

Sampling Soils for Nutrient Management

For information or assistance, contact the local offices of the following entities:



South Dakota Conservation Districts

www.sdconservation.org

(605) 895-4099

SD Department of Agriculture

Office of the Secretary

Foss Building, 523 E. Capitol

Pierre, SD 57501

(605) 773-5425 · Fax: (605) 773-5926

<http://sdda.sd.gov>

SD Department of Environment and Natural Resources

Surface Water Quality Program

Foss Building, 523 E. Capitol Ave.

Pierre, SD 57501-3182

(800) GET-DENR · (605) 773-3351

Fax: (605) 773-5286

<http://denr.sd.gov/>



South Dakota State University Extension Service

Department of Plant Science

Box 2207A, SDSU, Brookings, SD 57007

(605) 688-4772 | Fax: (605) 688-4667

Ronald.Gelderman@sdsstate.edu

<http://iGrow.org>



Visit your local **USDA NRCS Field Office** or **NRCS Ag Nutrient Management Team**

1820 North Kimball Street

Mitchell, SD 57301-1114

(605) 996-1564 Ext. 5

www.sd.nrcs.usda.gov

The Importance of Sampling Soil

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

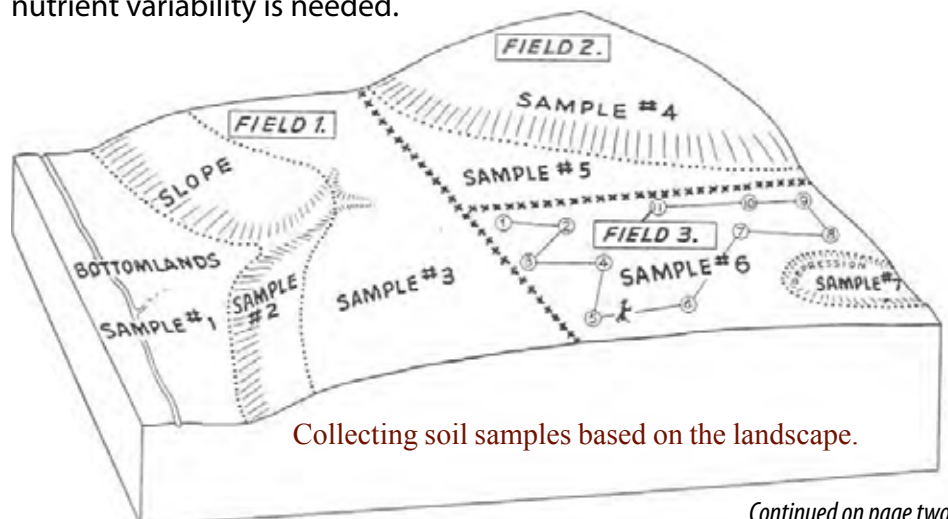
This publication summarizes:

- 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 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. 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.



Collecting soil samples based on the landscape.

Continued on page two.

For information about other field sampling methods or special sampling situations, such as fertilizer banding, refer to the SDSU Extension publication "[Recommended Soil Sampling Methods for South Dakota](http://pubstorage.sdstate.edu/AgBio_Publications/articles/FS935.pdf)" which can be found at http://pubstorage.sdstate.edu/AgBio_Publications/articles/FS935.pdf.

Tips for Sampling Soils

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. 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.

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. Other tools needed are sample bags and submission forms from the lab of your choice, two plastic pails, a cleaning brush, and a lubricant so the soil doesn't stick to the probe and it's 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.

Containers and Information Sheets

Soil sampling information sheets, hand probes and bags for sending samples are available from several sources. 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. Collecting and bagging samples in non-metallic containers is recommended to avoid contamination.

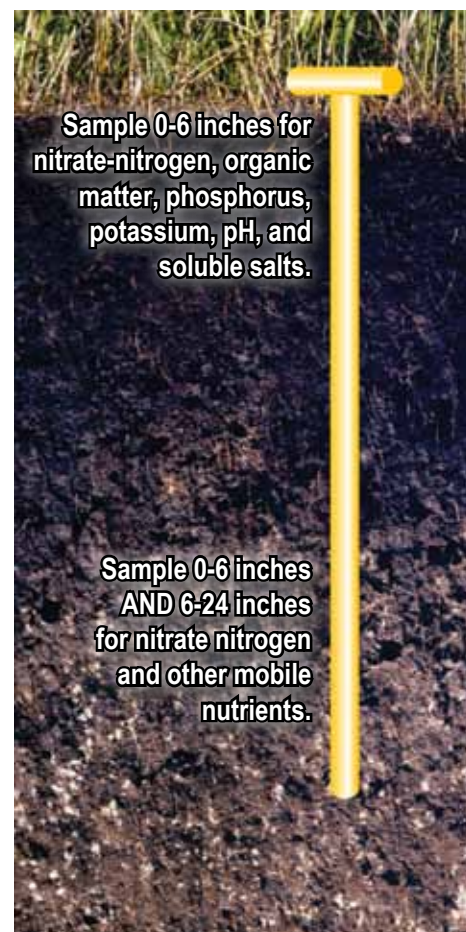
Amount of Sample

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.

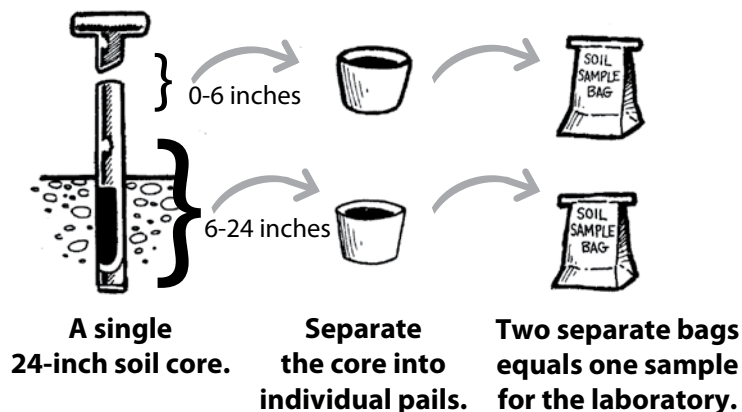
Sampling Depth

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. Both surface and subsurface soil samples are needed to test for available nutrients in the root zone. Separate the core into individual pails.

- 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.



Sampling Process



Sampling Process

The diagram illustrates the 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 pails should be used to mix 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.

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. Allow 5-10 days for return of results.

Additional Resources:

- The main site to access the SDSU Extension publications is: <http://www.sdstate.edu/sdces/store/index.cfm>.
- "Recommended Soil Sampling Methods for South Dakota" can be found in the SDSU Publications Database http://pubstorage.sdstate.edu/AgBio_Publications/articles/FS935.pdf.
- SDSU Extension Service web site: <http://iGrow.org>
- SDSU iGrow YouTube channel: <http://www.youtube.com/user/SDSUiGrow>. Soil sampling and soil probe videos may be of interest.
- SD NRCS Web page for nutrient management www.sd.nrcs.usda.gov/technical/NutrientManagementPage.html.
- NRCS Conservation Practice Standard for Nutrient Management (Code 590) http://efotg.sc.egov.usda.gov/references/public/SD/590_Notice264.pdf.