UNIT 6

Cultural Practices

LEARNING / FACILITATING MATERIALS

PINEAPPLE PRODUCTION
NATIONAL CERTIFICATE I

CAADP
NEPAD TRANSFORMING AFRICA
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Introduction

Welcome to the start of your career in land and soil preparation in pineapple production

A career in land and soil preparation for pineapple production has never been as popular as it is now; competition is strong and the standards are getting high. So you must aim higher, particularly if you see pineapple industry as opportunity to build up your lifelong career.

Many career options are also available within the land and soil preparation for pineapple production. This unit will also look at the, methods of land preparation, farm land demarcation and understanding of soil preparation for planting

While training, you should make an effort on improving your personal habits, skills and knowledge to get along well with the working industry. All these aspects are essential to achieving success in the world of work.

Congratulations for making the decision to study land and soil preparation for pineapple production. You have taken the first step towards a very interesting and satisfying career.

This learning material covers all the Learning Outcomes for land and soil preparation requirements for the Certificate I programme.

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LEARNING OUTCOME **1**

Demonstrate knowledge in weed management

In this LO, you will learn to:

a) Explain the importance of weed management.
b) Identify the various methods of weed management.
c) Select and use different mulching materials

PC (a) The importance of weed management.

A weed management system uses two or more control methods (prevention eradication, cultural, mechanical, biological, and chemical). The objective of weed management is to stop weeds from reaching a mature stage of growth where they could be harmful to plants.

A good weed management system will ensure:

1. Good aeration within plants
2. Minimal incidence and severity of pests and diseases
3. Reduced competition in water, nutrient, space and light
4. Enhanced other cultural practices to be carried out.
5. Higher yield

PC(b) Identify methods of weed management

Methods of weed management include cultural, chemical, physical, mechanical and biological. Biological weed management in pineapple production is not feasible.

Activity

Learner will be provided with needed resources to practice the various methods of weed management.

PC(c) Select and use different mulching materials

Mulch prevents weeds from sprouting up, keeps soil moist and aerated. It protects plants from soil borne diseases and organic mulches replenish the soil as it decomposes. Different materials can be used for mulching depending on the cost, availability and skills. The materials include:

1. Plastic mulch
2. Dry grasses
3. Dry leaves
4. Stubbles

Picture 1: Plastic mulch

Picture 2: Dry weed mulching

Activity

Leaner will be made to select and use different mulching materials for weed management in pineapple production.

Self-assessment

1. Explain three (3) reasons why mulching material are used

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2. List three (3) various method of weed management.

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3. State three (3) importance of weed control

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LEARNING OUTCOME 2

Demonstrate knowledge in water management

In this LO, you will learn to:

a) Explain the importance of water management.
b) Explain the various irrigation methods and systems.
c) Explain various drainage methods.
d) Explain the importance of measuring rainfall.
e) Measure rainfall

PC (a) Importance of water management

Water, together with soil, is the underpinning assets of any agricultural production. Water is important because it dissolves the soil nutrients for absorption by the plant root to prepare its food (photosynthesis).

Access to water is becoming increasingly important for farmers especially when farm businesses incorporate irrigation rather than rain-fed farming.

Water management ensures the following:

1. Availability of water all year round
2. Reduces cost of production
3. Reduces water borne disease
4. Minimises wilting of plants

PC(b) Irrigation methods and systems

Irrigation: Is an artificial application of water in place of rainfall for the growth of plants.

The different methods of irrigation includes: Overhead, Surface and Subsurface

The different systems are sprinklers: perforated pipes boarder, drip, basin and flood ditch.

The systems of irrigation are indicated in the description of the method below.

Overhead: In an overhead irrigation system, water is pumped under pressure and sprayed down onto the plants from flat spray nozzles; an example of an overhead irrigation is the sprinkler system. Sprinkler irrigation is a method of irrigation in

which water is sprayed, or sprinkled through the air in rain-like drops. The spray and sprinkling devices can be permanently set in place (solid set), temporarily set and then moved after a given amount of water has been applied (portable set or intermittent mechanical move), or they can be mounted on booms and pipelines that continuously travel across the land surface (wheel roll, linear move, centre pivot).

Picture 3: Sprinklers for surface irrigation

Surface irrigation is the application of water by gravity flow to the surface of the field. Either the entire field is flooded (basin irrigation) or the water is fed into small channels (furrows) or strips of land (borders). Surface irrigation consists of a broad class of irrigation methods in which water is distributed over the soil surface by gravity flow. The irrigation water is introduced into levelled or graded furrows or basins, using siphons, gated pipes, or turnout structures and is allowed to advance across the field. Surface irrigation is best suited to flat land slopes, and medium to fine textured soil types which promote the lateral spread of water down the furrow row or across the basin.

