T.R.I. ADVISORY CIRCULAR No.SP 7

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Soil Analysis

(This Circular cancels Advisory Circular No. S3, Serial No. 5/84, issued in 1984)

1. Introduction

Nutrient status of soil can be determined by soil analysis. The corrective measures to amend or improve nutrient deficiencies can be based on results of such analysis. However, soil analysis only may not be adequate to make recommendations as there are several other factors that govern the availability of nutrients.

Soil analysis may be resorted to, when it is suspected that the soil is the primary cause for poor performance of tea bushes. Other factors such as fertilizer application, cultural practices, *etc.* should have been correctly adhered to. Under such circumstances, a complete analysis of soil is likely to reveal the factor which causes poor growth.

For Site Specific Fertilizer Recommendation (SSFR), soil analyses are compulsory because SSFR mainly depends on soil nutrient status.

For soil analysis to be reliable for decision making, soil should have been sampled correctly. Therefore, due regard must be paid to the sampling procedure outlined below.

2. Sampling for nutrient analysis

The collection, preparation and delivery of a soil sample are important steps in the analytical operation.

2.1 Time of sampling

For the estimation of soil pH levels and/or nutrient status, sampling should be carried out after a minimum period of 6 weeks following the last ground fertilizer application. At the time of sampling, soil should be relatively moist. Sampling should be avoided during severe drought and heavy rainfall seasons. In the case of SSFR, representative soil samples should be obtained annually to determine the nutrient status. Samples for SSFR can be obtained during March/ April and September/October from the South-West quarter, and during September/October, from the North-East quarter.

2.2 Tools and the procedure

The ordinary post-hole auger is the best sampling tool. Its combined cutting and digging edge makes it most serviceable for general use even on hard ground. The stem should be marked at intervals of 15 cm (6 inches) so that the depth of sampling can be ascertained at a glance. Except in gravely areas, it is possible to sample up to a depth of 60 cm (24 inches) with the above soil auger, if necessary. As an alternative, the *alavangoe* normally used for digging planting holes is satisfactory for the purpose. For collecting soil from depths below the reach of the soil auger, it is necessary to dig pits. For diagnostic purposes, sampling to a depth of 15 cm (6 inches) would be sufficient. The leaf litter on the soil surface (not incorporated in the soil)

should be cleaned before sampling. While collecting soils from the second and lower depths with an auger, contamination of the samples with the top soil can be minimized by lightly scraping the outer part of the soil core with a knife.

2.3 Technique of sampling

One of the most important aspects of soil testing is the technique of obtaining a soil sample that is representative of the area. The errors in sampling a field are generally greater than the errors in laboratory analysis. The size of the area from which one sample may be taken varies greatly, but usually ranges from 2 to 10 hectares (5 to 25 acres). A field may be marked into blocks depending on the area, topography, drainage, past cultural practices, *etc*. Areas that vary in appearance, slope, drainage, soil-type should be sampled separately (Figure 1). Localized areas with extremely poor soil or crop growth should be marked separately and sampled.

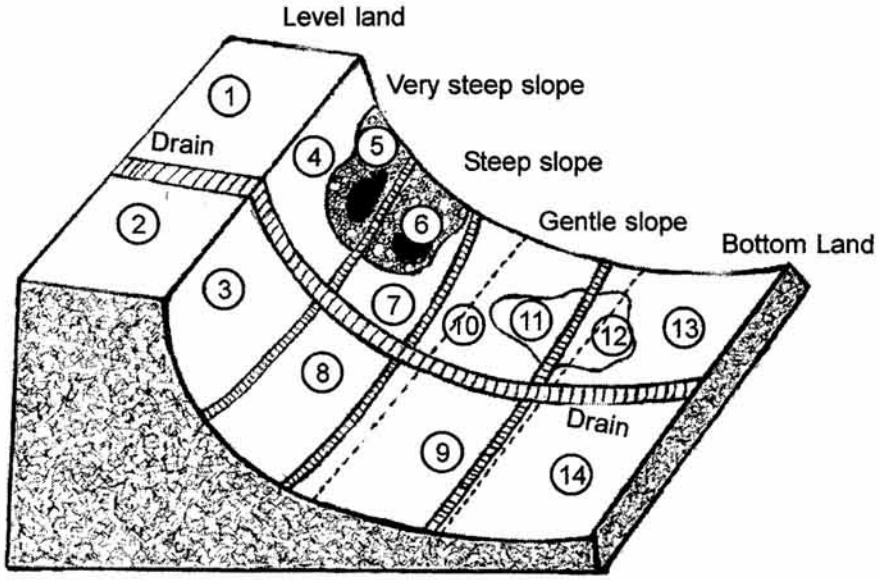

Figure 1. Demarcation of an area into blocks to obtain representative soil samples of the area (numbers within the circulars are blocks)

