USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

REGENERATIVE PILOT PROGRAM

Soil Health Testing and the Regenerative Pilot Program

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FARM PRODUCTION AND CONSERVATION
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- Regenerative agriculture is a conservation management approach that emphasizes natural resources through improved soil health, water management, and natural vitality for the productivity and prosperity of American agriculture and communities.
- The Regenerative Pilot Program (RPP) is a farmer-first, outcomes-based approach to conservation designed to keep working lands in working hands
- RPP addresses whole-farm resource concerns through support for voluntary regenerative agriculture Conservation Plans.

NRCS website
https://www.nrcs.usda.gov/programs-initiatives/regenerative-pilot-program

Regenerative Pilot Program Requirements

- Whole Farm Assessment
- Primary Practices
- Soil Health Testing
- Minimum 5-year contract




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CEMA 216 Soil Health Testing

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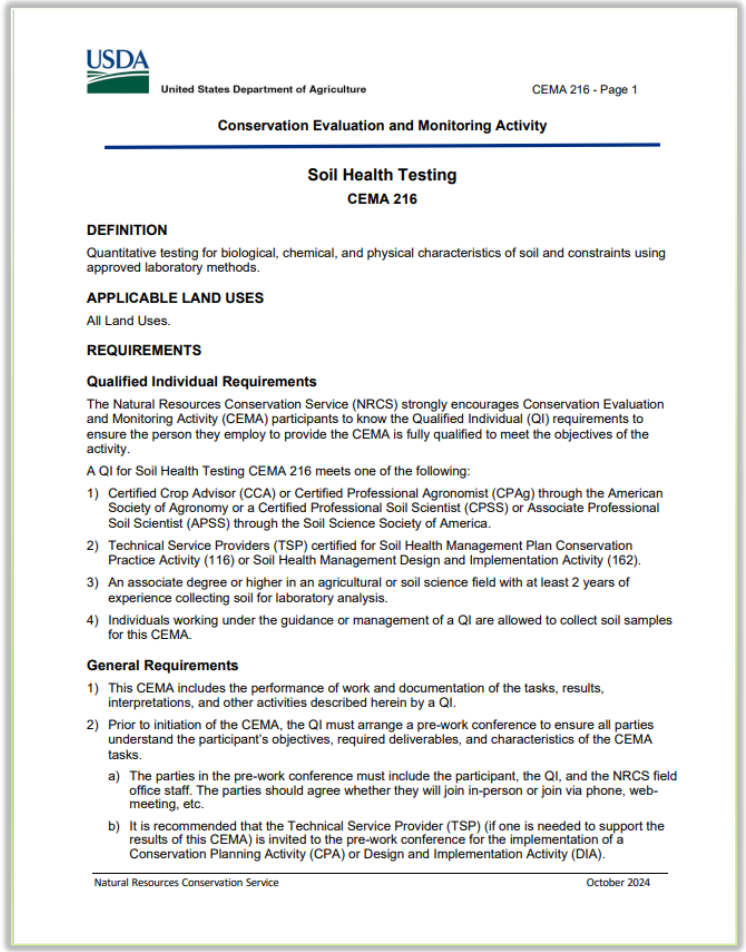
CEMA 216 Soil Health Testing



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Conservation Evaluation and Monitoring Activity

Soil Health Testing
CEMA 216

DEFINITION

Quantitative testing for biological, chemical, and physical characteristics of soil and constraints using approved laboratory methods.

APPLICABLE LAND USES

All Land Uses.

REQUIREMENTS

Qualified Individual Requirements

The Natural Resources Conservation Service (NRCS) strongly encourages Conservation Evaluation and Monitoring Activity (CEMA) participants to know the Qualified Individual (QI) requirements to ensure the person they employ to provide the CEMA is fully qualified to meet the objectives of the activity.

A QI for Soil Health Testing CEMA 216 meets one of the following:

1) Certified Crop Advisor (CCA) or Certified Professional Agronomist (CPAg) through the American Society of Agronomy or a Certified Professional Soil Scientist (CPSS) or Associate Professional Soil Scientist (APSS) through the Soil Science Society of America.
2) Technical Service Providers (TSP) certified for Soil Health Management Plan Conservation Practice Activity (116) or Soil Health Management Design and Implementation Activity (162).
3) An associate degree or higher in an agricultural or soil science field with at least 2 years of experience collecting soil for laboratory analysis.
4) Individuals working under the guidance or management of a QI are allowed to collect soil samples for this CEMA.

