TAKIING SAMPLES FOR SOIL TESTS

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INTRODUCTION

Soil is an important factor in efficient land use planning and crop management. We need to know the physical, chemical and biological properties of the soil in order to make the best use of land.

The most important properties of any soil are its physical properties, such as its texture (amount of sand, silt and clay), drainage, consistency (looseness, stickiness, etc.) and the organic matter in it. However, even if the physical properties of your soil seem suitable for your crops, there could still be problems caused by shortage of nutrients (plant foods). It may be a good idea to take a soil sample and carry out a 'soil test' in cases such as:

. Crops are not growing well in a particular area, or the crop yield is lower than for previous crops.

. The plants show unusual symptoms, e.g. leaves have an unnatural colour, leaf tissues die, stunted growth.

. If you want to plant a crop for the first time, and you would like to know if the soil has enough plant foods in it.

The results of the soil test, along with other information about the soil, are used to make recommendations for the best use of fertilizers.

The usefulness of a soil test depends on how the soil sample is taken. Poor soil sampling can result in unsuitable recommendations. The farmer could be wasting money on fertilizer that may not improve his crops.

This article gives some advice on how to take a good soil sample.

WHAT IS A SOIL TEST?

A soil test involves finding out the level of plant nutrients in the soil using chemical methods. From a soil test we can estimate the nutrients available for plant growth.

WHAT IS A SAMPLE?

A sample is a small part of a large group or area. The soil sample collected should give us a good idea of what the soil is like over the whole area sampled. That is, the sample should be representative of the area. Remember, only 1-10 g of a sample is used for each soil test. Unless care is taken to collect representative soil samples, the soil tests will give misleading information. Samples must be taken and handled with care to give accurate information for fertilizer recommendations.

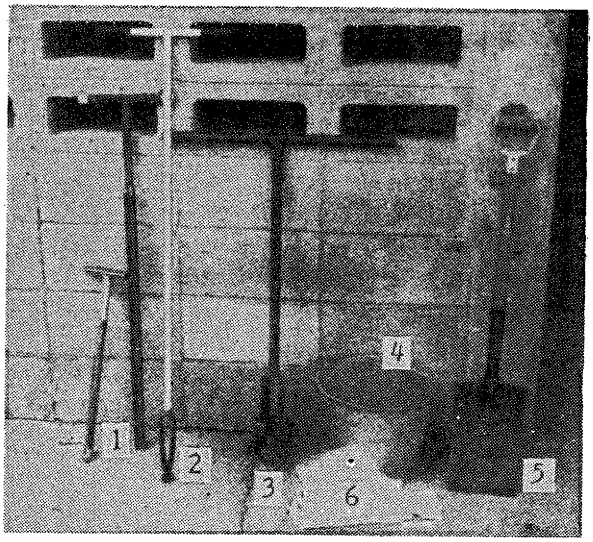
TAKING A SOIL SAMPLE

Equipment

Some equipment needed to take a soil sample is shown in the photograph:

- Tools for taking samples: (soil auger, sampling tube or garden spade)
- Bucket (used to mix up the composite sample)
- Plastic sample bag
- Labelling materials
- Soil record sheets

Select the best tool for taking your sample. An ordinary garden spade is suitable for taking surface soil samples (0 - 20 cm deep). The advantages of garden spades are that they are always available on small farms, and they are easy to use. You can



Equipment used for taking soil samples

1. *Two kinds of soil sampling tube*
2. *Dutch auger*
3. *Post - hole digger*
4. *Bucket for mixing samples*
5. *Garden spade*
6. *Plastic bags, labels, soil record sheets.*

take more accurate samples at different depths, as well as surface samples, using a soil auger or a soil sampling tube.

Depth of sampling

The depth of sampling depends on the type of crop that you want to grow. Take samples to the depth of the root zone of the crop:

Lawn grasses	0-10 cm
Pasture grasses	0-15 cm
Field crops	0-20 cm
Tree crops (rubber, cocoa, coffee)	0-20 cm plus a sub-soil sample at 20-45 cm

Take samples when the soil is moist - neither very wet nor very dry.

How to collect a representative sample

Step 1. Divide the land into sampling areas. Sampling areas are chosen according to one or more of the following characteristics:

- Slope of the land
- Texture of soil
- Drainage
- Colour of top soil
- Past management

If all these characteristics are uniform over the whole area, then one composite sample for each hectare (100 m x 100 m) is enough. However, if you find big variations in any of these characteristics, you should divide the area up into sampling areas. Some examples of how sampling areas are separated are shown in the diagram. Take one composite sample from each sampling area.

