

For information or assistance, contact your local:

- conservation district,
- Cooperative Extension Service or
- Natural Resources Conservation Service.

South Dakota Association of Conservation Districts
 P.O. Box 275
 Pierre, SD 57501-0275
 (800) 729-4099
 Fax: (605) 895-9424
 www.sdconservation.org
 info@sdconservation.org

USDA Natural Resources Conservation Service
 Federal Building
 200 Fourth Street SW
 Huron, SD 57501
 (605) 352-1200
 Fax: (605) 352-1270
 www.sd.nrcs.usda.gov
 publicaffairs@sd.usda.gov

South Dakota Department of Environment and Natural Resources
 Surface Water Quality Program
 Foss Building, 523 E., Capitol Avenue
 Pierre, SD 57501-3182
 (800) GET-DENR
 (605) 773-3351
 Fax: (605) 773-5286
 www.state.sd.us/denr/

South Dakota Department of Agriculture
 Office of the Secretary
 Foss Building, 523 E. Capitol,
 Pierre, SD 57501
 (800) 228-5254
 (605) 773-3375
 Fax: (605) 773-4003
 www.state.sd.us/doa

For detailed information or assistance with *soil sampling*:

South Dakota Cooperative Extension Service
 South Dakota State University

Department of Plant Science
 Box 2207A, SDSU
 Brookings, SD 57007
 (605) 688-4772
 Fax: (605) 688-4667
 james.gerwing@sdstate.edu
 http://plantsci.sdstate.edu/soiltest/

Development of this brochure was made possible through technical and design assistance from the USDA Natural Resources Conservation Service and South Dakota State University Cooperative Extension Service. Printing of this publication was made possible by a Section 319 Nonpoint Source grant to SD DENR from the U.S. Environmental Protection Agency - Region VIII.

Programs and services are available to everyone on a nondiscriminatory basis.

Sampling Soils for Nutrient Management



Photo courtesy USDA NRCS SD

Sampling Soils for Nutrient Management

The Importance of Sampling Soil

A soil test is essential to determine soil fertility levels and make good nutrient management decisions. Nutrients applied in the right amount 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

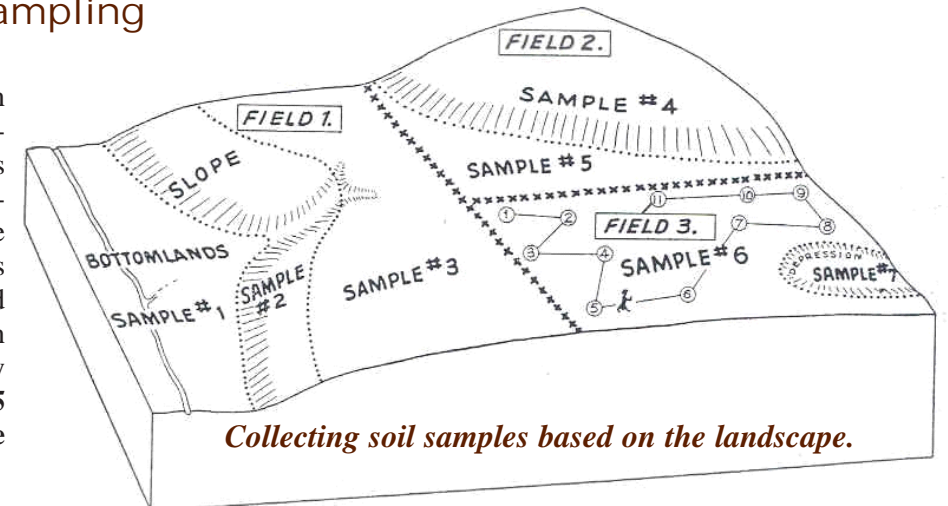
Avoid, or sample separately, areas such as abandoned farmsteads and feedlot sites, old fence rows, wet or eroded spots, and end rows.

Fields with significant landscape or other differences should be divided into separate 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 other field sampling methods or special sampling situations, such as, fertilizer banding, refer to the Cooperative Extension Service publication “*Recommended Soil Sampling Methods for South Dakota.*”

General Sampling Guidelines

A critical step in obtaining an accurate soil test is collecting representative samples in the field. Uniform fields should be sampled in a random pattern across the field by collecting at least 15 to 20 equal size soil cores.



Collecting soil samples based on the landscape.

Sampling Soils For Nutrient Management

Proper collection and handling of soil samples is extremely important. To get accurate soil test results, use 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 tests. 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 each year is recommended for more consistent results.

