Soil Sampling and Preparation for Soil Chemical Analysis

Matema Imakumbili[1]

[1]Sokoine University of Agriculture

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Matema LE. Imakumbili
Sokoine University of Agriculture

ABSTRACT

This protocol describes how to collect and prepare a soil sample for various soil chemical analyses.

MATERIALS TEXT

- Soil sampling tool e.g. soil auger, hand-hoe, small spade, soil sampler
- A plastic bucket (10 -20 L)
- A plastic cup or bowl of about 300-500 ml or 300-500 g capacity
- Plastic bags. If you cannot afford zip-loc bags any plastic bag that is robust and durable enough to securely hold soil samples can be used
- Labels
- Marker pen for labelling
- Plastic sheets or ink-free paper

Soil sampling design

1 When you come to a field from which you want to collect a soil sample from, first observe the field for any gradients/slopes. If the field is relatively even, i.e. with no obvious slopes, randomly select 10 to 20 points from which you will collect sub-samples of the fields' soil. Random sampling is good for small fields whether they are even or uneven. If the field is large with an obvious slope, then your sampling points can be along the slope in one straight line to get a better representation of the soils on the entire field and to help you sample the field quickly but thoroughly. The grid sampling design, which is a more orderly version of random sampling is easier to use on large uneven fields. Zigzag sampling design could however also be used and it is more convenient. More sampling points may be needed on large fields. Avoid sampling depressions on a field or along the edges of a fields; these points must be treated differently as they could have different properties from the rest of the field.

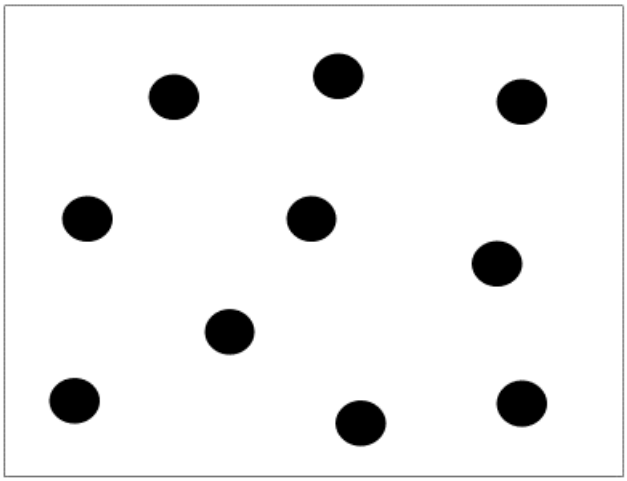

Fig 1: Sampling points on an uneven field

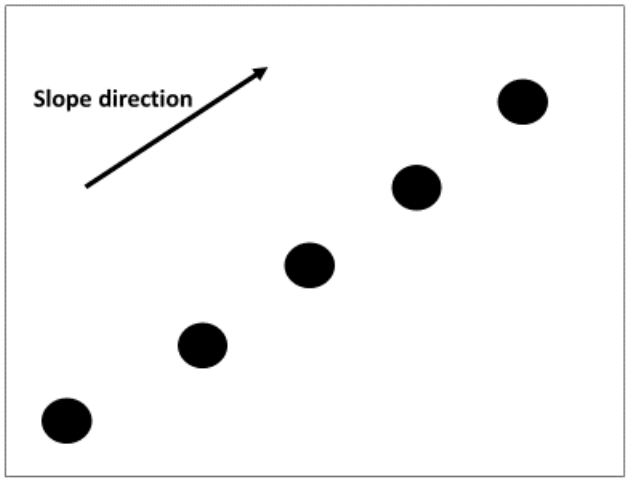

Fig 2. Sampling points on a large field with an obvious slope

Sub-sample collection

2 Take sub-samples of fields soil from each sampling point and place them all in a bucket. Before taking the soil from a sampling point, first remove surface litter from the surface of a sampling point. Remember that the soil is your main interest. Surface litter can be scrapped off using a hoe or spade. Using a hoe or spade cut out a thin slice of soil (about 5cm thick) from a depth of 0-20 cm i.e. from the soil surface to 20 cm below the soil surface. It is this slice of soil that you place in the bucket as a sub-sample. Ensure that the same quantity of soil is collected from the top to the bottom of the 0-20 cm depth. A soil sampler or auger can make the sample collection easier. Carry on sampling until you have collected soil from all planned sampling points on a field.

Collecting the final soil sample

3 Thoroughly mix the bulk sample (i.e. a collection of soil that has been sub-sampled from a field), which has now been collected and is now in a bucket. You can use your hands to mix it up. Once you are done with mixing get a 300-500 g plastic cup or bowl to collect a 300-500 g soil sample from the bulk soil sample in the bucket. This amount of soil is more than enough for all your analyses. The cup helps you to quickly estimate and collect the needed amount of soil from the bulk sample.

Packing and labeling the collected soil sample

4 Place the collected soil sample in a plastic bag. Label the bag on the outside but also place a small labelled paper with the fields name inside the bag. This second label also acts a means of verification, in case the outside label fades off or falls off. The soil sample can then be taken to the laboratory. It is advisable to label the plastic bag before beginning soil sample collection.

Air-drying the sample

5 As soon as the sample arrives at a laboratory, the soil should first be air-dried at room temperature (25^{o}C - 35^{o}C). *Note: Some soil samples may not have to be air-dried as this depends on the type of analyses to be carried out. Make sure you know how to handle your soil sample before setting out to collect it.* Air-drying is best carried out in a dust free, well ventilated room. The soil is spread out on ink free paper or on a plastic sheet and then left to air-dry. Take care that soil samples do not mix with other samples when you are drying many samples side by side. *Note: Air-drying is not only carried out when soil samples are brought to the lab wet.* It may take about 1 to 2 weeks for the soil to sufficiently dry.

The final step

6 Once dry, the soil should be sieved using a 2 mm sieve. Sieving removes any debris (stones and large pieces of plant litter) leaving behind only the fine soil. The fine soil must be packed in a well labelled plastic bag.After sieving the soil is ready for soil chemical analyses.

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