A composite sample is a number of smaller samples taken from different places in the sampling area, then mixed together.

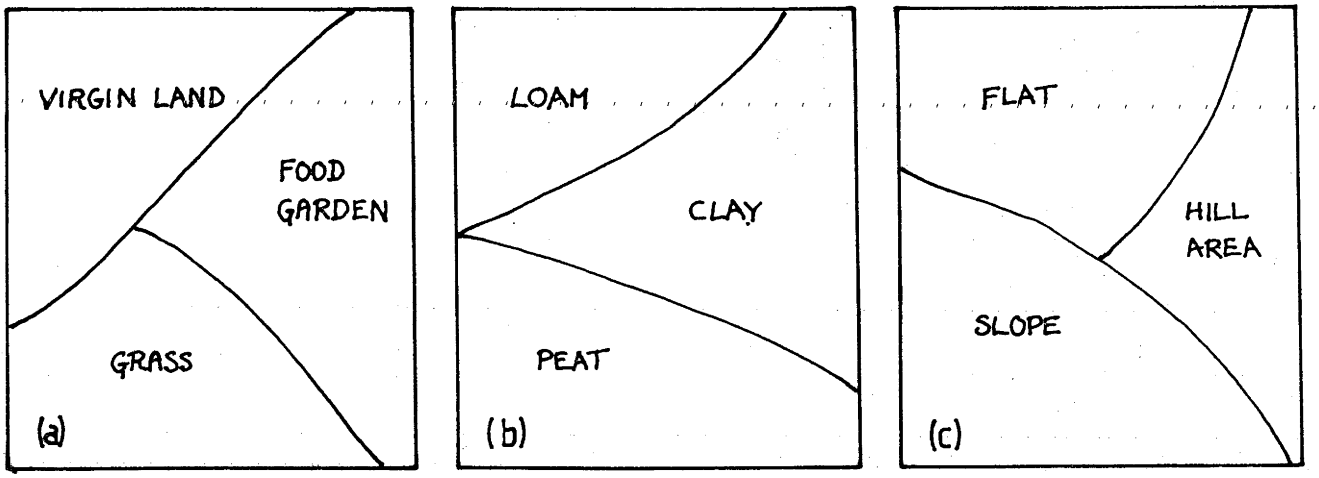
Step 2. How to take a composite sample. Once the area is marked out, sampling is done by walking over the sampling area at random, e.g. in a zig-zag as shown in the diagram. Take at least 10-15 samples from each sampling area. The more samples that are taken in an area, the more representative the sample will be.

At each sampling site, remove the surface litter and insert the auger, tube or shovel.

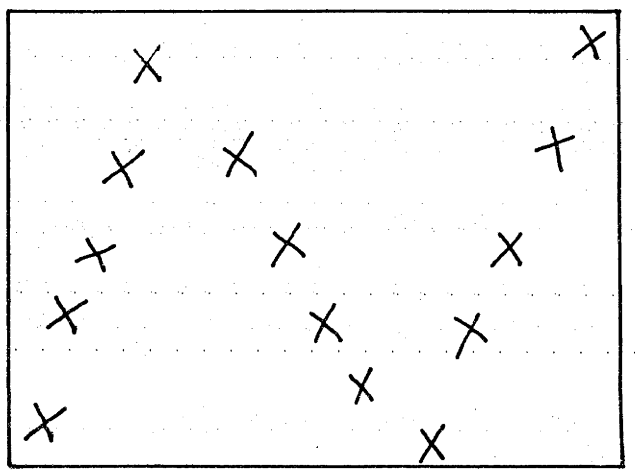
Place all the samples in a clean bucket and mix thoroughly. When taking soil samples you should avoid the following places:

- building sites
- gates
- roads and pathways
- wet spots
- recently fertilized areas
- areas where animals have been penned

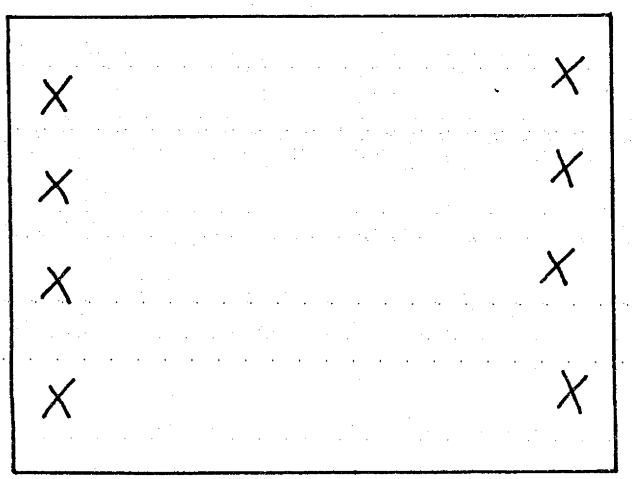
These areas should be avoided because they are not typical of the soil in the area and will give misleading results.



