Field Day Exit Survey

Thank you for your participation!

You are receiving this survey because you participated in an event as part of our Conquering Cover Crops from Coast-to-Coast project. These surveys are used to understand the impact of our programming, strengthen our network, and improve future events. This approximately 10-minute survey is voluntary and anonymous. The survey is broken into the following two sections: 1) understanding motivations for using soil health practices, and 2) an optional demographic survey. Answers will remain confidential and only shared with the evaluation team leads. All other AFT and NRCS staff will receive aggregate level data. Please direct any questions regarding this survey to Ellen Yeatman at eyeatman@farmland.org, or you can reach out to your local AFT contact.

1. **What field day did you attend (listed by state)?**
   - ☐ California
   - ☐ Connecticut
   - ☐ Kentucky
   - ☐ Massachusetts
   - ☐ New York
2. **How useful was the content of this field day?**
   - ☐ Extremely useful
   - ☐ Very useful
   - ☐ Somewhat useful
   - ☐ Not so useful
   - ☐ Not at all useful
3. **Have you attended an AFT event before?**
   - ☐ Yes
   - ☐ No
   - ☐ If yes, please share which one(s):
4. ***Are you a farmer?**
   - ☐ Yes
   - ☐ No *(skip to question #10)*

FARMERS-ONLY QUESTIONS: If you are a farmer, answer questions 5-8, then 16-25; otherwise, skip to question 9.

5. ***What was your knowledge of and experience with cover crops PRIOR to this event?**
   - ○ Never heard about it
   - ○ Heard about it, but never tried it
   - ○ Experimented with it on my farm but discontinued use
   - ○ Experimenting with it on my farm
   - ○ Plant consistently on my farm

6. **What practices are you currently doing on your farm, and what practices would you like to be doing on your farm? Choose all that apply.**

Practice	Currently Doing	Hoping to do
Single species cover crop		
Multi-species cover crop		
Adaptive nutrient management		
Applying organic amendments (e.g., compost, manure)		
Applying biochar as a soil amendment		
Reduced or strip tillage		
No-till		
Short-season cash crop (e.g., early maturing corn)		
Experimenting with cover crop termination from timing to method		
Experimenting with cover crop seeding rates		
Diversifying crop rotation/varietal selection		
Integrating livestock into cropping systems		
I am not using any of these practices on my farm		

Other (please specify):

7. **Please choose at least three motivations for adopting (or wanting to adopt) new soil health practices for your farm.**

I want to...

- ☐ Improve biodiversity
- ☐ Improve crop yields/increase productivity
- ☐ Improve pollinator and beneficial insect habitat
- ☐ Increase my resilience to excess precipitation events (e.g., flooding)
- ☐ Increase my resilience to drought
- ☐ Reduce erosion
- ☐ Reduce negative water quality impacts from my farm
- ☐ Reduce labor costs

- ☐ Reduce greenhouse gas emissions
- ☐ Reduce the time I spend in the field
- ☐ Save money by reducing input costs (e.g., fertilizer, fuel, livestock, feed)
- ☐ Sequester carbon in my soils
- ☐ Boost profitability
- ☐ Other (please specify):

8. **Choose at least three soil health outcomes that you are hoping to achieve through a change in your current practices. I want to...**
   - ☐ Boost my soil organic matter
   - ☐ Improve my soil water holding capacity
   - ☐ Improve habitat for soil organisms and beneficial microbes
   - ☐ Reduce ponding and improve water infiltration rates
   - ☐ Reduce compaction and improve soil structure
   - ☐ Reduce sediment loss due to soil erosion
   - ☐ Reduce nutrient loss due to soil erosion
   - ☐ Increase plant-available soil nutrients
   - ☐ Other (please specify):

9. **What are your concerns about adopting new soil health practices if applicable, specifically cover crops, on your farm? Choose all that apply.**
   - ☐ I don't know which cover crop(s) are best suited for my needs or area
   - ☐ I am worried about cover crops' adverse effects to my cash crops
   - ☐ I am concerned about resources, equipment, and know-how associated with cover crop establishment/termination and cash crop planting/harvest
   - ☐ I am worried about the added costs associated with new practices and how they might affect my operating expenses and return on investment
   - ☐ I am worried that my landlord or neighbors will not be supportive of the use of these new conservation practices
   - ☐ Other (please specify):

END OF FARMER-ONLY QUESTIONS *– skip to question #16*

RESOURCE PROVIDER –ONLY QUESTIONS:

