SOIL HEALTH INSTITUTE

Enriching Soil, Enhancing Life

TRUTERRA CLIMATE SMART: EARLY ADOPTER PROGRAM

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Who is Soil Health Institute (SHI)?

Our Mission:

To safeguard and enhance the vitality and productivity of soils through scientific research and advancement

Truterra Climate SMART – SHI team

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SHI's partners

North American Project to Evaluate Soil Health Measurements (NAPESHM)

- **124 long term experimental sites**

  Paired treatments- tillage, cover crops, crop rotations

  0-15 cm depth

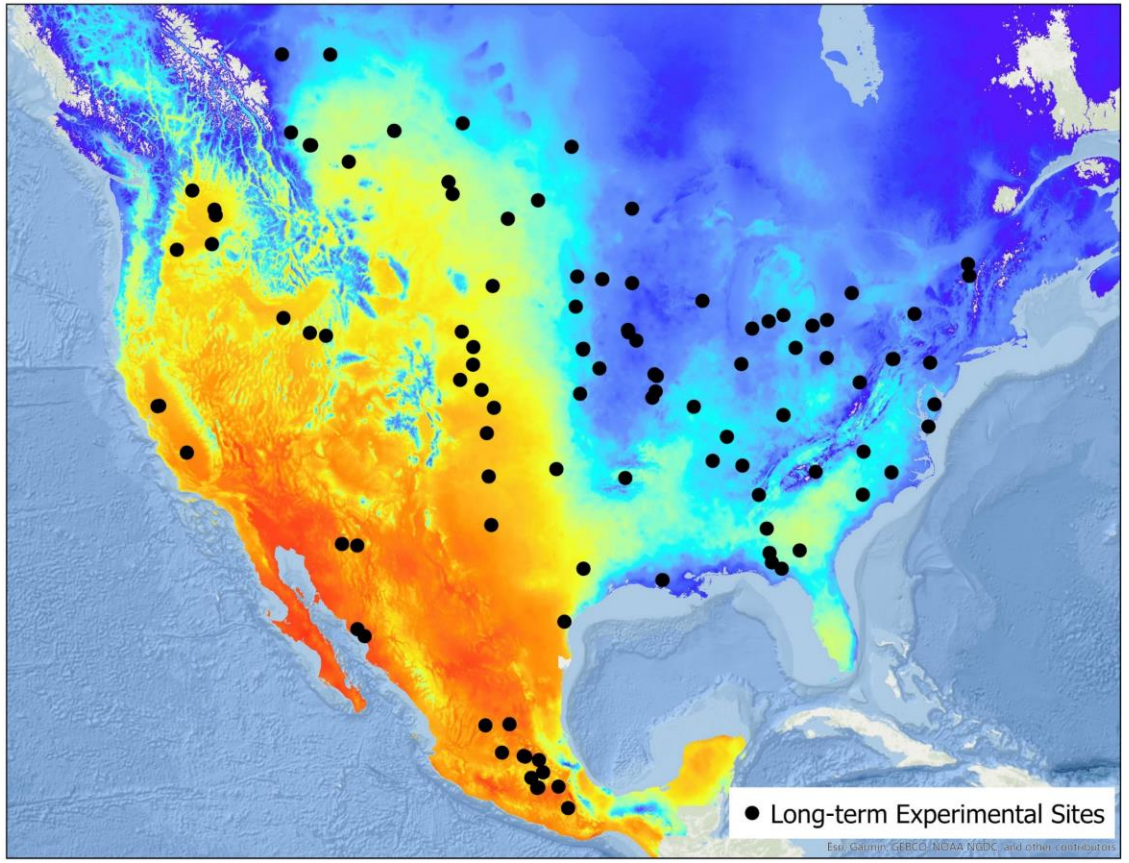
- **Identify most effective indicators of soil health**

- Soil Organic Carbon

- C mineralization Potential

- Aggregate Stability

- Predicted plant available water



Early Adopter Program (Initiative 5)

- Early Adopters are producers that have been practicing soil health or climate smart practices for greater than 8 years
- Early Adopters are often overlooked in traditional or market-based incentive programs

