

2023 Soil Health Benchmark Study:

Project Overview for Research Collaborators

Objective: The Soil Health Benchmark Study is a community science project that enables farmers to work collaboratively to build healthy soil on their farms, and advance our collective understanding of how farming practices can degrade or enrich soil over time.

Background: The study was developed by Pasa Sustainable Agriculture (Pasa) in 2016, with the goal of empowering farmers to make informed decisions that are best for their farms, their land, and their communities. Today, Pasa continues to administer the study in collaboration with a growing list of vegetable, pastured livestock, and row crop farmers and partners including the Bionutrient Institute, Cornell Soil Health Laboratory, Future Harvest and the Million Acre Challenge, Maine Farmland Trust and Wolfe's Neck Center, Penn State Extension, Stroud Water Research Center, OpenTEAM, and OurSci. As of 2022, we had over 150 farmer research collaborators across three states!

Through funding from a Partnerships for Climate-Smart Commodities grant, we are actively expanding the scope of this project to include urban agriculture and agroforestry cohorts, and to engage farmer research collaborators across 15 states and territories.

The Soil Health Benchmark Study was initially made possible thanks to generous financial investments from Lady Moon Farms, the Jerry Brunetti family, the Shon Seeley family, and more than 120 private donors committed to supporting farmers' efforts to build and preserve soil health. Additional financial support has been provided by the William Penn Foundation, the Hillman Foundation, the Pennsylvania Department of Agriculture, and the USDA.

Basic framework: Research collaborators agree to work with their study coordinator to perform soil sampling in their fields in the fall and to submit appropriate field management records at the end of the year.

Participation is optional for the following:

- Farmers can work with Pasa to measure water infiltration in their fields.

Research Collaborators receive:

- Three fully subsidized soil health tests from the Cornell Soil Health Lab.
- A detailed benchmark report that shows how your soil health test outcomes and soil management practices compare to peer farms.
- Connection to a learning community of farmers who are working to solve practical soil health challenges.

Pasa and organizational partners will retain the opportunity to use data collected in this study for future workshops, presentations, and publications. For all public presentations of these data, farm names and identifying information will be kept anonymous.

Key Dates to Remember

ASAP: Farmers return the 2023 Research Collaborator Agreement

Mid-October through mid-December 2023: Soil sampling and optional water infiltration testing happens on farms

January 20, 2024: Farmer's 2023 field management records are due to Pasa

March 1, 2024: Farmers receive 2023 soil health test results by this date from Pasa

Fall 2024: Farmers receive 2023 soil health benchmark summary and infographic from Pasa

Participation Steps

STEPS:

1) REQUIRED: Return the 2023 Research Collaborator Agreement to your study coordinator.

You can access all other documents, protocols and record templates for this project on our soil health research collaborator webpage: <https://pasafarming.org/soil-health-research-collaborators/> (Bookmark this webpage for future use!)

2) REQUIRED: Maintain detailed 2023 field management records for your three designated research fields. The records required include: soil disturbance and equipment activity; planting and termination dates of all cash and cover crops; all soil amendments; grazing events; pesticide records (row crop farms only). You can review more detailed field record instructions and example tables in our Methods Guide and stand alone record protocols. Visit our website to quickly access and download these documents:

<https://pasafarming.org/soil-health-research-collaborators/>

- **New participants:** We will help you choose the most appropriate three research fields for sampling on your farm. (This normally happens during the fall sampling visit.) These should be *three production fields* on your farm that correspond to different phases of your crop rotation. These fields should also represent typical performers, soil types and topographic positions on your farm. If your farm has multiple enterprises, like a vegetable and a livestock operation, it can be ideal to pick three research fields from one enterprise, unless they are fully integrated with each other or there is a compelling reason.
 - Vegetable farm example: If your farm practices a three-year vegetable rotation involving fall brassicas in year one, tomatoes and peppers in the next year, to a full year of cover crops, the research fields should each be in one of these rotational phases.

