



**TBT PROGRAMME**  
OVERCOMING TECHNICAL BARRIERS TO TRADE



# Training Manual

# Good Manufacturing Practices

## Cocoa Production



# Module 1 Standards

## **Learning outcomes**

- 1.1. Gain familiarity with NIS 468 of 2016
- 1.2 Understand the key quality parameters of Cocoa
- 1.3 Understand where and how quality of Cocoa beans is assessed

## **Teaching strategy:**

Learning activities for the trainee must include the instructor to:

- a) Discuss the content of the standards
- b) Discuss cocoa production

## **Assessment condition: Trainee must be given** access to:

- i) NIS Standards for Cocoa
- ii) Cocoa Beans
- iii) Overview of Cocoa Production

## **Assessment criteria:**

Trainees shall be able to demonstrate an understanding of the quality parameters contained in the standard and how these can be affected during production.

## **Assessment method: To demonstrate** achievement of the above criteria the trainee will be given:

- oral questions
- or written questions
- Practical demonstration

# Cocoa

- NIS 468:2014 Standard for Cocoa beans



# Key Issues

- Fungal growth on damaged fruit
- Damage to beans during opening of fruit
- Proper fermentation and washing of Mucilagenous material
- Proper drying of beans (Moisture content)
- Insect and animal infestation of stored beans
- Pesticide residues

# Cocoa - Quality

	Bean count (300g)	Mouldy beans(%max)	Slaty beans(%max)	Flat Beans(%max)	Defects such as insect damaged, infested beans and germinated beans(%max)	Foreign mater(%max)
Grade I	100-120	3	3	1	3	0.5
Grade II	100-120	4	8	1	5	0.5
Grade III	>120	>4	>8	1	>5	0.5

Parameter	Limit
Colour	Chocolate brown
Moisture Content %(max)	7.5
Fat (cocoa butter, shell fat)	35-57
Total Ash (on dry weight basis) % (max)	9.0
Total Nitrogen % (max)	3.7
Water Soluble ash %(max)	6.0
Crude Fibre % (max)	5.2
Theobromine% (max)	1.6
Starch (on dry weight basis)% (max)	13.5
Crude fibre	5.2
Free Fatty Acid (FFA) (Max)	1
Acid Value(Max)	2

# Cocoa - Contaminants

Maximum Residue Levels ( mg/kg)	Limit
Arsenic	1,0
Copper	1,0
Lead	0,1

Maximum Residue Levels ( mg/kg)	Limit
Fenitrothion	0,10
Hydrogen Phosphide	0,01
Lindane	1,00
Deltamethrin	0,05
Metlaxyl	0,20

Mycotoxins	Maximum permitted level µg/kg (ppb)
Total Aflatoxin	4
Ochratoxin A	5

# Pre – Harvesting



Healthy crops  
lead to  
good products.

- Good material
- Good preparation
- Maintenance
- Preparation for harvesting

# Pre- Harvest Key points

- Growing stock
  - Seed / trees
- Prepare the growing environment
- Control pests
- Control weeds
- Tools and equipment
- Harvest time
  - When its ripe
  - Crop protection protocols
  - Safe pesticide “window”



# Good Agricultural Practices

- **Proper site selection is very important.**

- Soil type
- Drainage



- **Preparation:**

- Clear the site of shrubs and stubble.
- Prevent contamination and soil-borne diseases from dead plant material, weeds and other crops.

