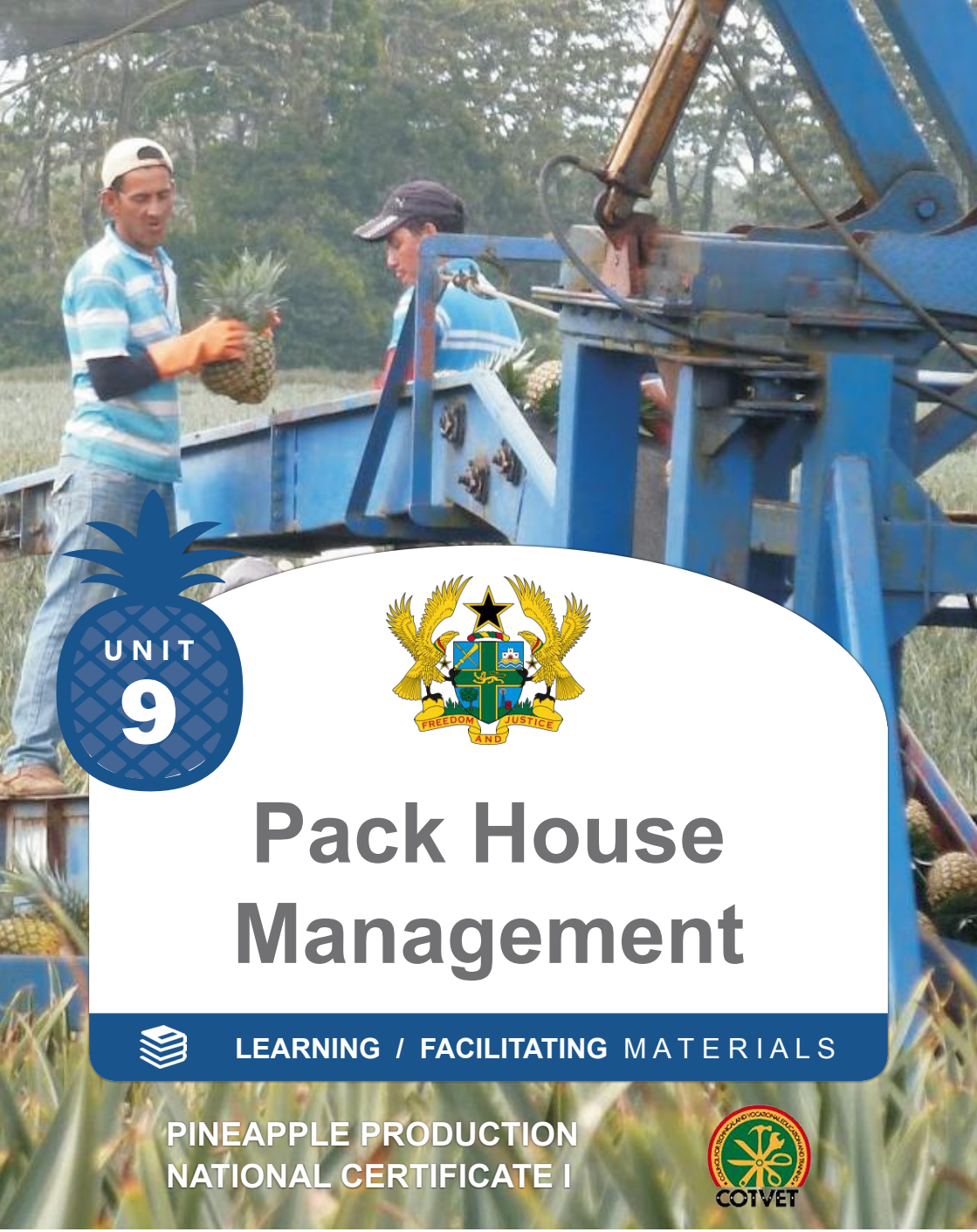

UNIT 9

Pack House Management

LEARNING / FACILITATING MATERIALS

PINEAPPLE PRODUCTION
NATIONAL CERTIFICATE I

COTVET

CAADP

NEPAD TRANSFORMING AFRICA

german cooperation DEUTSCHE ZUSAMMENARBEIT

Implemented by: giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Introduction

Welcome to the start of your career in pineapple pack house management.