General Requirements

1) This CEMA includes the performance of work and documentation of the tasks, results, interpretations, and other activities described herein by a QI.
2) Prior to initiation of the CEMA, the QI must arrange a pre-work conference to ensure all parties understand the participant's objectives, required deliverables, and characteristics of the CEMA tasks.
   a) The parties in the pre-work conference must include the participant, the QI, and the NRCS field office staff. The parties should agree whether they will join in-person or join via phone, web-meeting, etc.
   b) It is recommended that the Technical Service Provider (TSP) (if one is needed to support the results of this CEMA) is invited to the pre-work conference for the implementation of a Conservation Planning Activity (CPA) or Design and Implementation Activity (DIA).

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- Definition: Quantitative testing for biological, chemical, and physical characteristics of soil and constraints using approved laboratory methods.
- CEMA 216 can be implemented on all land uses.
- Current version at NRCS CPA, DIA, and CEMA webpage

Qualified Individuals (QIs)

- A QI for Soil Health Testing CEMA 216 meets one of the following:
  - Certified Crop Advisor (CCA) or Certified Professional Agronomist (CPAg) through the American Society of Agronomy or a Certified Professional Soil Scientist (CPSS) or Associate Professional Soil Scientist (APSS) through the Soil Science Society of America.
  - Technical Service Providers (TSP) certified for Soil Health Management Plan Conservation Practice Activity (116) or Soil Health Management Design and Implementation Activity (162).
  - An associate degree or higher in an agricultural or soil science field with at least 2 years of experience collecting soil for laboratory analysis.
  - Individuals working under the guidance or management of a QI are allowed to collect soil samples for this CEMA.

Responsibilities of QI

- Pre-work conference with the client, NRCS and QI
- Soil Sampling
- Submission of samples to appropriate laboratory
- Interpretation of results
- Provision of documentation & deliverables to client
- Note: NRCS will communicate with program participant on all matters regarding their contract and operation. The participant must give explicit permission in writing for NRCS to directly communicate with their QI.

Frequently Asked Questions

- Can a soil testing laboratory be a QI?
  - Yes, provided the person (or the lab's assigned professional) meets one of the QI criteria in the CEMA 216 document. If a lab serves as QI, it still must meet QI requirements and provide all required deliverables.
- Does NRCS maintain a list of QIs?
  - NRCS does not maintain a national list of QIs. A program participant could start their search for a QI by visiting the Science Societies' "Find a Professional" search page or the NRCS Registry for technical service providers certified for CPA 116 or DIA 162.
  - The program participant is responsible for selecting the QI
- What does "working under the guidance of a QI" mean? Must the supervising QI sign?
  - This means that the person performing sample collection must be under the guidance or management of a QI. The supervising QI is accountable for protocol adherence and the report. They should review and sign the QI cover sheet included in deliverables to attest that the activity meets requirements.

Required Laboratory Analyses

- Two CEMA 216 scenarios
  - Basic: Soil Aggregation, Soil Carbon Cycling, Microbial Activity, Carbon Food Source, and Nitrogen Food Source
  - Advanced: Basic + microbial diversity/functional diversity information
- Both scenarios must have texture and pH analyses to facilitate interpretation

Table 2. Soil characteristics are used to interpret soil health indicators. Choose a method to measure the soil characteristic from each column.

Soil Characteristic	Soil Texture	Soil pH
Preferred Method	KSSL Particle Size Distribution Analysis by pipette	1:1 water
Alternate Method	Hydrometer Method	0.01M $CaCl_2$

Basic Scenario

Table 1. Each soil process should be measured to evaluate overall soil health. Choose a method to measure the soil indicator from each column.

