FIELD SAMPLING
(USDA – Soil Quality Test Kit Guide; Gelderman, Gerwing, and Reitsma, South Dakota State University)

Introduction

The following methods provide guides as to how to conduct sampling. Note that methodology may vary depending upon site logistics – plot size, landscape position, and plot location; experimental goals; other collaborators, land-managers, or producers; and upon labor and costs. The goal for within-field sampling is to obtain representative samples (some general field characteristics to consider are listed below). Soil properties vary across a field, especially due to management operations, and even within the same soil type. Using a Soil Survey map or some other mapping information may help to identify different soil types and variations. The experimental objectives may require differences in sampling: i. for assessing trouble spots, sample those areas separately; ii. for comparing management systems, select sites with the same soil type and are located on the same topographical features; iii. for monitoring changes in soil quality over time, make sure the same sites within a field are measured (using flags, GPS or some other methodology to pinpoint the site) and try to sample when the fields are in the same condition (i.e. pre or post planting, harvesting, fertility treatments, or pesticide treatments and, if possible, under similar moisture and temperature conditions). Sometimes sampling points within the same field may be compared if points differ across gradients of soil type, soil moisture, slope, or other factors rather than just at a fixed point. The number of samples to take may depend on the variability of the field, plots size, or labor. Also, in some cases several samples may be taken within a site or plot and then composite. A minimum of three samples should be collected on any one soil type and management/treatment combination. If a field is highly variable, a larger number of samples may need to get taken. Stay away from distinctly different areas, such as farm lanes and field borders, fertilizer bands, areas within 150 feet of a gravel road, potholes, eroded spots, etc. It is good practice not to sample at the field or treatment edge but rather to establish buffer zones on your map. Samples collected to various depths may be divided at specific intervals with different depths collected separately.

General field characteristics to consider are:
- row versus inter-row areas,
- differences in soil type,
- differences in management,
- wheel versus non-wheel tracked areas,
- differences in crop growth,
- salt affected versus non-salt affected areas,
- eroded versus non-eroded areas,
- differences in slope, and
- wet versus non-wet areas (drainage).

Materials

Soil probe, garden shovel, or spade
Field information (i.e. maps, aerial photos, soils information)
Rags, paper towels, and/or probe brush to clean probe
Tape measure or ruler
Knife or sample divider
Lubricant (i.e. WD-40)
Sample bags/boxes
Box or container to hold sample bags/boxes
Permanent marker and/or pencil
Kraft paper or newspaper

Methods

Sample Collection

Grid sampling
The field is divided into rectangular grids and a sample is taken from each grid. Grid samples may be composites of at least five cores collected in a zig-zag or W-shaped pattern across the sampling/plot area. In some cases only one core may be taken from each grid at a particular point. Care should be taken to make sure that there is an appropriate buffer around the point to keep it within the grid of interest, and this point may be marked for future sampling. If the grid is large enough, the points should be staggered from one grid to the next while maintaining the appropriate buffers. Staggering may help to avoid bias in soil tests due to management impacts. Grid sizes smaller than 1 to 2.5 acres are recommended.

Directed sampling
Directed, “zone,” “management zone,” or “smart” sampling uses detailed information about a field obtained from yield monitor maps, remote sensing imagery, digital soil survey or topographic maps, and/or electrical conductivity data to determine where to sample based on known variability.

Sampling by landscape/topography
Sampling may be conducted by determining landscape differences, such as separating uplands, slopes, and low ground. Landscape differences may be determined visually, with aerial or satellite photos, or by using elevational data from GPS units. Grid or direct sampling may be conducted for each landscape designation depending on size, the number of topographic changes across a plot, or other consideration such as those mentioned above.

Other methods of determining sampling position
Sampling points, plots, or grids may be determined by aerial or satellite imagery that shows soil color differences or crop growth patterns or color, soil conductivity maps using an on-the-go Sensor, land-manager or producer knowledge, and knowledge about previous land use.

Sample Transport and Storage

1. Samples collected in the field should be kept on ice until they can be transported to a cold room or a location for processing.
2. Samples may be divided depending on the analysis requirements.
3. If samples are to be used for aggregate stability or glomalin measurements, they should be laid out on Kraft or newspaper to air-dry.
4. While drying, samples may be gently broken up by hand along fracture lines. This may be especially important in very wet or high clay content samples.
5. After drying samples may be stored in air-tight containers for future analysis.