Sampling Tools

A soil probe or tube is the best tool for collecting soil samples under normal soil conditions. A soil probe provides a continuous soil core with minimum disturbance to the soil, and the core can easily be divided into the various sampling depths. Hand or vehicle-mounted hydraulic probes are available; the latter is the best choice under adverse soil sampling conditions.

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 each soil core collected. The soil cores collected for each sampling depth must be thoroughly mixed. A pint of each sample is needed for laboratory testing.

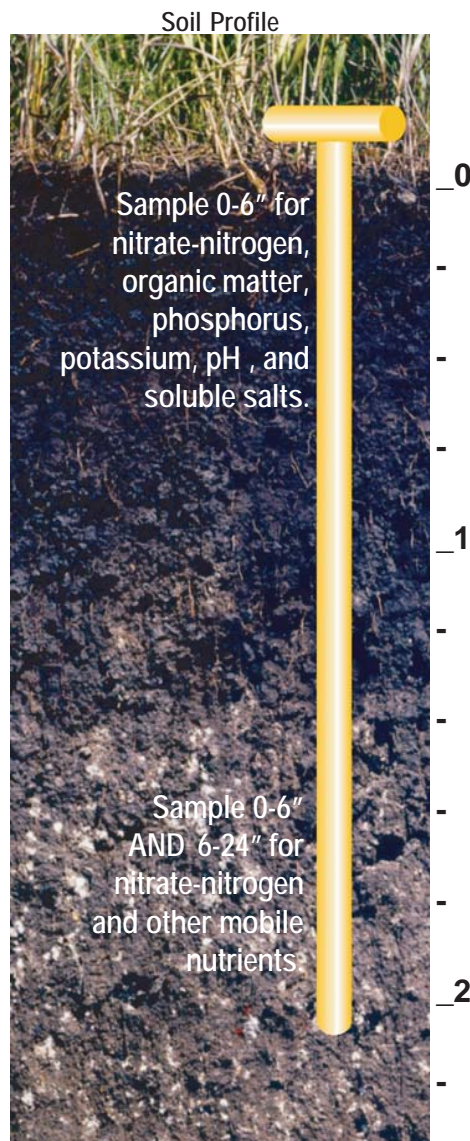
Sampling Depth

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.

Surface soil samples (0-6 inches) are used for conventional tests 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.

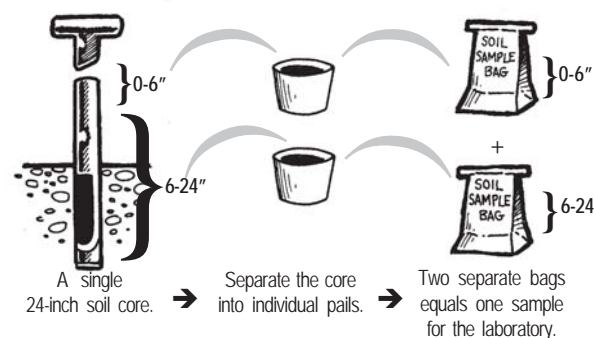
Both surface and subsurface soil samples are needed to test for available nutrients in the root zone.



Sampling Process

To collect an accurate 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 plastic pails should be used to mix the the surface and subsurface samples.



- (3) Mix, dry and bag each portion as a separate 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 to 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 Environment and Natural Resources.

Drying or Freezing Samples

Moist soil samples must be air dried as soon as possible before being bagged or bag and freeze before sending to a soil testing laboratory. Drying is best accomplished by spreading each sample on paper to air dry at room temperature. A household fan directed at the samples will help speed the process. **Do not oven dry samples.** This can change nutrient levels in the sample, making the soil test results invalid.

Containers and Information Sheets

Soil sampling information sheets, hand probes and bags for sending samples to the laboratory are available at local Cooperative Extension Service and conservation district offices, and from most fertilizer dealers. Samples must be securely packaged if shipped by mail. Fill out sampling information sheets to describe the location, past cropping and management history, and proposed crops along with a list of tests requested, for each field or area sampled. **Complete information sheets are essential.**

If possible, use an information sheet from the laboratory that will perform the test. For the South Dakota State University laboratory, visit the local Cooperative Extension Service or conservation district office for assistance in obtaining forms. The SDSU Soil Sampling information sheet is available online at: <http://plantsci.sdstate.edu/soiltest/>. Click on "Soil Sampling Information Sheet." Fees are also listed.

Collecting and bagging samples in non-metallic containers is recommended to avoid contamination. Allow 5-10 days for return of results.

Sample 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 cardboard 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 soil testing laboratory of your choice or the South Dakota State University lab:

Soil Testing Laboratory
 Box 2207A Ag Hall 07
 South Dakota State University
 Brookings, SD 57007-1096