Subsurface irrigation consists of methods whereby irrigation water is applied below the soil surface. The specific type of irrigation method varies depending on the depth of the water table. When the water table is well below the surface, drip or trickle irrigation emission devices can be buried below the soil surface (usually within the plant root zone).

PC(c) Various drainage methods.

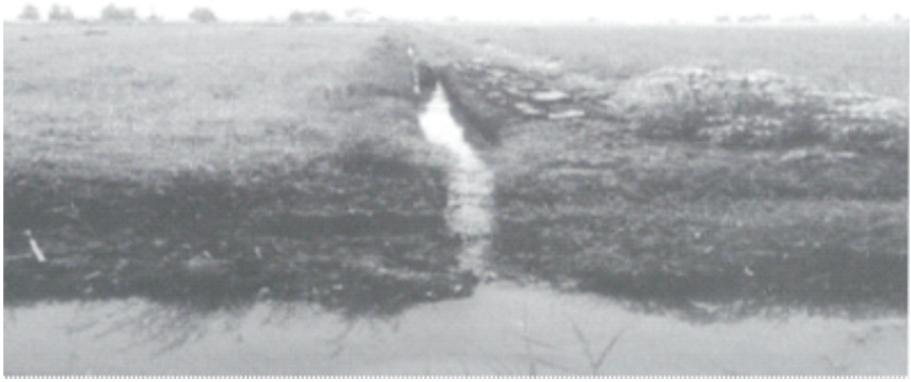
The various drainage methods are, Surface and Subsurface drainage:

Surface drainage is the shaping, grading, or management of the land surface to provide gradual removal or diversion of water off the land surface. Surface

drainage is accomplished by smoothing out small depressions (land smoothing) or re-grading an undulating land surface to a uniform slope, and directing water to a natural or improved, constructed channel.

Sub-surface drainage system (to control the water table in the soil). In subsurface drainage, field drains can be either open drains or pipe drains. Open drains and pipe drains have the same function. Sub-surface drainage remove excess water from the soil profile with a perforated tube install 2-4 feet below the soil surface

These tubes are commonly called 'tiles' because they were originally made from short length of clay pipes known as 'tiles' and water will seep into the small spaces in between the tiles and drains away.



Picture 4: Sub-surface open drainage

PC (d) Importance of measuring rainfall

Measuring of rainfall is very important for two main reasons:

1. To compare the amount of rainfall with how well (or not well) our crops perform. This can help us determine just how important fluctuations in precipitation are to the success of our crops.

2. Recording rainfall for consecutive years can inform us about fluctuations from year to year, and can help us plan accordingly as we learn nature's patterns. Most importantly, we learn when to plant crops to allow plants to mature without irrigation.

PC(e) Measure rainfall

Activity

Learner will be given appropriate apparatus to measure the rainfall

Self-assessment

1. State one advantage and disadvantage of any two (2) systems of irrigation.

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2. State two (2) processes involve in surface drainage.

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3. State two (2) reasons why water is important to crops

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4. What instrument is used in measuring rainfall?

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5. Why should a farmer take measurements of rainfall?

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LEARNING OUTCOME 3

Demonstrate knowledge in application of soil amendments

In this LO, you will learn to:

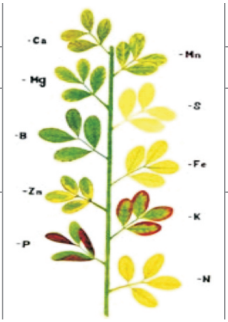
a) State the importance of the various nutrients to the plant and fruit.
b) Identify nutrient deficiency symptoms.
c) State the nutrient requirements of the plant.
d) Measure the appropriate soil amendments and apply them.
e) Explain the frequency of soil amendments applications

PC (a) Importance of the various nutrients on the plant and fruit.

Plant food nutrients are essential for proper crop development and quality fruit formation. Balanced nutrients levels prevent pests and diseases incidence. Each nutrient is equally important to the plant, yet each is required in vastly different amounts. These differences have led to the grouping of these essential elements into two categories; macro nutrients and micro nutrients.

PC (b) Nutrient deficiency symptoms

Common nutrients deficiencies symptoms are:

Nutrients		Deficiency symptoms
Nitrogen		Yellowing of older leaves,
Potassium		Stunted growth, wilting in older leaves, leave scorch and interveinal chlorosis
Phosphorus		Burn leaves tip and older leaves turning dark green or reddish purple, Poor fruit formation

PC (c) Nutrient requirements of the plant

Potential growth of the pineapple plant is determined by the amount of available nitrogen, which in turn determines the potassium requirement by the pant. Nitrogen also determines the weight of the fruit, and the size.

In pineapples, phosphorus is required for floral differentiation and fruit development. Good phosphorus nutrition results in compact fruits with a high percentage of vitamins C.