2.4 Number of samples

Using the auger, a large number of core samples should be collected randomly in a zigzag manner as shown in Figure 2. It is advisable to take cores from points closer to the plants where root activity is high, rather than the middle of the rows. Sampling should not be done near roads, paths, drains or other non-representative or abnormal areas. The number of soil cores to be taken would depend on the area which the composite soil sample is expected to represent. Each sample should contain soil from cores taken at several places in the field. This procedure is to maximize the influence of uniformity in the soil smaple. From small or experimental plots, it would suffice to take about 10 cores. When sampling a large field, it should first be divided into blocks of about 2 hectares (5 acres) and 15 to 20 cores should be taken from each block.

- The soil cores from each block should be collected on an aluminium/plastic tray or a piece of polythene sheet or brown paper
- When soil is collected for trace element analyses, the tray should be lined with a polythene sheet

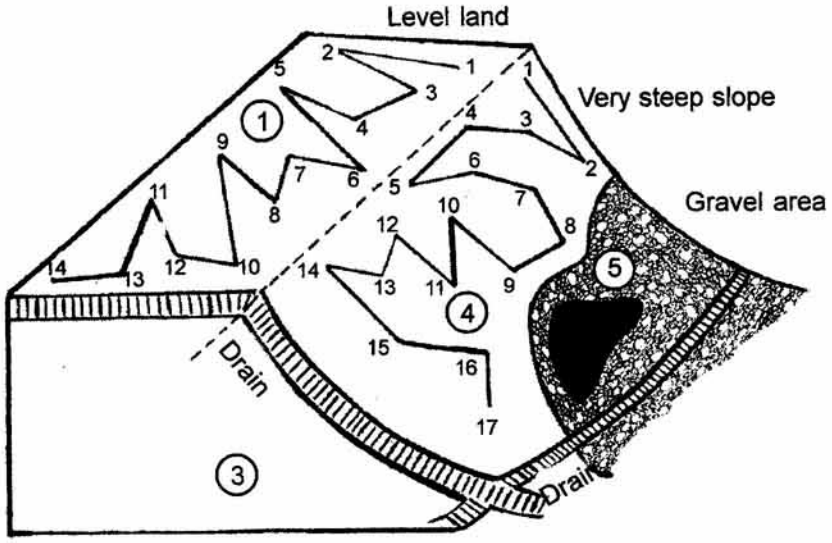

Figure 2. Soil sampling in a zigzag random manner to obtain a composite sample

- The soil should be thoroughly mixed, breaking-up any lumps and spread into a layer
- Small portions from the layers are taken at random and transferred into a clean polythene bag in order to provide a sub-sample of about ½ kilogram (1 lb)
- The bag should be closed immediately by tying and labelled with a waterproof marking pen, giving details of location (estate, field and block), depth of sample, date *etc.* The samples should then be despatched to the laboratory without undue delay

3. Sample despatch

The samples should be sent directly to the Head, Soils and Plant Nutrition Division, Tea Research Institute of Sri Lanka, Talawakelle or to the regional laboratories located at following addresses depending on the convenience for transport.

- Soils and Plant Nutrition Laboratory, Walahanduwa, Galle
- Soils and Plant Nutrition Laboratory, Research, Advisory and Extension Centre, PO Box, 130, Hantana, Kandy

It is necessary that the total cost of analysis should be paid prior to commencing analysis. Payments could be made through cheques, postal or money orders drawn in favour of "Tea Research Institute of Sri Lanka" and forward to the Head, Soils and Plant Nutrition Division, Tea Research Institute of Sri Lanka, Talawakelle or to the regional laboratories at Hantana, Kandy and Walahanduwa, Galle. Money could also be paid at the cash counter of the Tea Research Institute or its centres at the time of submission of samples for analysis.