

**Penang Sangam High School**  
**P.O. Box 44, Rakiraki**  
**Year 13 Agriculture Lesson Notes Week 8**

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

Lesson 3: Nutrient Deficiency

Lesson Outcome: At the end of the lesson the student will identify the deficiency symptoms of macro and micro nutrients

1. Nutrient deficiency - shortage of nutrient in a plant
2. Chlorosis - fading of chlorophyll in plants
3. Necrosis - death of plant tissues

Nutrient requirements generally increase with the growth of plants. Malnutrition may occur if nutrients are deficient or in excess. Deficiencies or excess of nutrients can damage plants by slowing or inhibiting growth and reducing yield.

2019 – MC No. 10

Deficiency of Macronutrients

<b>Macronutrient</b>	<b>Deficiency</b>
Nitrogen	<ul style="list-style-type: none"> <li>✓ Leaves are small and light green</li> <li>✓ Lower leaves lighter than upper ones</li> <li>✓ Not much leaf drop and weak stalks</li> </ul>
Phosphorous	<ul style="list-style-type: none"> <li>✓ Dark-green foliage</li> <li>✓ Lower leaves sometimes yellow between veins</li> <li>✓ Purplish color on leaves or petioles</li> </ul>
Potassium	<ul style="list-style-type: none"> <li>✓ Lower leaves may be mottled</li> <li>✓ Dead areas near tips and margins of leaves</li> <li>✓ Yellowing at leaf margins continuing towards center</li> </ul>
Calcium	<ul style="list-style-type: none"> <li>✓ Tip of the shoot dies</li> <li>✓ Tips of young leaves die</li> <li>✓ Tips of leaves are hook – shaped</li> </ul>
Magnesium	<ul style="list-style-type: none"> <li>✓ Lower leaves are yellow between veins (veins remain green)</li> <li>✓ Leaf margins may curl up or down or leaves may pucker</li> <li>✓ Leaves die in later stages</li> </ul>
Sulfur	<ul style="list-style-type: none"> <li>✓ Tip of the shoot stays alive</li> <li>✓ Light green upper leaves</li> <li>✓ Leaf veins lighter than surrounding areas</li> </ul>

2020 – MC No. 9

2018 – Differentiate between nutrient deficiency and nutrient toxicity in relation to availability of nutrients. (2 marks)

2018 – Describe one symptom of nitrogen deficiency in plants. (1 mark)

### Deficiency of Micronutrients

<b>Micronutrient</b>	<b>Deficiency</b>
Iron	<ul style="list-style-type: none"> <li>✓ Tip of the shoot stays alive</li> <li>✓ New upper leaves turn yellow between veins (large veins remain green)</li> <li>✓ Edges and tips of leaves may die</li> </ul>
Zinc	<ul style="list-style-type: none"> <li>✓ Poor leaf development</li> <li>✓ Chlorotic mottle in less severe cases</li> </ul>
Copper	<ul style="list-style-type: none"> <li>✓ Death of young leaves</li> <li>✓ Chlorosis</li> <li>✓ Failure of fertilization and fruit set</li> </ul>
Manganese	<ul style="list-style-type: none"> <li>✓ Tip of the shoot stays alive</li> <li>✓ New upper leaves have dead spots over surface</li> <li>✓ Leaf may appear netted because of small veins remaining green</li> </ul>
Molybdenum	<ul style="list-style-type: none"> <li>✓ Cupping of leaves</li> <li>✓ Long and slender leaves</li> <li>✓ Inter-veinal chlorosis</li> </ul>
Boron	<ul style="list-style-type: none"> <li>✓ Tip of the shoot dies</li> <li>✓ Stems and petioles are brittle</li> </ul>

### Lesson 4: Soil Nutrient Evaluation

Lesson Outcome: At the end of this lesson student should be able to

1. identify and describe the different methods of soil nutrient evaluation
2. discuss the advantages and disadvantages of the different methods of soil nutrient evaluation

1. <u>Soil fertility</u> - the nutrient status of the soil with respect to its ability to supply essential elements for plant growth.	2. <u>Soil productivity</u> - it is the soil's capacity to produce a certain yield of crops with optimum management.
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1. <u>Shifting cultivation</u> - is a rotation of fields between relatively short or longer periods of cropping and followed by fallowing.	2. <u>Fallowing</u> - when the cultivated land is left without any crop for short periods of time to regain soil fertility.
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**Soil Fertility Evaluation** - the process by which nutrient problems are diagnosed and fertilizer recommendation is made.

**1. Observing Plant Deficiency Symptoms** (Visual/ Field Observation) - simply observing (using our eyes) together with our knowledge of common nutrient deficiency symptoms.

#### Advantages

1. Cheap and quick
2. Does not require equipment or a laboratory

#### Disadvantages

1. By the time deficiency symptoms become obvious it may be too late in the season to apply fertilizers
2. Symptoms may be mixed with pest and disease conditions
3. Before symptoms appear yield loss may already have occurred

**Question:** Discuss how a farmer would differentiate between nutrient deficiency and effects of drought on plant growth.