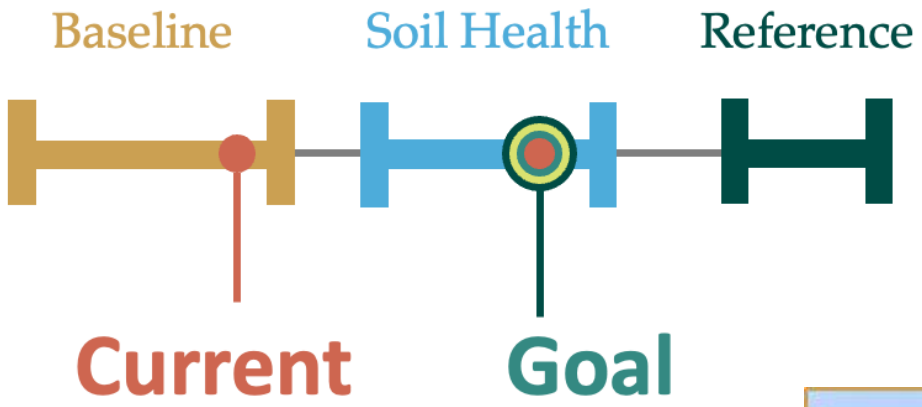
Goal: To reward and engage early adopters, understand the impacts of long-term climate smart management on soil health, leverage the knowledge and experience of early adopters to promote climate smart practice adoption

Primary Program Tasks

1. Soil health benchmarking: Quantify the impact of long-term climate-smart practice adoption on soil health for early adopter farms
2. Economic analysis: quantify the economics of climate smart practices for early adopter farms using SHI's partial budget economic analysis
3. Disseminate results of benchmarking and economic analysis through reports and Truterra-led outreach

Benchmarking Soil Health

Soil Health Indicators



Reference

Baseline

Soil Health (Early Adopters)

ECONOMICS of Soil Health Systems

Yellow River and Upper Iowa River Watersheds of Iowa

FARM SIZE
1,040 crop acres

CROPS GROWN
Corn:
692 acres
Soybean:
346 acres

SOIL TEXTURE
Silty clay loam

SOIL HEALTH MANAGEMENT SYSTEM
No-till production
Cover crops
Soils amended with dairy manure
Grid sampling to monitor nutrient levels and for variable rate applications

NET INCOME INCREASE
Corn
$32.72/acre
Soybean
$24.26/acre

FARM #20

INTRODUCTION

The Don Elsbernd farm in the Yellow River and Upper Iowa River Watersheds of Iowa increased profitability by increasing yields for corn and soybean with a soil health management system (SHMS) of no-till production and cover crops. No-till and strip till have been practiced for 25 years and cover crops planted for 10 years.

Benefits of the SHMS reported by the farmer:

- → **IMPROVED** WATER INFILTRATION
- → **DECREASED** EROSION
- → **REDUCED** PHOSPHOROUS AND POTASSIUM APPLICATIONS
- → **INCREASED** SOIL ORGANIC MATTER
- → **IMPROVED** WEED MANAGEMENT

ADDITIONAL INFORMATION ON THE FARM IS AVAILABLE IN A REPORT AND VIDEO PRESENTATION AT WWW.NACDNET.ORG/SOIL-HEALTH-ECONOMICS.

METHODS

The Soil Health Institute conducted an interview to obtain production information for evaluating economics of the soil health system based on partial budget analysis. In this approach, the benefits and costs of a soil health system are assessed by calculating changes in revenue and expenses before and after adoption of that system. The change in net farm income associated with adopting a SHMS is calculated as shown below and presented in Table 1.

Net change in farm income = Benefits – Costs, where:
Benefits = Reduced Expenses + Additional Revenue
Costs = Additional Expenses + Reduced Revenue

A DETAILED DESCRIPTION OF THE METHODOLOGY FOR PARTIAL BUDGET ANALYSIS CAN BE FOUND AT HTTPS://SOILHEALTHINSTITUTE.ORG/ECONOMICS.

FINDINGS

Initial Management System and Reduced Expenses

- → The initial management system was conventional tillage.
- → Post-plant weed management was exclusively with herbicide in conventional tillage.
- → A field trip with a chisel plow and a field cultivator were eliminated for both crops.
- → Phosphorous and potassium were reduced 20% for both crops.
- → Total reduced expenses were $33.94/acre for both corn and soybean.