10. ***As a non-farmer, how would you describe yourself?**
    - ☐ Extension staff
    - ☐ Non-farming landowner
    - ☐ Non-profit staff
    - ☐ Land Trust Staff

- ☐ Agricultural Educator
- ☐ Policy Maker
- ☐ Private ag industry professional (e.g., crop consultant, seed dealer, food distributor, etc.)
- ☐ State or Federal Agency Staff
- ☐ Prefer not to answer
- ☐ Other (please specify):

11. ***What is your experience with cover crops? Select all that apply.**
    - ☐ None
    - ☐ Cover crop seed dealer
    - ☐ Cover crop equipment dealer
    - ☐ Provide financial assistance
    - ☐ Provide technical assistance
    - ☐ Research
    - ☐ Other experience (please describe):
12. **How comfortable were you in providing technical information on the following topics BEFORE attending this event?** *(Likert 5-scale from not at all comfortable to extremely comfortable.)*
    - ☐ Improving habitat for soil organisms and beneficial microbes
    - ☐ Reducing ponding and improving water infiltration rates
    - ☐ Reducing compaction and improving soil structure
    - ☐ Reducing erosion
    - ☐ Increase plant-available soil nutrients
13. **How comfortable were you in providing technical information on the following topics AFTER attending this event?** *(Likert 5-scale from not at all comfortable to extremely comfortable.)*
    - ☐ Improving habitat for soil organisms and beneficial microbes
    - ☐ Reducing ponding and improving water infiltration rates
    - ☐ Reducing compaction and improving soil structure
    - ☐ Reducing erosion
    - ☐ Increase plant-available soil nutrients
14. **How likely are you to take any of the listed actions following this meeting?** *(1 being not at all likely and 5 being very likely.)*
    - o Follow up with one or more of the farmers/landowners you met today about the resources your organization offers
    - o Consider ways that your organization could better conduct soil health outreach
    - o Consider ways to better support cover crop adoption in your region
    - o Talk with others at your organization about how to improve cover crop adoption
    - o Other (please specify):
15. **What resources might you need to further support cover crop practice adoption in your region? Check all that apply.**
    - o More financial incentives to support regional adoption
    - o More technical assistance to support my outreach goals

- More target economic information to help farmers see the potential benefits of conservation
- Support for communicating and engaging farmers in new and creative ways
- Support in taking and interpreting soil health testing
- Support developing on-farm soil health trials
- Other (please specify):

Remaining questions for all:

16. For future field days/workshops, what topics might interest you? Choose all that apply.

- ☐ Biochar amendments for soil health
- ☐ Advanced cover crop management strategies
- ☐ Nutrient management strategies to maximize cover crop benefits
- ☐ Conducting your own side-by-side trials
- ☐ Diversifying your cash crop rotation
- ☐ Other (please specify):

17. Is there anything else you would like to share with us about our event?

18. Please leave your contact information with us if you would like to be signed up for AFT newsletters or to be contacted in the future by local AFT staff about events near you.

- ☐ Name
- ☐ Zip code
- ☐ Email

19. We are working to track the demographic information of our participants to aid in our understanding of who we are reaching and identify gaps in our efforts to reach a more diverse group of producers. Would you be willing to provide answers to a few demographic questions?

- ☐ Yes
- ☐ No

Optional demographic questions

20. Are you a Beginning Farmer?

- ☐ No – Farming/Ranching 10 Years or more
- ☐ Yes – Farming/Ranching 6-10 Years
- ☐ Yes – Farming/Ranching 1-5 Years
- ☐ Yes – Farming/Ranching less than 1 Year
- ☐ Prefer not to answer

21. How old are you?

- ☐ Under 25 years
- ☐ 25-34 years
- ☐ 35-44 years
- ☐ 45-54 years

- ☐ 55-64 years
- ☐ 65 years or over
- ☐ Prefer not to answer

22. Please choose the option(s) that best describes your gender identity. Select all that apply.

- ☐ Man
- ☐ Woman
- ☐ Transgender
- ☐ Non-binary/third gender
- ☐ Prefer not to answer
- ☐ Prefer to self-describe:

23. What is the highest level of school you have completed or the highest degree you have received?

- ☐ Some high school
- ☐ High school degree or equivalent (e.g., GED)
- ☐ Some college but no degree
- ☐ Associate's degree (e.g., AA, AE, AFA, AS, ASN)
- ☐ Bachelor's degree (e.g., BA, BS, BFA)
- ☐ Master's degree (e.g., MA, MBA, MFA, MS)
- ☐ Applied or professional doctorate degrees (e.g., MD, JD, DDC, DDS, PharmD)
- ☐ Doctorate degree (e.g., EdD, PhD)
- ☐ Other (please specify): *write-in*