Potassium increases and strengthens the fruit bearing stem of pineapples thereby reducing the risk of lodging. This element also enhances the shell, flesh colour, and the amount of slips and suckers formed.

PC (d) Measuring the appropriate soil amendments and its application.

Fertilizers may be applied in a row alongside the plant, in a band around the plant or placed in the lower leaf axil. Avoid placing fertilizer into the shoot area as this could kill the plant. Fertilizers NPK in a ratio of 2:1:3, that is 2 parts of nitrogen to 1 part of phosphorus to 3 parts of potassium should be applied to each plant at 2nd month after planting, 4th month after planting and 5th month after planting.

Fertilizer used	Rate	Formulation	Number of application
NPK 15-15-15	5g/plant 3 bags/acre 120 kg/acre	Solid Liquid	6-10
Potassium Nitrate +Urea	50 kg +9 kg /200 l 9 kg + 1 kg/200 l 6 kg + 4 kg/ 200 l	Liquid	6-10
Urea	4-6 g /kg 4-5 kg /200 l 150-200 kg /ha	Liquid Solid	2
Potassium nitrate	5-15 g/plant	Solid	2
Sulphate of potash	4 g/plant 50 kg /200 l	Solid Liquid	2
23-15-5 (TSP) triple superphosphate	5g/plant 50 kg /200 l	Solid Liquid	2

11-5-27+5 Magnesium SOP + urea	100 kg /acre 4 bags +1 bags /400 30 kg +5 kg /16000 plat	Liquidsolid	2

Activity

Learner will be given soil amendment (fertilizer) to measure and apply on an acre of pineapple farm.

PC (e) Frequency of soil amendment applications.

The number of soil amendments to be applied during the growth of the plant is referred to as the frequency.

Basic soil amendment application is linked to the result of soil analysis. Use leaf analysis as a basis for subsequent application.

Self-assessment

1. List the category to which nutrients are classified

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2. State the nutrients that show the following deficiency symptoms of pineapple.

Symptoms	Nutrients
i. Wilting in older leaves,	
ii. Yellowing of leaves	
iii. Poor fruit formation	

3. List any two (2) nutrients required by pineapple.

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LEARNING OUTCOME 4

Demonstrate knowledge in flower induction

In this LO, you will learn to:

a) Explain the occurrence of natural flowering.
b) Identify types of forcing agents.
c) Determine the maturity of the plant for forcing.
d) Select and apply forcing agent at the appropriate time of the day.

PC (a) Explain the occurrence of natural flowering.

Naturally most plants flower after vegetative growth. However natural pineapple flowering may be delayed or uneven. It is highly desirable to attain uniform flowering and to control time of harvest. In order to avoid uneven production in the peak periods flowering has to be induced.

PC (b) Identify types of forcing agents.

Forcing agents are synthetic hormones use to induce plants to flower. It permits better scheduling of the harvest as it takes five months from the time of induction to full maturity of the fruits

The types of forcing agents used to induce flowering are Naphthalene Acetic Acid (NAA), Ethylene and calcium carbide. For calcium carbide use 0.5kg -1.0kg in 200 litres of water. The NAA is available in tablet form (0.5 mg active ingredient per tablet/plant).

Activity

Learner will be introduced to different samples of forcing agents and ask to identify them.

PC(c) Determine the maturity of the plant for forcing

The plants in the block to be treated should be homogeneous in size and not less than 7 months old or possesses more than 25 leaves. Young and unhealthy plants should not be induced to flower since they will produce small fruits, (unless small fruits are specifically required for a particular market.

Activity

The learner will be taken to a farm to determine the maturity of plant in a block.

PC (d) Select and apply forcing agent at the appropriate time of day.

Application of forcing agent should take place in the cool hours of the day, early morning or late afternoon, with preference to the late afternoon. With the number of forcing agents available on the market select and apply an appropriate forcing agent.

Dissolved 0.5 -1.0 kg calcium carbide in 200 litres of water in sealed plastic drum, apply the solution at rate of 15 litres per 300 plat (0.05 litres /plant) in the morning or evening ; repeat the treatment on the 3days later to complete the processes. Alternatively apply ethylene gas at 6000litres/ha, plus 6 kg active carbon; repeat on the 3rd day.

Caution: Don't use copper containers for mixing carbide; do not allow open flames in the vicinity. Do not use fungicides within 2 weeks after carbide forcing, document growth regulators use as required.

Activity

Learners will be given a forcing agent to apply on a pineapple farm.

Self-assessment

1. State two (2) forcing agents in pineapple production.

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2. State two (2) maturity signs of pineapple plant for forcing

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3. State one (1) procedure of inducing pineapple

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4. State two (2) economic effects of natural flowering in commercial pineapple production

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