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USDA United States Department of Agriculture Natural Resources Conservation Service

Soil Health Management System and Additional Expenses

- → The soil health management system adopted was no-till production with cover crops.
- → Cover crops were planted on as much acreage as weather conditions permitted.
- → Winter/cereal rye was drilled in the fall, after the preceding crop harvest.
- → Corn and soybean were planted into the living cover crop with a no-till planter.
- → Termination of cover crops with herbicide was not an additional expense.
- → Cover crop seed costs were $10.00/acre for both corn and soybean.
- → Winter/cereal rye was custom drilled at an expense of $16.00/acre.
- → Post-harvest expenses due to increased yields were hauling and check-off fees for corn and soybean, as well as additional drying cost for corn.
- → Total additional expenses were $43.22/acre for corn and $39.68/acre for soybean.

Soil Health Management System Impact on Farm Income

- → Additional expenses were $9.28/acre greater than reduced expenses for corn.
- → Additional expenses were $5.74/acre greater than reduced expenses for soybean.
- → Yield increased by 10 bu./acre, providing additional revenue of $42.00/acre for corn.
- → Yield increased by 3 bu./acre, providing additional revenue of $30.00/acre for soybean.
- → **Net farm income increased by $32.72/acre for corn and $24.26/acre for soybean.**

Table 1. Partial Budget[1] Analysis, 25 Years with a Soil Health Management System on a 1,040-Acre Farm, $ per Acre per Year (2019 Dollars).

	Corn		Soybean	
	BENEFITS	COSTS	BENEFITS	COSTS
Expense Category	REDUCED EXPENSE	ADDITIONAL EXPENSE	REDUCED EXPENSE	ADDITIONAL EXPENSE
Seed	0.00	10.00	0.00	10.00
Fertilizer & Amendments	7.64	0.00	7.64	0.00
Pesticides	0.00	0.00	0.00	0.00
Fuel & Electricity	3.30	1.03	3.30	1.03
Labor & Services	7.81	20.69	7.81	20.69
Post-harvest Expenses	0.00	4.50	0.00	0.96
Equipment Ownership	15.19	7.00	15.19	7.00
Total Expense Change	**33.94**	**43.22**	**33.94**	**39.68**
	ADDITIONAL REVENUE	REDUCED REVENUE	ADDITIONAL REVENUE	REDUCED REVENUE
Yield, bu./acre	10.00	0.00	3.00	0.00
Price Received,[2] $/bu.	4.20	4.20	10.00	10.00
Revenue Change	**42.00**	**0.00**	**30.00**	**0.00**
	TOTAL BENEFITS	TOTAL COSTS	TOTAL BENEFITS	TOTAL COSTS
Total Change	**75.94**	**43.22**	**63.94**	**39.68**
Change in Net Farm Income	**32.72**		**24.26**	

1 Expenses and expected yields based on farmer reported production practices. (https://soilhealthinstitute.org/economics/)
2 Commodity prices applied to yields based on long-term average prices. Irwin, S. "IFES 2018: The New, New Era of Grain Prices?" Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 11, 2019.