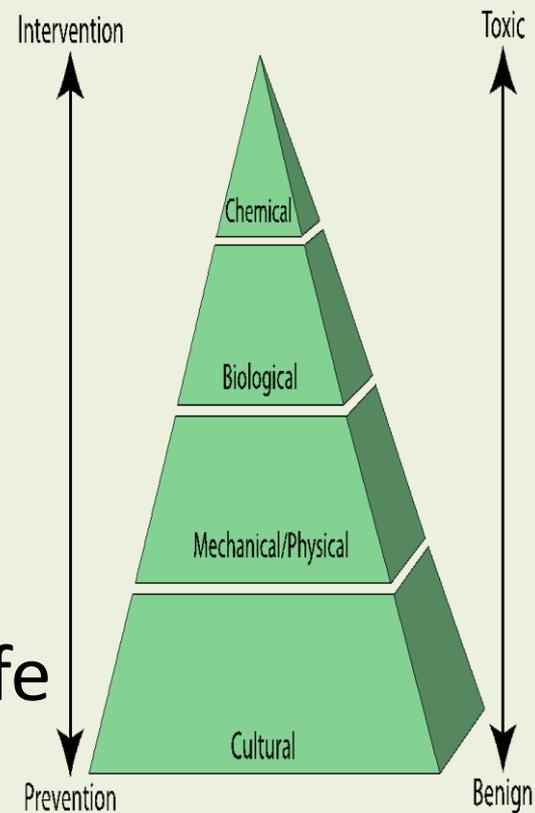


## Environmental hygiene in Harvesting Areas

- Primary production should not be carried out when there are potentially harmful substances that may contaminate the crops during harvest.

# Pre-harvest operations

1. Minimize insect damage and fungal infection in the vicinity of the crop by proper use of acceptable insecticides, fungicides and other appropriate practices within an integrated pest management program prior to harvesting.
2. Weeds can be controlled by manual removal or by use of appropriate herbicides or other safe and suitable weed eradication practices.



3. Mechanical damage to plants during cultivation should be minimized to avoid contamination of plant by fungi.



# Pre-harvesting techniques



- ❖ Harvesting tools must be ready and it include:
  - Sharp cutlass,
  - A sharp knife with short handle
  - A sharp knife attached to a long pole (go-to-hell)
  - A clean basket

# Module 1 : Cocoa Beans Harvesting and handling

## Exercise 1: **Harvest Cocoa**

Suggested minimum instructional time: **40 minutes**

### **Learning outcomes**

- 1.1 Identify the signs of maturity in Cocoa Pods
- 1.2 Know how to split Cocoa Pods

### **Teaching strategy:**

Learning activities for the trainee must include the instructor to:

- Identify and explain the signs and maturity of Cocoa.
- Explain and demonstrate the methods of harvesting pods, splitting pods and preparing pods for fermentation

**Assessment condition: Trainee must be given** access to:

- i) information and handouts
- ii) Harvesting Sticks and baskets
- iii) mature Cocoa Pods
- iv) Splitting sticks

### **Assessment criteria:**

- 1.1.1 Signs of maturity in Cocoa Pods are identified correctly
- 1.1.2 Risks associated with harvesting practice are understood
- 1.1.3 Pods are split and fermented correctly

