

Penang Sangam High School
P.O. Box 44, Rakiraki
Year 13 Agriculture Lesson Notes Week 14

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.

Lesson 10: Soil Buffer Capacity

Lesson Outcome:

At the end of this lesson student should be able to

- 1. explain the term soil buffer capacity**
- 2. discuss the importance of soil buffering in stabilizing the pH of the soil**

Vocabulary

Soil buffer capacity - is the ability of the soil to resist changes particularly in relation to chemical reaction or soil pH. Humic acids and clay minerals have good buffer qualities.

In acid soils, buffering refers to the ability of Al, H and hydroxyl-aluminium to maintain a certain concentration of H^+ in a solution.

For example; if soil A needs more liming than soil B to increase its pH it is said to have a higher buffering capacity.

2018 – MC No. 11

Generally, soils with high organic matter and clay have higher buffering capacity than soil low in organic matter and clay.

Importance of Buffering Capacity in Soil

-Buffering capacity is important because it helps to stabilize the pH.

*Sudden changes in pH can affect plants in a variety of ways.

Other importance of soil buffering capacity is:

- ✓ Can be used in making agricultural lime recommendations for acid soils
- ✓ Can be used in making Sulphur recommendations for decreasing the pH of some soils

2019 – State one importance of soil buffering capacity (1 mark)

2020 – MC No. 11

Lesson 11: Soil Husbandry Techniques and Chemical Properties of the Soil

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

- 1. identify husbandry techniques that enhances the chemical properties of the soil for better plant growth and production.**
- 2. discuss how husbandry techniques enhances the chemical properties of the soil for better plant growth and production**

1. Tillage - is the breaking of soil into pieces either physically or mechanically
2. Mulching - is the covering of the soil surface to retain moisture
3. Hilling - piling up of soil around the base of the plant

The husbandry techniques on the farm include tilling, hilling, planting, and mulching, irrigation, drainage and fertilizer application. These husbandry techniques assist in the chemical properties of the soil positively and also negatively.

Tillage

With minimum tillage, the soil contains more organic matter with high fertility and CEC whereas conventional tillage will lower the rate of CEC and the amount of organic matter in soil.

Hilling

Hilling is piling of soil up around the base of a plant. This allows the fertilizer or nutrients to be mixed with the soil, which will cover the plant for ideal absorption into the root zone.

Planting

Plants take up nutrients in soluble ionic form. The pH of the soil determines which type of crops to grow. Majority of the crops are grown in the pH range of 6.5 – 7.

In soils, respiration by plant roots produces carbon dioxide that reacts with water in soil to form weak carbonic acid (H_2CO_3) which contributes H^+ ions into soil solution thus increasing soil acidity.

Mulching

Mulching prevents leaching of nutrients in soil.

Some mulch, especially those containing fresh grass clippings, can affect soil pH and lead to nutrient deficiencies or toxic build-ups.

Organic mulch increases organic matter and cation exchange capacity of soil.

2019 – State one way in which mulching enhance the chemical properties of the soil (1 mark)

Drainage and Irrigation

Irrigation increases soil pH and the fertility of soils resulting in the leaching of nutrients which lowers the organic matter thus the cation exchange capacity decreases in the soil.

Drainage reduces leaching, maintains cation exchange capacity of soils and lowers soil pH.

Fertilizer Application

The addition of fertilizing materials provides nutrients which are available to plants through root absorption of ions from soil solution.

The End of Soils Notes...