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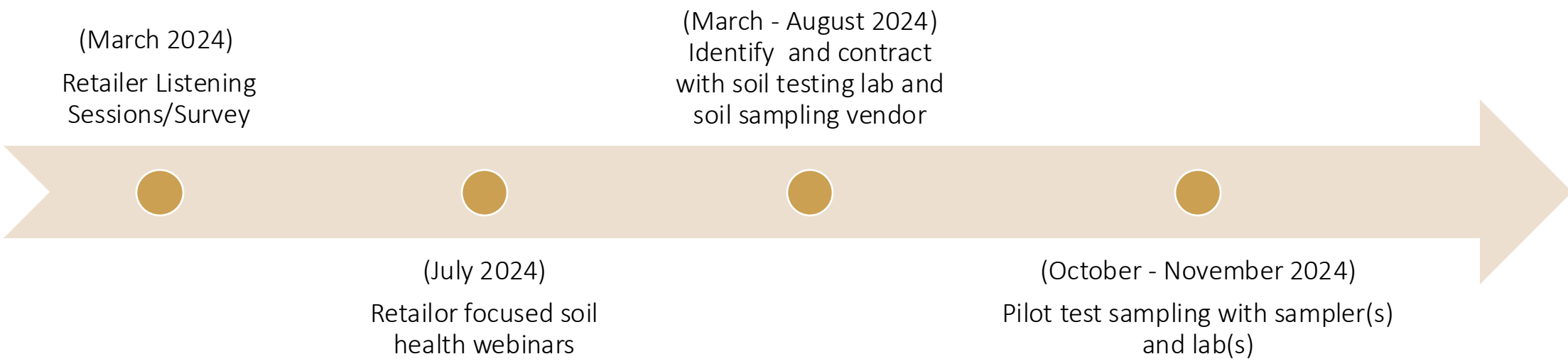
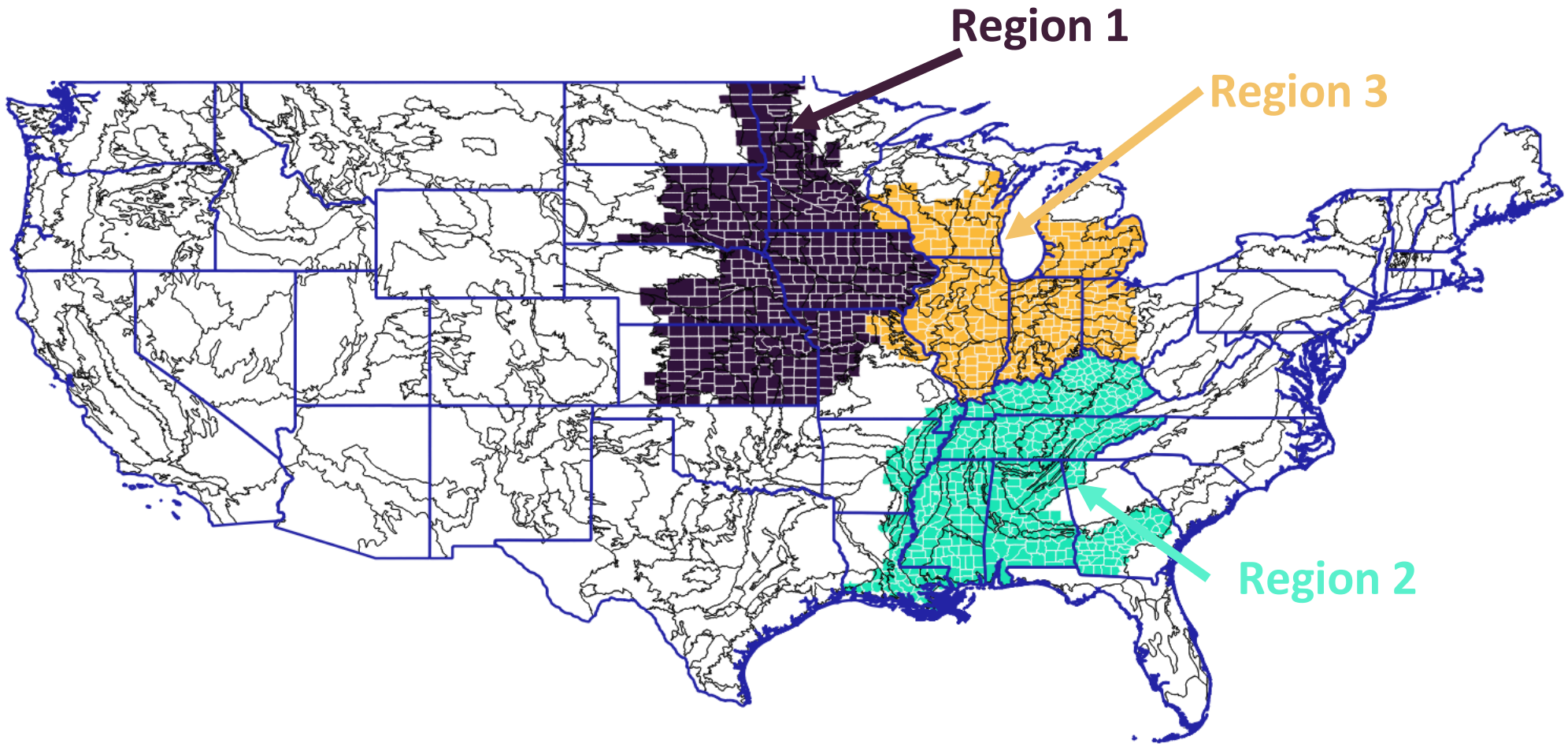
2024 Early Adopter Workplan