- Pastured livestock farm example: If your farm is divided into roughly a third permanent pastures, a third hay fields, and a third annual crops, each research field should represent one of these production uses.
- Row crop farm or grain example: If your farm practices a six-year crop rotation involving two years of corn silage, to one year of soybean, to three years of alfalfa, the research fields should represent a field in first year corn, a field in soybean, and a field in second year alfalfa.
- **Returning participants:** If you participated in the 2022 study, maintain records on the same three fields for 2023.

Field management records are due by **January 20, 2024**. Please submit your records according to the instructions below on or before this date.

You have several options for submitting records:

- **Preferred method: Submit your records using an online survey tool through SurveyStack.** *All farmers with an email address have a SurveyStack account created for them automatically.*

Why use this method: You can access your survey throughout the year using your desktop computer, tablet or smartphone to enter your field management records. This tool uses the same format as our other record templates, but there are also features that make entering your records easy—like drop down selection boxes and the ability to quickly copy similar entries. We're also able to more quickly organize and analyze your records, which means we can send you insights and reports sooner!

If you would like guidance in submitting your field management records through SurveyStack, please reach out to the Pasa research team. (researchteam@pasafarming.org; 814-349-9856)

- **Alternative method: Submit your records using our field management record templates.**
 - For downloadable electronic record templates or printable record templates, please visit the soil health research collaborator webpage: <https://pasafarming.org/soil-health-research-collaborators/>
 - For print copies to be mailed to you, please reach out to your study coordinator. (for Pasa: researchteam@pasafarming.org; 814-349-9856)
- **Alternative method: Submit your own records.** If you are submitting your own records, please review the field records protocol to make sure that all necessary information is provided.

Improve your record keeping with farmOS: With this flexible, online record keeping system, you can keep track of all your records throughout the year, and then send us the necessary information at the end of the season. Contact the Pasa research team (researchteam@pasafarming.org; 814-349-9856) for more information and support in using this tool.

3) REQUIRED: Perform soil sampling after all equipment activity and all soil disturbance for the year, which would generally be from **mid-October through mid-December 2023**, using protocols provided by Pasa. All sampling must be completed before the ground freezes.

- **New participants:** We will visit your farm to take soil samples. Please make plans to be available for 2 hours on this day to review protocols and to participate in soil sampling.
- **Returning participants:** We will coach you on how to collect and submit your own samples to the Cornell Soil Health Lab and send you a soil sampling kit in the mail in the beginning of October. (Note: The soil sampling protocol has shifted slightly for 2023, please be sure to review before sampling!) Pasa and organizational partners will cover the costs of shipping and testing services for your samples. *And if assistance is needed for sampling, Pasa staff can help you!*

OPTIONAL: Perform water infiltration measurements from mid-October through November 2023 with on-farm assistance from Pasa. We will plan to help take your soil samples during the same time.

We will be measuring water infiltration through double infiltration rings filled with water to measure the infiltration rate at a select number of soil sampling locations. One of your research fields will be designated for these measurements. We will visit your farm to work with you on taking infiltration measurements. Please make plans to be available for an additional 1-1.5 hours on this day to review the protocol (found on pages 19-24 of the Methods Guide) and to participate in taking infiltration measurements.

- **New water infiltration participants:** We will discuss with you which field is most appropriate prior to October.
- **Returning water infiltration participants:** We will plan to collect infiltration data in the same field as previous years.

4) Receive soil test results, a custom benchmark summary, and a custom soil health infographic from Pasa and organizational partners. Your Cornell Soil Health test results will be shared with you by March 1st 2024. Your custom soil health benchmark summary and soil health infographic will be shared with you in fall 2024

Your farm benchmark summary will report your farm's data (management records and soil test results) in comparison to the data from other participating farms. Key soil health indicators will include: soil organic matter, soil biological activity, soil nutrient levels, days of living cover, and a tillage intensity index.

Your farm soil health infographic will summarize headline data that you can share with your customers, neighbors, and friends to communicate the benefits of soil stewardship.

5.) Participate in ongoing soil health learning community opportunities. Pasa and organizational partners will host a series of conference workshops, webinars, conference calls, and in-person workshops throughout the calendar year. At these educational events, we will explore the data and collaboratively develop new ideas and

recommendations for further improving soil health. The format of these events will be adjusted as necessary in order to best meet the needs and availability of participants.