USDA United States Department of Agriculture

Sampling Soils for Nutrient Management

The Importance of Soil Sampling

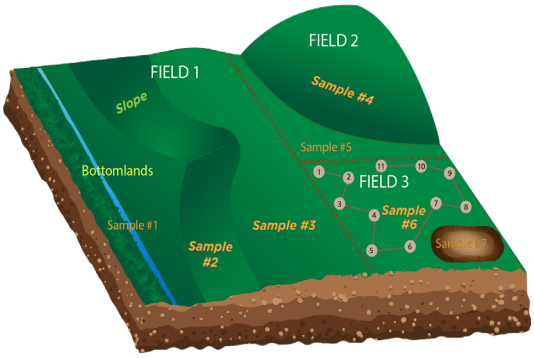
A soil test is essential to determine soil fertility levels and make informed nutrient management decisions. Nutrients applied correctly can increase yields, reduce production costs, and prevent surface and groundwater pollution.

This publication summarizes:

- How often to sample
- Time of sampling
- Amount of sample
- Sampling tools
- Sampling process
- Drying/Freezing samples
- Containers and information sheet
- Sample identification and shipping.

General Sampling Guidelines

A critical step in obtaining an accurate soil test is collecting representative samples in a field.Uniform fields should be sampled in a random pattern across the field by collecting 15 to 20 equal size soil cores. Avoid, or sample seperately, areas such as abandoned farmsteads and feedlot sites, old fence rows, wet or eroded spots, and end rows. Fields with significant landscape or other differences should be decided into seperate sample areas. Differences may include soil types, slope, degree of erosion, drainage, crop and/or manure history, or other factors that may influence soil nutrient levels. More intensive sampling should be used where detailed information about within field nutrient variability is needed. For information about field sampling methods or special sampling situations, such as fertilizer banding, please refer to the SDSU Extension publication.



Tips for Soil Sampling

Proper collection and handling of soil samples is extremely important. To get accurate soil soil test results, follow the following basic guidelines.

How Often to Sample

Collecting a sample for a nitrate-nitrogen test should be done every year prior to planting non legume crops. For other nutrients, sampling every 2-4 years is often sufficient. Sampling and testing for both phosphorus and nitrate-nitrogen is required prior to manure application.

Time of Sampling

Collect soil samples after one crop matures and before seeding the next one. Spring sampling prior to planting is ideal, especially for nitrate-nitrogen test. However, soil sampling is generally done in the fall, which allows more time to collect samples and get results from the laboratory.

Sampling fields at approximately the same time every year is recommend for more consistent results. Samples should be air dried or frozen if they are held for more than a week. As you sample keep the bags in a cool, dry place versus high temperatures or store the bags with samples in a freezer until shipping to the lab.

For More Information

- SDSU Extension Recommended Soil Sample Methods and Instructions: https://extension.sdstate.edu/recommended-soil-sampling-methods-and-instructions
- Video Tutorial: https://www.youtube.com/watch?v=LDo2m9s_SQg
- SD NRCS Nutrient Management page: https://www.nrcs.usda.gov/wps/portal/nrcs/main/sd/technical/ecoscience/manure/
- SD NRCS Nutrient Management (590) practice standard: https://efotg.sc.egov.usda.gov/#/state/SD/documents/section=4&folder=-161
- SD Department of Agriculture and Natural Resources: https://danr.sd.gov/
- SD Association of Conservation Districts: https://www.sdconservation.org/sdacd

Sampling Tools

A soil probe or tube is the best tool for collecting samples under normal conditions. A soil probe provides a continuous soil core with minimum disturbance to the soil and the core can be easily divided into the various sampling depths. Hand or vehicle-mounted hydraulic probes are available; the latter is best choice under adverse soil sampling conditions. Other tools needed are sample bags and submission forms from the lab of your choice, two plastic pails, a cleaning brush, and lubricant so so the soil does not stick to the probe and it is easier to remove the sample and the probe stays cleaner. Many people use WD-40 since it has a relatively small impact to the test results.

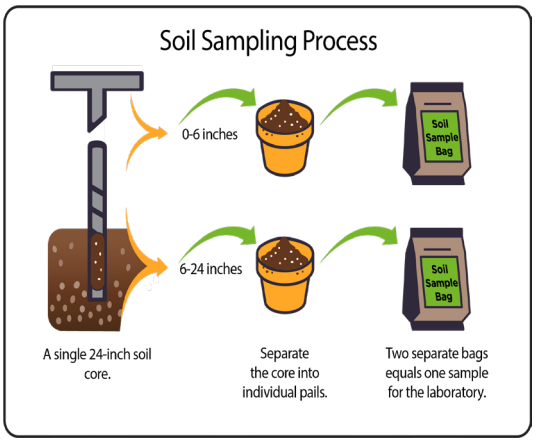
Amount of Sample

Mixing a large sample uniformly is difficult. Using a soil probe (one-half to one inch diameter tube) limits the size of the soil core collected. The soil cores collected for each sampling depth must be throughly mixed. A pint of each sample is needed for laboratory testing.

Sampling Depth

Laboratory tests are calibrated to specific depths. It is important to collect samples correctly because a core taken deeper or shallower can produce invalid test results. Both surface and subsurface soil samples are needed to test for available nutrients in the root zone. Seperate the core into individual pails.

- Surface soil samples (0-6 inches) are used for conventional of organic matter, phosphorus, potassium, pH and salt levels.
- Subsurface soil samples (6-24 inches) are used to test for mobile nutrients such as nitrate-nitrogen, chloride, and sulfur.



Sampling Process

The diagram illustrates the sampling process. To collect a sample:

1. Take at least 15-20 representative soil cores to a minimum depth of 24 inches.
2. Separate each of the cores into 0-6 and 6-24 inch portions and place each into a separate pail. Separate pails should be used to mix the surface and subsurface samples.
3. Mix, dry, and bag each portion as a seperate sample.

Nitrogen fertilizer recommendations are adjusted based on the deep soil test results. In cases where a field is highly vulnerable to leaching to a shallow aquifer, collecting an additional sample to a depth of 24-48 inches is recommended, and in some instances, required. *For soil sampling requirements and/ or options for state permitted Concentrated Animal Feeding Operations (CAFO's) contact the South Dakota Department of Agricultural and Natural Resources.*

Sampling Identification and Shipping

1. Complete the label on each soil sample bag. Make sure it corresponds to the information sheet.
2. Place the information sheet and dry or frozen bagged samples in a sturdy carboard box or similar container for shipment to the laboratory. If shipping frozen samples, seal the information sheet in a plastic bag. Ship samples to the testing laboratory of your choice. Allow 5-10 days for results.

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