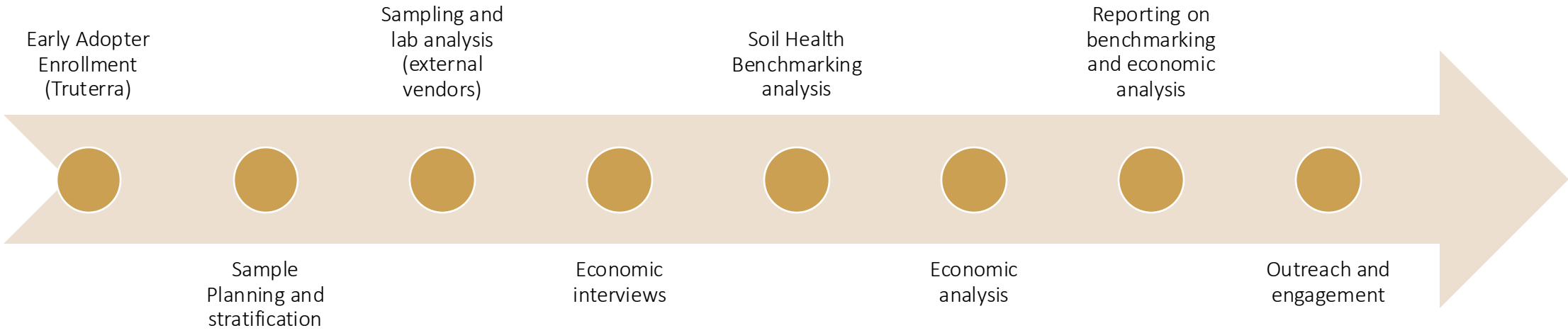
Overall Goal: prepare for regional benchmarking, economic analysis and grower engagement