**Assessment method: To demonstrate** achievement of the above criteria the trainee will be given:

- oral questions
- or written questions
- Practical demonstration

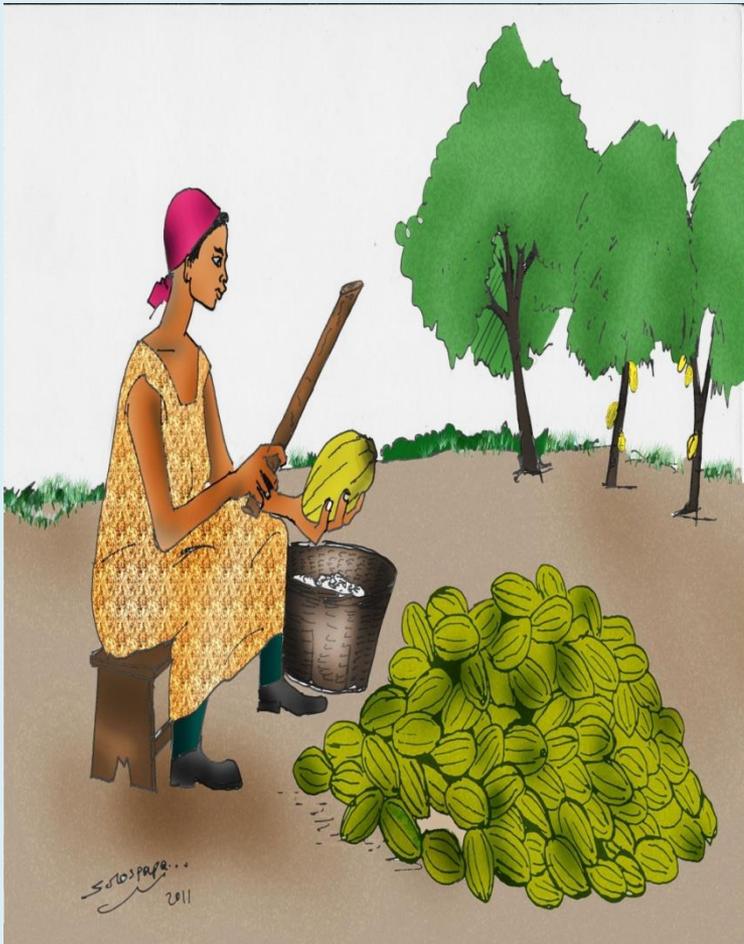


- Harvest only ripe pods
- The tools and baskets used to transport the fruits must be clean and the tools sharpened regularly.



Allow the pods  
to rest for two  
days before  
processing.

# Breaking / opening of cocoa pods



Use a blunt object such as a stone or a thick piece of wood

# Removing beans from the pod

- After Splitting, remove wet beans from the pods
- Any defective or damaged beans are removed
- Wet beans are fermented for 5 to 6 days (until strong odour develops)
- Beans should be turned every 48 hours



➤ Protect cocoa beans during drying from rain and dew. The cocoa beans should be heaped and covered at night or during rainy weather to avoid re-wetting.

# Packaging and storage



➤ Remove flat beans, slaty beans, shriveled beans, black beans, moldy beans, small and/or fused beans, germinated beans, beans with insect damage before bagging.



- Cocoa beans shall be packaged in clean hydrocarbon-free jute bags
- The bagged cocoa beans shall be placed in storage sheds that are weatherproof, well aerated, cleaned, free from dampness and insect pests and away from smoke

# Labelling

- Each bag of cocoa beans shall be securely sealed, marked clearly and indelibly with the following information
  - Only non-toxic ink or paint shall be used for marking and shall not be allowed to come in contact with the beans
- I. Name of the product, variety or commercial type
  - II. Grade
  - III. Net weight(kg)
  - IV. Name and address of producer, trader or exporter and relevant license number
  - V. Location/place produced(town/province)
  - vi. Consignment or lot or contract number as applicable
  - vii. Product of Nigeria
  - viii. Year of harvest
  - ix. Destination

# Warehouses

- ❖ The design and structure of the warehouses or storage sheds should be adequate to maintain dryness and uniformity of the stored dried cocoa beans.

❖ The cocoa bags should be arranged on pallets and away from walls, to allow good air circulation.





- ❖ Storage facilities should be periodically inspected, cleaned and repaired.
- ❖ The moisture content of the stored cocoa beans should be periodically checked and kept below 7.5% by re-drying

- ❖ Before receiving a new cargo, the vehicles must be cleaned from residues of previous cargo
- ❖ Check vehicle floor, side walls and ceilings (in closed vehicles) for the presence of points where exhaust fumes or water from rain can be channeled into the cocoa cargo.



- Tarpaulins and plastic canvas used to cover the cargo should also be regularly checked to ensure that they are clean and without holes.
- The vehicles should also receive regular maintenance and should be kept in good condition.



- When shipped in containers it is preferable to use fully ventilated/ super ventilated containers.
- preferably line with rattan matting, and/or kraft paper
- Stow bags correctly in order to allow ventilation.

The recommended practices during transportation in the port are:

- a) Cover cocoa loading and unloading areas to protect against rain.
- b) Check cocoa lots to ensure that they are uniformly dried and below 7.5% moisture content, free of foreign matter and conforming to the established defect levels.
- c) Check containers before loading to ensure they are clean, dry and without structural damage that could allow water to enter into the container.



d) Bags should be well stacked and crossed over for mutual support.

e) Choose an appropriate place, not directly exposed to outside elements, aboard the ship to store the cocoa to reduce the possibility of uptake of moisture or water spillage.

f) Keep the ventilation holes in the containers free from blockage.

g) Avoid unprotected stowage on the deck (top layer) and stow away from boilers and heated tanks or bulkheads.