A career in pack house management 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 it as opportunity to build up your lifelong career.

There have been significant changes in the pineapple industry over the years which have brought new standards, techniques, products and opportunities. Many career options are also available within the pineapple pack house management.

This unit will look at washing and disinfecting of harvested fruits, waxing, and treatment of peduncle and drying, sorting and grading of pineapple fruits, packaging materials and pre-cooling and cooling of pineapple fruits.

While training, you should make an effort on improving your personal habits, skills and knowledge in order to build competent career for yourself in achieving success in the world of bussiness.

Congratulations for making the decision to study pineapple pack house management. You have taken the first step towards a very interesting and satisfying career.

This learning material covers all the Learning Outcomes for Pack House management for the Certificate I programme.

Table of Contents

LEARNING OUTCOME 1

Demonstrate knowledge of pack house

On completion of this unit, the learner will be able to:

a) Explain the importance of pack house in pineapple production.
b) Explain the importance of pack house layout.
c) Use and service pack house tools and equipment appropriately.
d) Apply pack house hygiene.
e) State the various pack house facilities.
f) Adhere to fire and safety regulations

PC (a) Importance of pack house in pineapple production:

A Pack-house can be defined as a designated facility where fresh produce is cooled and prepared in order to meet the requirements of a market. The pack-house is the site where post-harvest treatments are applied and quality standards are monitored.

The main importance of pack-house are:

- It serves as collection and assembly point of products such as fruit.
- It serves as a temporary holding area prior to distribution
- It serves as dispatch point of produce to different destination

PC (b) Explain the importance of pack house layout.

The importance of pack-house layout include:

- Provision of sufficient area for parking and movement of trucks, layout of facilities and future expansion.
- Easy accessible highways for truck
- Prevention of injury and accident to workers and others.
- Easy access way for human movement, tools and equipment
- Smooth field roads leading to pack house.
- Provision of adequate shade
- Provision of sufficient and dependable supply of water and electricity
- Access to reliable communication system
- Provision of adequate drainage system
- Provision to address natural disaster

PC (c) Use and service pack house tools and equipment appropriately

Table 1: Tools and equipment, uses and services

TOOLS/EQUIPMENT	USES	SERVICES
Refrigerators	Conduct activity	Clean at regular interval.
Fork lift	Conduct activity	Clean, lubricate after use and stored in dry place
Weighing bridge/scale tighten	Conduct activity	Clean, lubricate after use, bolt and nut and stored in dry place
Stainless processing equipment	Conduct activity	Clean, oil after use and stored dry place
Box or bag tipping	Conduct activity	Clean and store in a dry place

Activity;

Learners to visit pack house and be provided resources to use tools and equipment, clean and lubricate regularly.

PC (d) Apply pack house hygiene

Hygiene is an important element that every pack house must consider; the following are some of the hygiene that must be applied in the pack house:

- Changing room must be provided,
- Always clean room after work
- Clean protective clothing and boot must be provided,
- Adequate wash room and toilet facility must be available,
- Always use clean water
- Observe good drainage system,
- Provide adequate ventilation in the pack house
- Observe proper waste management practices.

Activity

Learner will visit pack house and be provided with resources to apply hygiene as per the above.

PC (e) Pack house facilities:

Pack house facilities are resources needed when working in any pack house, this facility includes:

- Changing rooms,
- Washrooms,
- Pheromone traps
- Stand by generator
- Water hydrant.
- Fire extinguishers
- Safety regulations
- Crates,
- Weighing scale,
- Trolleys,
- Tally cards
- Personnel offices
- Smoke and fire detectors,
- First aid boxes

PC (f) Fire and safety regulations

It is a safety measure put in place at any pack house to prevent accidents or reduce the level of injury. This regulation protects the environment, personnel, tools and equipment.

Some of the fire and safety regulations considered in a pineapple pack house include:

- Note of fire extinguishers position
- Note of water hydrants position,
- Use the nearest exit point in the house,
- Use protective cloths,
- Observe safety signs,
- Observe symbols and colour coding.
- Note Emergency contact lines.

