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KCSE AGRICULTURE NOTES

TOPIC 4: Crop Production I (Land Preparation)

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SPECIFIC OBJECTIVES

By the end of the topic, the learner should be able to:

a) explain the importance of land preparation
b) describe the various types of cultivation
c) relate each cultivation operation to correct tools and or implements
d) Prepare a piece of land ready for crop production.

TOPICS/SUB-TOPICS (7 LESSONS)

Land preparation

Definition

Importance

Operations in land preparation

Clearing land before cultivation

- Importance (include clearing as a method of land reclamation)
- Methods and equipment

Primary cultivation

- Definition and importance Timing
- Choice of tools and implements

Secondary cultivation

- Definition and importance
- Number of operations
- Correct tools and implement for different operations
- Relating final tilth to the intended planting material

Tertiary operations

- Ridging
- Rolling
- Levelling

Note: For each type: Give reasons, explain how it is carried out

Sub-soiling

- Meaning
- Importance
- Equipment used

Minimum tillage

- Definition
- Importance
- Practices

CROP PRODUCTION I (Land Preparation)

Introduction

- ✓ A piece of land which is prepared is known as seedbed.
- ✓ A seedbed is a piece of land that is prepared ready to receive planting materials.

Seedbed Preparation

Reasons for Seedbed Preparation;

- ✓ To enable water to infiltrate.
- ✓ To kill weeds
- ✓ To improve soil aeration.
- ✓ To destroy pests and diseases.
- ✓ To incorporate organic matter in the soil.
- ✓ For easy planting.
- ✓ To facilitate root penetration.

Operations in Land Preparation

Land Clearing

Clearing of land is necessary when:

- ✓ Opening up a virgin land.
- ✓ A stalk growing crop was previously planted.
- ✓ There is long interval between primary and secondary cultivation.
- ✓ Land was left fallow for a long time.

Procedure

- ✓ Tree felling and removal of stumps and roots.
- ✓ Burning
- ✓ Slashing

- ✓ Use of chemicals

Note: Burning should be avoided where possible since it;

- ✓ Leads to loss of organic matter,
- ✓ Kills soil organisms
- ✓ Destroys soil structure and plant nutrients.

Primary Cultivation

- ✓ This is the initial breaking of land.
- ✓ It is done early before the onset of the rains to:
    - Give time for soil organisms to act on organic matter.
    - Allow gaseous exchange to take place, thus carbon dioxide diffuses out of the soil while oxygen enters into the soil.
    - Allow other operations to take place in time.

Reasons for primary cultivation:

- ✓ Remove weeds.
- ✓ Burry organic matter.
- ✓ Open up soil for infiltration of water and air.
- ✓ Expose pests and disease causing organisms.
- ✓ Soften the soil for easy planting.

Operations in primary cultivation

- ✓ Hand digging;

Use of hand tools;

- Jembes,

- Mattocks,
- Fork-jembes.

✓ Mechanical cultivation;

Use of mouldboard ploughs;

- ✓ Disc ploughs,
- ✓ Chisel ploughs,
- ✓ Subsoilers
- ✓ Rippers.

Use of Ox-Ploughs;

Which can be drawn by;

- ✓ Oxen,
- ✓ Donkeys,
- ✓ Camels

Depth of Cultivation

Depends on:

- ✓ The type of crop to be planted/size of seed.
- ✓ The implements available.
- ✓ The type of soil.

Choice of Implement

Determined by:

- ✓ The condition of land.
- ✓ The type of tilth required/type of crop.

- ✓ Depth of cultivation.

Secondary Tillage

- ✓ These are refinement practices on the seedbed that follow primary cultivation.
- ✓ It is also known as harrowing.

Reasons for secondary Tillage:

- ✓ To remove the germinating weeds.
- ✓ To break soil clods to produce required tilth.
- ✓ To level the seedbed for uniform planting.
- ✓ To incorporate organic matter/manure into the soil.

Factors determining number of secondary cultivation:

- ✓ Soil moisture content.
- ✓ Size of the planting materials.
- ✓ Condition of the soil after primary cultivation.
- ✓ Slope of the land.

Tertiary Operations:

Ridging;

The process of digging soil on a continuous line and heaping on one side to produce a furrow and a bund (ridge).

It is important for root crops, to allow root expansion and for soil and water conservation.

Rolling:

It is the compaction of the soil to produce a firm surface which increases seed-soil contact and prevents wind erosion.

Levelling;

Production of an even, uniform surface which promotes uniform planting.

Sub soiling:

This is deep cultivation into the subsoil layer to break up any hardpan which might have developed.

It is done for the following reasons:-

- ✓ To facilitate drainage.
- ✓ Bring up leached nutrients to the surface.
- ✓ Increase aeration of the soil.
- ✓ To improve root penetration.
- ✓ The implements used include chisel plough and Subsoilers.

Minimum Tillage:
This is the application of a combination of farming practices with the aim of reducing the disturbance of the soil.

Examples of which include:

- ✓ Use of herbicides.
- ✓ Mulching and cover-cropping.
- ✓ Timely operations to prevent weed infestation.
- ✓ Strip cultivation.
- ✓ Uprooting and slashing of weeds.

Reasons for Minimum Tillage

- ✓ To reduce cost of cultivation.
- ✓ To control soil erosion.
- ✓ To preserve soil moisture.

- ✓ To prevent root exposure and damage.
- ✓ To reconstruct destroyed soil structure.

QUESTIONS ON TOPIC

1. Give three factors that determine depth of Ploughing during land preparation
2. List four reasons for cultivating land before planting
3.
   a) What is minimum tillage?
   b) Give four farming practices that help in achieving minimum tillage.
4. Describe the establishment of grass pasture from the time the land is ploughed using a mould board plough to the time the pasture is ready for grazing
   a) Explain five practices that a farmer should carry out to ensure uniform germination of seeds
   b) Describe five factors that determine the number of cultivations when preparing a seedbed
5. State four physical conditions of the seedbed that need to be changed to facilitate germination
6. State four importance of sub soiling as a tertiary operation
7. Outline four advantages of rolling in seedbed preparation
8. State four disadvantages of minimum tillage
9. Give two reasons why it is advisable to cultivate the field during the dry season
10. How are hard pans caused by cultivation?
11. Give four factors that determine the number of secondary cultivation operations
12. Define the term minimum tillage
13. List four advantages of timely planting
14. State any two factors that determine the number of cultivation on a field before it is ready for planting
15. Give three benefits of timely planting of annual crops
16. State four factors determining the depth of Ploughing land