Soil Process and Indicator	Soil Aggregation – Wet Aggregate Stability	Carbon Cycling – Soil Organic C (SOC)	Microbial Activity – Soil Respiration	Carbon Food Source for Microorganisms – Labile Carbon	Food Source for Organisms – Bioavailable Nitrogen
Reason for Measurement	Measure of the physical soil environment. Related to water infiltration, carbon and nutrient storage, biological activity, and reduced erosion	Related to soil structure, fertility, and provides microbes with food	Measure of how active the microbes are in the soil	Carbon food that is easily taken up by microbes	Related to protein that is readily available to microbes
Preferred Method	Wet sieving	Dry combustion	24-hour incubation/burst	Permanganate Oxidizable Carbon (POXC)	Autoclaved citrate extractable (ACE) protein content
Alternate Method	Cornell Sprinkle infiltrometer or Image Analysis	SOC calculated from Soil Organic Matter measured by Loss on Ignition	96-hour incubation	Water extractable organic carbon	Water extractable organic nitrogen

Advanced Scenario: Basic +

Table 3. If additional soil biological information is desired, choose a method to measure microbial/functional diversity.

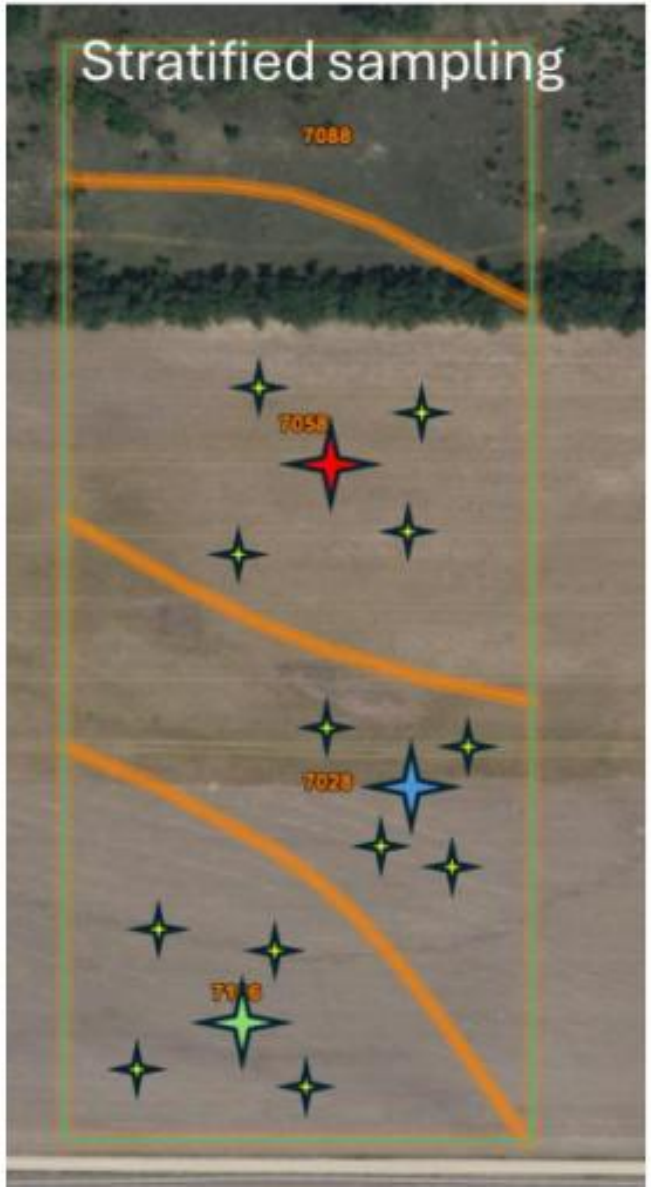
Soil Indicator	Microbial Diversity/Functional Diversity
Preferred Method	Phospholipid Fatty Acid (PLFA)
Alternative Method	Choice of three of the following soil enzymes: β-Glucosidase (Carbon Cycling) N-acetyl-β-D-glucosaminidase (Carbon and Nitrogen Cycling) Protease (Nitrogen Cycling) Acid and/or Alkaline Phosphatase (Phosphorus Cycling) Arylsulfatase (Sulfur Cycling)

Frequently Asked Question

- Are program participants required to provide their soil health test results to NRCS?
  - No. NRCS cannot require a client to provide soil health test laboratory results as a condition for participation in a program or activity. Under the Privacy Act of 1974 (5 U.S.C. § 552a), "agencies may only maintain in its records only such information about an individual as is relevant and necessary to accomplish a purpose of the agency required to be accomplished by statute or by executive order of the President."
  - If the participant does not provide soil health test results to field staff, they can show sufficient evidence that they have completed the requirements of CEMA 216 by providing laboratory reports that redact soil health test result data.