Self-assessment

1. State two (2) importance of pack-house

2. List six (6) pack house facilities.

3. State two (2) importance in applying pack house hygiene

4. List three (3) importance of pack-house layout

5. Give two (2) reasons why pack-house layout is important in pineapple production

6. State three (3) pack-house safety regulations

LEARNING OUTCOME **2**

Demonstrate knowledge in washing and disinfecting of harvested fruits.

In this LO, you will learn to:

a) Explain the importance of washing and disinfecting of harvested fruits.
b) Describe methods for washing and disinfecting of harvested fruits
c) Identify the appropriate chemical for washing and disinfecting

PC (a) Importance of washing and disinfecting harvested fruits

The importance of washing and disinfecting harvested fruits are to:

- Remove chemical residue on the fruit
- Remove natural wax
- Regulate the temperature of the fruit,
- Remove disease pathogens.
- Remove dust and dirt on the fruit
- Meet standards for marketing

PC (b) Describe methods for washing and disinfecting of harvested fruits

The following methods are used in washing and disinfection of pineapple fruits:

Automated method: The processes where pineapple fruits are displayed on conveyor belts allowing water and disinfectants to wash the fruits as it moves towards the packing boxes.

Un-automated method: washing fruit with disinfectant and water using human hand and brush.

Picture 1: Un-automated (manual) washing and disinfection of pineapple fruit

PC (c) Identify chemicals for washing and disinfecting

The following are examples of chemicals (fungicides) for washing and disinfecting of pineapple fruits: Bayfidan 250 EC, Sportac and Shirtan.

Activity

Learner will be provided with relevant chemicals and assisted to identify appropriate one for washing and disinfection of pineapple fruits.

Self-assessment

1. State three (3) importance for washing harvested pineapple fruits.

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2. State two (2) methods of washing harvested pineapple fruit.

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3 State two (2) chemicals use for washing and disinfecting of pineapple fruits.

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Demonstrate knowledge in waxing, treatment of peduncle and drying.

In this LO, you will learn to:

a) Explain the importance of waxing, treatment of peduncle and drying.
b) Describe methods of waxing.
c) Identify and select the appropriate types of wax and fungicide.
d) Apply appropriate wax and fungicide
e) Explain the principles and procedures for drying

PC (a) Explain the importance of waxing, treatment of peduncle and drying

It is very important to wax, treat peduncle and dry pineapple fruit for the following reasons:

- Prevent microbial infection on fruit and peduncle
- Reduce rotting on peduncle
- Increase shelf life
- Increase economic value of fruit

P C (b) Methods of waxing:

Discuss any two waxing method in pineapple you know?

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Waxing is an application of appropriate chemical on fruits to preserve it shelf life. Wax may be applied in different ways:

Examples are : Manual rubbing and Automated roller brush application.

Manual rubbing: Liquid waxes can be applied by manually rubbing the commodity and smearing wax evenly over the surface. A soft absorbent cloth or fine bristle brush can be used to speed up the process. After application, the product should be left to air dry for about 15 mins before packing.

Automated roller brushing: Liquid waxes can be applied to the surface of the commodity by using series of roller brushes. The wax is dispensed from above and saturates the brushes which rotate and spin the product smearing the wax even the product surface.

PC (c) Identify and select appropriate types of wax and fungicide

The following are some common types of wax and fungicides use in the pineapple industry:

- Wax:
- Paraffin
- Bee wax.
- Fungicides:
- Bayfidan 250 EC
- Sportac
- Shirtan

Activity

Learner will be provided with the required resources to identify and select different types of wax and fungicides.

PC (d) Apply appropriate wax and fungicide

Paraffin wax: Paraffin wax is typically applied as a brief dip or submergence of the product in a bath of melted paraffin. Submergence time is usually 1 second or less. Upon removal from the melted solution, the paraffin solidifies almost instantaneously.

Fungicide: The peduncle is treated with fungicides like Bayfidan 250 EC, Sportac, Shirtan. This prevents fungi infection in peduncle of pineapple.