24. Which of the following describes your racial or ethnic identity? Select all that apply to you.

- ☐ American Indian or Alaska Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latino Origin
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White or European
- ☐ Some other race, ethnicity, or origin (please specify):
- ☐ Don't know
- ☐ Prefer not to answer

25. Have you ever served on active duty in the U.S. Military?

- ☐ Yes, currently serving on active duty
- ☐ Yes, currently serving in the Reserves
- ☐ Yes, currently a veteran
- ☐ Never served in the military
- ☐ Prefer not to answer

Appendix E: Example Farm Trial Designs

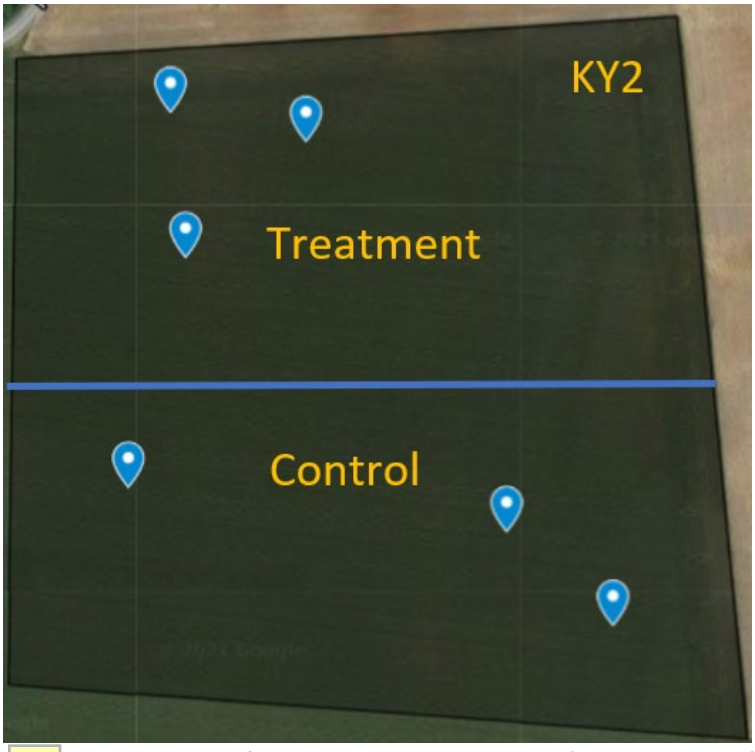

Photo A: Example of a side-by-side trial design (non-replicated)

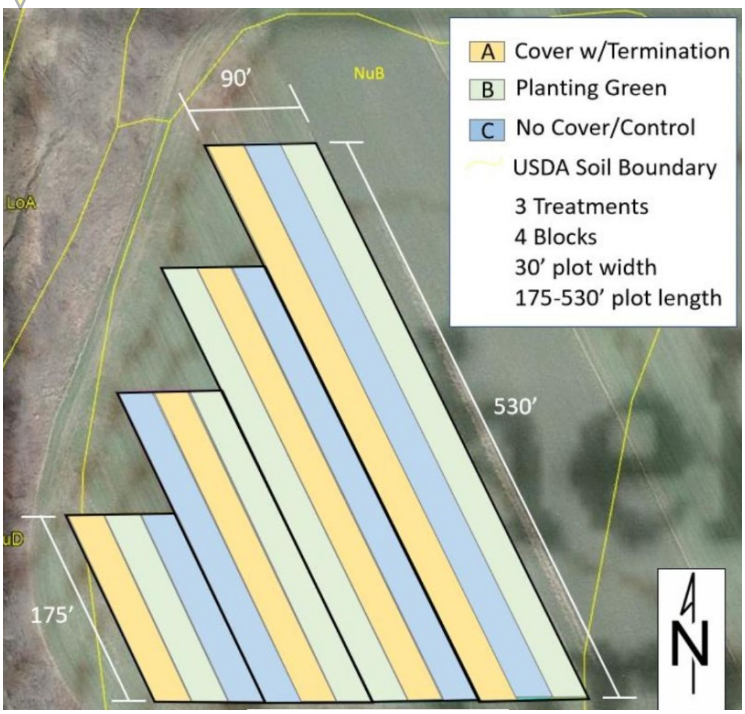

Photo B: Example of a replicated trial design