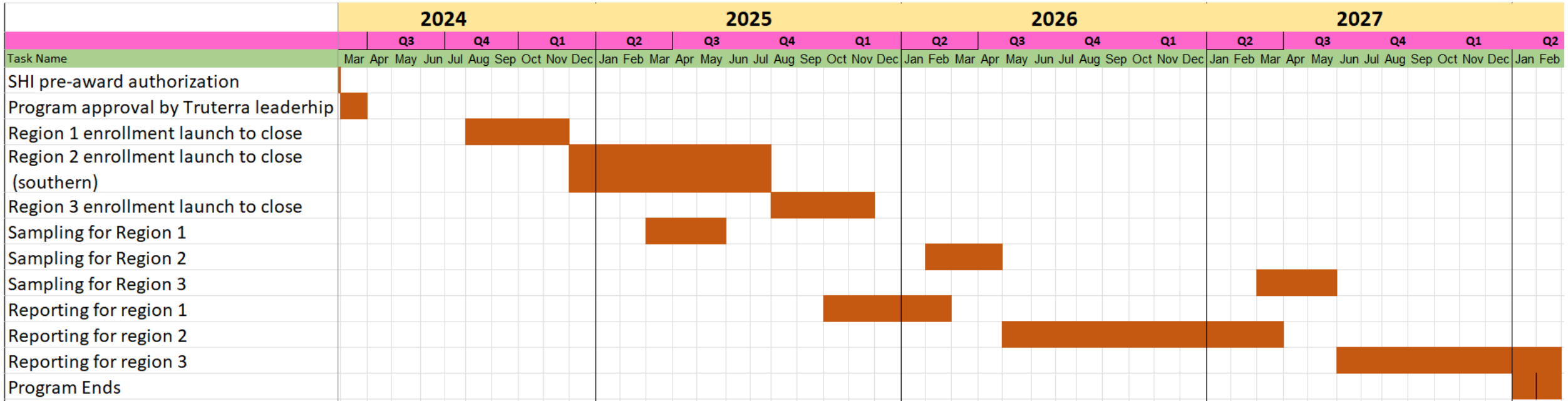
Program Regions



Generalized regional timeline



Plans for 2024, 2025, 2026, 2027, and 2028



Mid-Project Reporting to Farmers

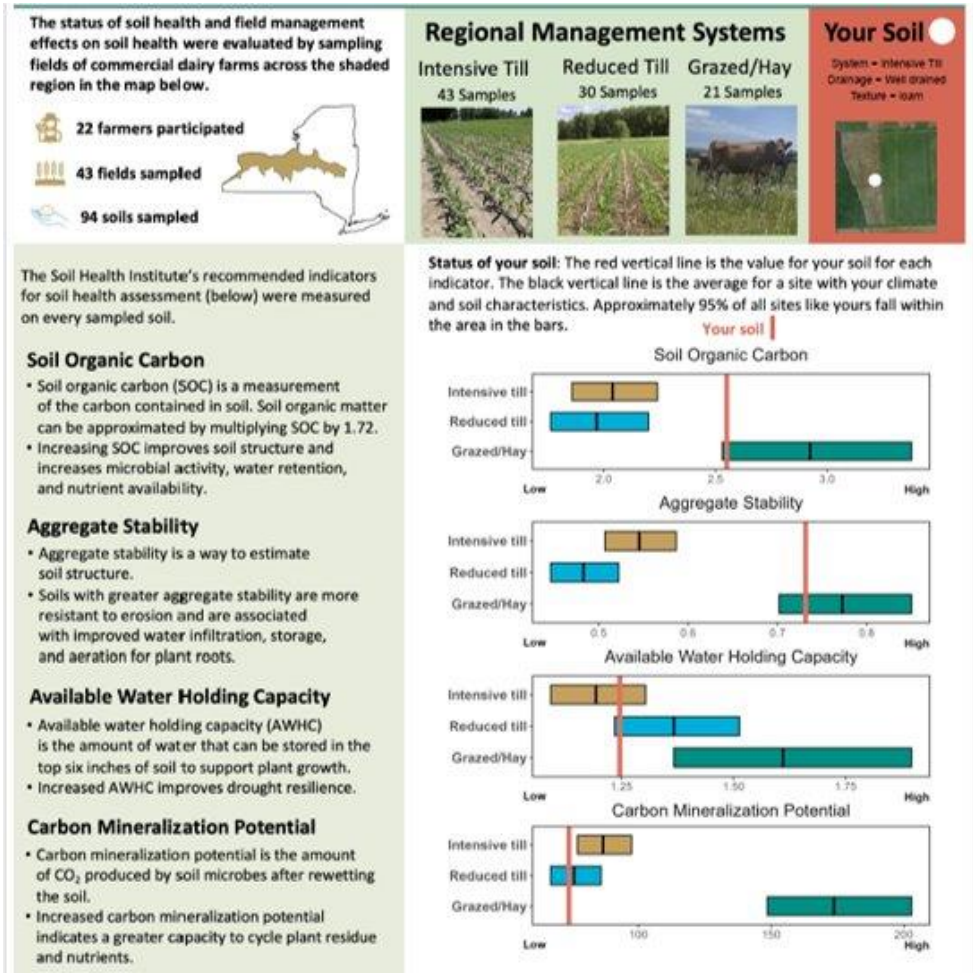
- Every participating farmer will receive information during the project period
- Enrolled farmers having their fields sampled will receive field-level reports
- All enrolled farmers will receive a regional report upon completion of the regional study

Example of farmer reports

- Quantify the soil health state of the soil
- Quantify practical soil health targets

Contains

- Context on where and how many samples
- Context on the different management being compared
- Context on different soil health indicators being measured
- Graphical representation of each soil health indicator
- Detailed soils result on the samples from the farm



Goals by the end of the program

- We will have quantified the effect of long-term climate smart practice adoption on soil health via soil sampling early adopter farms
- We will have quantified the economic benefit of long-term climate smart practice adoption using the experience of early adopters
- We will have shared results of soil health and economic analysis via reports, regional summaries, and cooperation with Truterra SMART partner events