Activity

The learner will be provided with the required resources to apply appropriate wax and fungicides on pineapple fruits.

PC (e) Principles and procedures for drying Pineapple fruits

Drying in pineapple production is part of the preventive measures applied to protect the pineapple fruits free from diseases and rot.
After washing, fruits are cleaned with soft tissue and air dried. The air drying eliminates the excess water adhering to the shell of the fruits.

The following are procedure for drying pineapple fruits:

- Use extra clean water to rinse fruit off excess chemical before cleaning with tissue
- Always clean fruit with tissue to remove excess water off before drying
- Always air dry under room temperature
- When drying, fruits should be turned in an upside-down position to avoid water accumulation in the eye or crown of the fruits.

Self-assessment

1. State three (3) benefits of waxing.

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2. State two (2) reasons why the peduncle of pineapple should be treated and dry.

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3. State two (2) types of wax used in pineapple production.

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4. List two (2) methods of waxing.

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5. State two (2) types of fungicides used in pineapple fruit treatment.

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Demonstrate knowledge of sorting and grading of pineapple fruits

In this LO, you will learn to:

a) Explain the importance of sorting and grading.
b) Explain the factors to consider when sorting and grading.
c) Use the appropriate factors in sorting and grading.
d) Explain the factors that lead to rejection of pineapple fruits.
e) Apply factors to reject pineapple fruits.

PC (a) Importance of sorting and grading.

Sorting: Regardless of the market destination, the fruit should be sorted according to size, shape, firmness, external colour, insect damage and decay. Visibly damage fruits should be rejected.

Grading: In grading, pineapples are classified for packing based on size, stages of ripeness, and if applicable shape. Fruits of different shape may not be mixed in the same carton. Different markets have different quality requirements and the fruits should be graded to conform to the individual market standards.

The following are the importance of sorting and grading:

- Helps select quality fruit to meet market demand.
- Determines sizes and shapes of fruits for market.
- Determines fully ripe and partially ripe fruits
- Separate injured and disease fruits from wholesome fruits.
- Makes the package fruits attractive.
- Helps to determine prices of fruits.
- Avoids mixing different fruit sizes and shapes.

PC (b) Factors to consider when sorting and grading

Factors to consider when sorting and grading are market demand and physiological disorders. In both sorting and grading the following qualities are considered: size, colour, shape, brix level, firmness, flavour and juice content of the fruit.

PC(c) Use the appropriate factors in sorting and grading

The factors to consider when sorting and grading include:

- Sizes: Group or package bigger, medium and smaller fruit in their appropriate cartons.
- Colour: Ripe, fully ripe and partially ripe fruit should be packaged in their respective cartons.
- Firmness of fruits: Hard and soft fruits should be placed in their cartons.
- Flavour: Flavoured and unflavoured fruits should be grouped separately.
- Juice Content: Fruits with high and low fruit contents should be packaged separately.

Activity

Learner will be given pineapple fruits to sort and grade considering the factors and qualities under PC (c).

PC (d) Factors that lead to rejection of pineapple fruits

Pineapple fruits are rejected based on the following factors:

- Diseased and physical damaged fruits
- Less firmness fruits
- High content of chemical residue
- Abnormal shapes of fruits
- Unattractiveness and colour appearance of fruits.

PC (e) Apply factors to reject pineapple fruits

Activity

The learner will be given fruits and asked to reject some based on the factors explained below:

Diseased and damage fruits: These kinds of fruits are not accepted both local and foreign markets.

Less firmness fruits: Soft fruits easily get rotten and reduce taste and flavour.

High content of chemical residue: This leads to fruit poisoning.

Abnormal shapes of fruits: Fruits of these kinds are not appealing to buyers.

Unattractive appearance of fruits: The fruits or cultivars should represent its kind and colour.

Self-assessment

1. List two (2) factors to consider when sorting and grading in pineapple production

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2. State four (4) factors that lead to pineapple fruit rejection.

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3. State three (3) reasons why pineapple fruits are rejected.