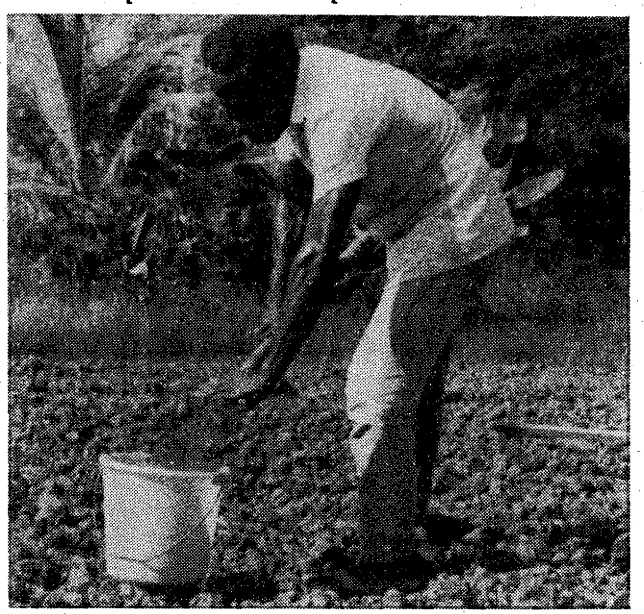
Some examples of how land may be divided into sampling areas: (a) different use of land; (b) different soils; (c) different slopes

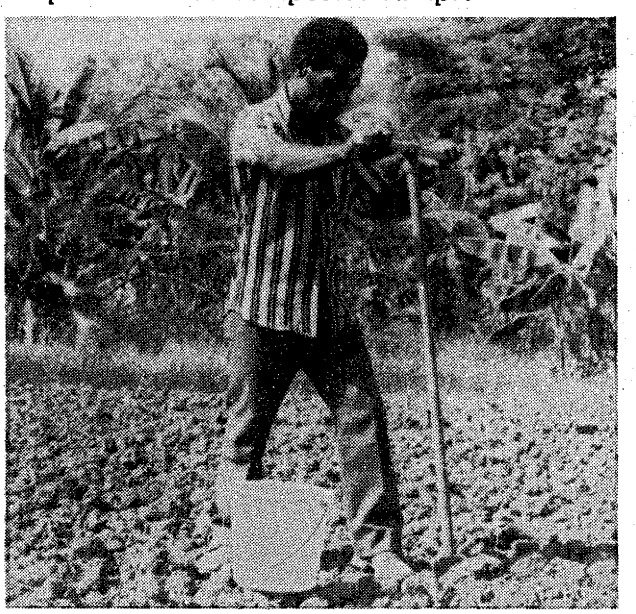


The correct method of taking samples. Each x represents a sample



Sampling like this will probably not give a representative composite sample





Sampling soil using a spade (left) and a soil auger (right). Samples are transferred to a bucket for mixing

Step 3. Take a sub-sample of about 1 kg from your composite sample. Place the sub-sample in a clean plastic bag and label it clearly with your name and sample number, so that it is easy to recognise. Do not place the label inside the bag with the soil. The moist soil will cause the label to spoil so that it cannot be read. Place the first bag inside a second bag, for protection.

Step 4. When collecting the soil sample, you should also record the following information about the site:

- if possible, soil type and profile characteristics
- past fertilizer use, if any
- crops grown, and management system
- slope, drainage characteristics
- climate

This data will help the soil scientist interpret the results of the soil analysis carried out on the sample.

FURTHER INFORMATION

1. For general information on soils and crops, contact:

   Dr K. Thiagalingam
   Agriculture Department
   U.P.N.G.
   P.O. Box 320
   University

2. For information on soil analysis and interpretation, contact:*

   Chemistry Section
   Department of Primary Industry
   P.O. Box 417
   Konedobu

3. For information on soil mapping, classification and distribution of soils in Papua New Guinea, contact:

   Land Use Section
   Department of Primary Industry
   P.O. Box 417
   Konedobu

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* *Chemistry Section, D.P.I., have produced simple 'Instructions for Taking Soil Samples'. Anyone who wants to have a soil tested by the Chemistry Section should follow these basic instructions carefully, and also complete a 'Soil Analysis Request Form'.*

Both these forms are available from D.P.I. Chemistry Section at the address given above.