Soil Sampling Strategies

- Stratified
  - Soil in the planning land unit contains different soil types across different landscape positions. Sampling locations are chosen randomly within delineated subareas (or strata) in proportion to the size of the subarea in relation to the land unit.
- Whole Field
  - Soil in the is homogeneous and there are few problem areas. Sampling locations are chosen by assigning random numbers to areas on a grid overlay.
- Problem Area
  - Distinct areas with uneven crop performance are strategically sampled.


Stratified sampling
7088
7059
7023


Whole field sampling


Problem area sampling

Sampling Procedure

- QI will use a tile spade, sharpshooter, or straight shovel to collect soil when practical.
- Dig a hole 8 inches deep and remove a 2-inch thick vertical, rectangular slice of soil 6 to 8 inches in depth from the side of the hole.
- If it is impractical to sample a slice of soil, then a soil probe that is 1-inch or more, inside diameter, may be used.
- At each of the sample locations, combine all 5 subsamples to create 1 composite sample.
- Gently mix the samples and place in sample bags

Frequently Asked Questions

- How many samples are required per instance of CEMA 216? Composite or separate?
  - For each instance of CEMA 216, collect soil from at least three main locations. At each of the main locations, collect a soil sample plus four more subsamples about 20 to 50 feet from the main location (total five subsamples per location). Combine the five subsamples to create one composite sample for each location.
- How are CEMA 216 sampling areas determined?
  - The soil sampling area for CEMA 216 is determined by the planner and producer from planning assessments and producer objectives. It is not limited to specific acreage.
- Are soil augers (also known as Dutch or spiral augers) acceptable?
  - No. Soil augers destroy or compact soil aggregates.

QI Communication with Laboratories

- QI is responsible for helping their client select an appropriate soil testing laboratory
- Prior to sampling, the QI must contact the soil testing laboratory to obtain recommendations/protocol (soil temperature, soil moisture content, storage, shipping times, etc.) for the indicator(s) being analyzed.
- *If sampling for PLFA: Coordinate closely with the laboratory to receive instructions.*

QIs must ensure laboratories maintain accreditation with:

- The Performance Assessment Program (PAP) from The North American Proficiency Testing Program (NAPT) under the auspices of the Soil Science Society of America, or
- The American National Standards Institute (ANSI) National Accreditation Board (ANAB), or
- The International Organization for Standardization (ISO/IEC 17043:2010) for ISO 10694:1995, or
- State-approved certification program that considers laboratory performance and proficiency to assure accuracy of soil test results.

Frequently Asked Question

- Does NRCS maintain a national list of accredited labs for CEMA 216?
  - No. NRCS does not provide a list of labs. However, Technical Note 470-01, "Choosing a Laboratory for Soil Health Testing," provides guidance on how to select a laboratory that performs soil health tests. Also, consult the NAPT-PAP website for accredited labs.
  - NRCS state staff may develop locally relevant lists of accredited labs to assist program participants in their areas.

Future for Soil Health Testing

- NRCS can update CEMA 216 Soil Health Testing once per year
- We welcome feedback: CEMA 216 Document
- Goals:
  - Farmer and rancher friendly
  - Commercial lab friendly
  - Stable and consistent program offering

Additional Resources

- NRCS CPA,DIA, and CEMA webpage
- NRCS Technical Notes
  - Technical Note 470-01, “Choosing a Laboratory for Soil Health Testing
  - TN 470-07 Guidance on Field Grab Sampling for Soil Health Testing.pdf
  - TN 470-16 Soil Health Testing to Support Conservation Planning.pdf
- Fact Sheets and FAQs:
  - CEMA 216 Soil Health Testing Fact Sheet
  - Forest Soil Health Testing Guidance fact sheet
  - CEMA 216 Job Aid
  - CEMA 216 Soil Health Testing FAQs
  - CEMA 216 RPP Fact Sheet
- QI and TSP training made available on NRCS TSP Resource website:
  - CEMA 216 Training (Recorded Jan 29, 2026)
  - TSPs and the Regenerative Pilot Program PowerPoint (Mar 5, 2026)
  - TSPs Roles through the RPP Program - Video Training

Additional Questions?

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