

Penang Sangam High School
P.O. Box 44, Rakiraki
Year 13 Agriculture Lesson Notes Week 9

Strand	AS 13.3 Agronomy
Sub-Strand	AS 13.3.1: Soils
Content Learning Outcome	AS 13.3.1.1 Demonstrate the assessment methods in determining the chemical properties of the soil.

2. Soil Testing (soil sampling or lab tests) - chemical method of estimating the nutrient content (supplying power) of a soil. It measures a part of the total nutrient supply (available nutrient) in the soil.

Advantage	Disadvantage
1. Deficiency can be identified before planting a crop	1. Problems in obtaining a sample
2. Soil testing needs only a small sample	2. Soil test values do not tell us how much fertilizer needs to be applied
	3. Services of a testing laboratory are required

What Is Soil Sampling? - collecting a few kg of soil in such a way to obtain information about many thousands or millions of kg of soil (representative of a large area/mass of soil)

<u>Importance of Soil Sampling</u>	<u>When Sampling Should Be Done?</u>
-to find out if any nutrient are deficient in a particular soil	-once every 3 years of continuous cropping
-to decide which fertilizers are to be applied	-3 months after applying fertilizers
-to check the suitability of the soil for a particular crop	-6 weeks before planting a crop
	-sampling should be done on a sunny day

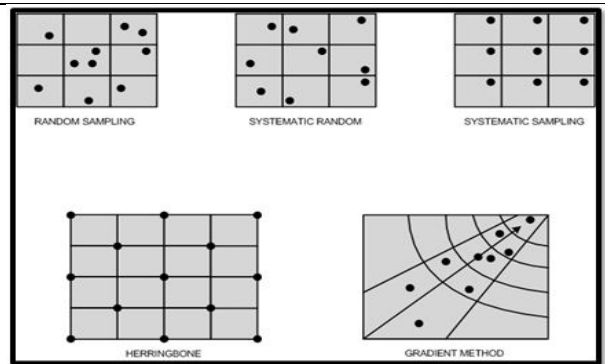
<u>Equipment Used For Soil Sampling</u>	<u>Depth of Sampling</u>
• screw or tube auger	For normal crops 15 cm
• small spade	Fruit trees 15+ cm
• hand trowel	Cultivated crops 20 cm
	Pasture 7.5 cm

Types of Soil Sampling

<u>Subsoil sample</u> - samples are usually taken from 0-15 cm depth of soils from a particular point in the field	<u>Composite sample</u> - collecting approximately 20 equal portions of soil from various parts of the sampling area to make up one composite sample
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Methods of Sampling

- For uniform areas or flat land samples are taken from evenly spaced intervals along 2 diagonals across the field
- For complex areas (slope land) use a zigzag pattern or a random pattern



What Is Done After Soil Samples Are Taken?

- (i) Take soil samples, place it in bucket or plastic bag, mix thoroughly and label each sample with
 - ✓ Name and address of farmer
 - ✓ Name of the area, village or field number
 - ✓ Date of sampling and sample number
 - ✓ Field history and crops to be grown
- (ii) It is sent to an Agricultural Research Station in the chemistry laboratory to be analyzed by soil chemists.
- (iii) The fertility record together with the recommendations for which fertilizer to be applied at what rate to improve soil fertility is sent to the farmer through the locality agricultural extension officer.

3. Plant Tissue Testing

Plant analysis is based on the assumption that the amount of a given element in a plant is an indication of the supply of that particular nutrient and as such is directly related to the quantity in the soil.

2018 – MC No. 10

2020 – Describe one way in which nutrient deficiencies can be detected in plants. (1 mark)

Advantages

- (i) Nutrient concentration varies with age and species of the crop
- (ii) Nutrient concentration varies due to weather conditions
- (iv) Good technique to determine the soil nutrient supply

Disadvantages

- (i) Since a shortage of an element will limit growth, other nutrients may accumulate in the cell sap and show high tests irrespective of the soil nutrient supply
- (ii) It may be too late in the season for some crops when the deficiency is identified
- (iii) It is essential to test that part of the plant, which will give the best indication of the nutritional status

4. Field Tests

The field plot method is one of the oldest and best known of the biological tests.

Experiments are carried out in the field using treatments and replications to help in the formation of general recommendations. These results are then forwarded to the farmers.

5. Micro-organisms

This is based on the principle that the nutrient requirement of microorganisms is similar to those of crop plants.

Example: Azotobacter species is used for determining lime, phosphorus and potassium content in the soil.

2019 – Essay Question No. 3

- ✓ Three methods of identifying soil deficiencies. (3 marks)
- ✓ One advantage of each method identified. (3 marks)
- ✓ One disadvantage of each method identified. (3 marks)

Question: During a practical class the students observed that the cucumber in the school vegetable garden was not performing as to expectation. Discuss the method that you as a student would undertake to evaluate on the performance of the cucumber in the school garden.