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LEARNING OUTCOME **5**

Demonstrate knowledge of packaging materials

In this LO you will learn to:

a) Explain the importance of packaging
b) Identify the types of packaging materials.
c) Arrange boxes in stacks

PC (a) Importance of Packaging

Packaging is the technology of enclosing or protecting products for distribution, storage, sale, and use. Packaging also refers to the process of design, evaluation, and preparing goods for transport, warehousing, sale, and end use. Packaging contains, protects, preserves, informs, and sells goods.

All fruits packed in the same carton or container should be uniform in size, shape, and external colour. Immature or over mature fruit should not be packed for export. It is important that the carton should be properly ventilated and be of sufficient strength to withstand the vigorous of distribution without collapsing. Weak cartons do not have sufficient physical strength to be stacked and result in major losses of the fruit upon arrival.

The importance of packaging pineapple fruits include the fact that it:

- Ensures safety of the product during transportation
- Ensures proper storage and distribution
- Protect the desired sensory characteristics and microbiological soundness till the end of the expected shelf-life of the product

Picture 2: Packaged pineapple fruits

PC (b) Identify types of packaging materials

The under listed are types of packaging materials:

- plastics,
- paper
- wooden

PC (c) Arrange boxes in stacks

The Picture 3: Boxes arranged in stacks

Activity (PC b and c)

Learner will visit a pack house and identify appropriate packaging materials, pack fruits and arrange boxes in stacks.

Self-assessment

1. State two (2) importance of packaging pineapple fruits.

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2. List three (3) packaging materials.

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Demonstrate knowledge of pre-cooling and cooling

On completion of this LO, the learner will be able to:

a) Identify and explain the methods of pre-cooling and cooling
b) Explain the methods of pre-cooling and cooling
c) Determine the pre-cooling and cooling temperatures
d) Determine the duration of cooling and pre-cooling

PC (a) Importance of pre-cooling and cooling in pineapple

Pre-cooling and cooling are defined as the removal of field heat from freshly harvested produce in order to slow down metabolism and reduce deterioration prior to transport or storage. One of the most important factors affecting post harvest life and quality of fruit is temperature. Quality loss after harvest occurs as a result of physiological and biological processes, the ratio of which is influenced primarily by product temperature.

Pre-cooling and cooling in pineapple fruits are important because they:

- Prevent quality loss due to softening by suppressing enzymatic degradation and respiratory activity.
- Prevent wilting by slowing or inhibiting water loss.
- Slow the rate of decay of produce by slowing the growth of decay producing micro-organisms (moulds and bacteria).
- Reduce the rate of ethylene production
- Minimise the impact of ethylene on ethylene sensitive produce items

PC (b) Explain the methods of pre-cooling and cooling in pineapple

Methods of pre-cooling and cooling in pineapple fruits are explained below:

Room cooling: During room cooling produce is simply loaded into a cold room, and cold air is allowed to circulate among the cartons, sacks, bins or bulk load.

Forced- air cooling: It is the use of moist air to decrease water loss of produce during cooling.

Hydro-cooling: This is where water tolerant produce is immersed or showered with water.

Evaporative cooling: The process involves misting or wetting the produce in the presence of a stream of dry air.

Other pre-cooling methods are: Ice-cooling, vacuum cooling, crynogenic cooling.

PC(c) Determine pre-cooling and cooling temperatures

Pre-cooling of fruit should be undertaken to bring down the temperature between-13-15°C.

Pineapple fruit should be cooled to 8°C (47°F) as soon as possible after harvest and maintained at this temperature during transport to market.

Activity

Learner will be provided with a thermometer to determine pre-cooling and cooling temperatures in a pineapple pack house.

PC (d) Determine the duration for pre-cooling and cooling

Pre-cooling duration for pineapple fruits ranges from 6-8hrs

Cooling duration for pineapple fruits is a minimum of 4hrs after pre-cooling and temperature maintained till time of market.

Activity

Learner will be provided with a stop clock to determine the duration of pre-cooling in a pineapple pack house.

Self-assessment

1. State three (3) importances of pre-cooling and cooling

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2. Describe two (2) methods of pre-cooling and cooling

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3. State the required temperature for pre-cooling and cooling pineapple fruits.

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4. State the required duration for pre-cooling

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