Soil Sampling Method

Background information

Sampling involves the selection from the total population of a **subset** of individuals upon which measurements will be made; the measurements made on this **subset** (or **sample**) will then be used to estimate the **properties** (or **parameters**) of the total **population**. Sampling is **inherent** to any field research program in soil science because the measurement of the total population is impossible for any realistic study.

Soil test may refer to one or more of a wide variety of soil analysis conducted for one of several possible reasons. Possibly the most widely conducted soil tests are those done to estimate the plant-available concentrations of **plant nutrients**, in order to determine fertilizer recommendations in agriculture. recommend that a soil test contains 10-20 sample points for every (160,000 m^2) of field.

Laboratory tests often check for plant nutrients in three categories:

- Major nutrients: **nitrogen** (N), **phosphorus** (P), and **potassium** (K)
- Secondary nutrients: **sulfur**, **calcium**, **magnesium**
- Minor nutrients: **iron**, **manganese**, **copper**, **zinc**, and **chlorine.**

General Sampling Procedures

A critical step in obtaining accurate soil tests is collecting representative samples in the field. Typically, uniform fields should be sampled in a simple random pattern. 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.

Soil sampling Equipment

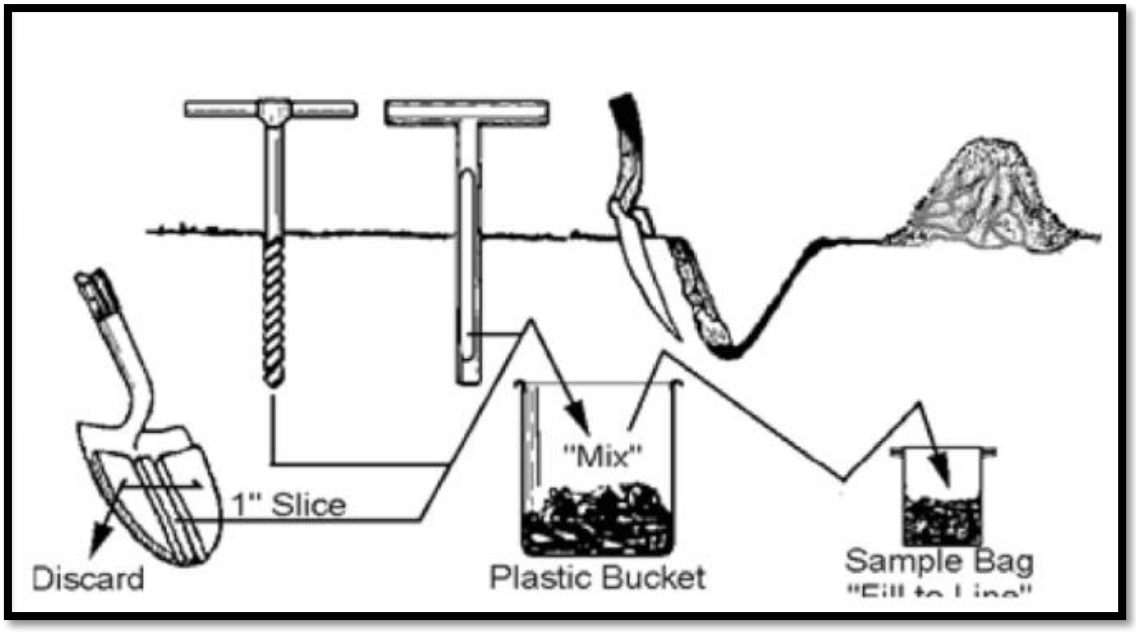
- **Standard Augers –** Used for sampling most soil types, standard augers have an open bit design, and are available in (76mm) and (102mm).
- **Clay Augers –** Like the standard augers, clay augers have an open bit design and work well in cohesive soils. Available in (76mm) and (102mm).
- **Sand Augers –** Designed for looser, granular soils, sand augers have closed bits to retain cuttings and are available in (76mm) and (102mm).
- **Mud Augers –** Best-suited for muck-like, boggy and root-bound soils, the mud auger offers an open design and is available only in (76mm).
- **One-Piece Soil Samplers –** Available in (279mm) or (360mm) lengths, these units have a T-handle and steel construction that allows penetration into tougher soils.

Sample Timing

sampling for mobile nutrients should be taken as close to seeding as possible or when biological activity is low. Fall sampling should generally start after the soil temperature is **less than 10°C** at which time no further changes in the soil nutrient levels are expected. Spring sampling, before seeding, can be done as soon as the soil frost is gone.

Depth of Sampling

Commonly used sample depth combination is **(0 to 15 cm)** and **(15 to 60 cm)**. However, if the soil nutrient of interest is expected to be stratified by depth, as with water-soluble highly mobile nutrients, then additional sampling increments would help ensure accurate recommendations. If organic matter or pH measurements are of importance, then a **(0 to 15 cm)** sample should be taken.



Sample Handling

To ensure that a uniform volume of soil is taken through the full depth of each sampling. Samples should be collected using soil **probes** and **augers** designed for this purpose. A **wedge-shaped** sample like that collected using a **spade** will not give consistent results. All probes should be kept **clean** and **rust free**. Avoid contamination at all stages of sample handling. In many situations, a **lubricant** will need to be applied to the soil probe to prevent the soil sticking inside the probe.

Selection of Sampling Design and Sample Numbers

For each field or field subsection samples can be taken using a random sampling design, a grid sampling design, or a benchmark sampling design. In random sampling individual samples are collected from locations that are randomly distributed across the representative portion of the field. These random locations can be generated with a GPS. A **zigzag sampling pattern** is often used for field sampling. Typically, all samples are combined and a composite sample is taken and submitted for laboratory analysis. **Composite sampling** is comparatively **inexpensive** since only one sample from each field or subsection of a field is sent for laboratory analysis.