# HARVESTING AND POST HARVEST OF COCOA

# HARVESTING

- Harvesting is done every 3-4 weeks when pods are ripe.
- Harvesting is done by cutting the stalk of the fruit with a knife as close as possible to the pod.
- Extreme care should be taken not to damage the flower cushion which carries the fruit.

# GATHERING OF PODS

- During harvesting, diseased pods and those damaged by rodents, are also removed.
- The healthy pods are then carried to a central breaking point.

# BREAKING OF PODS

- Pods are broken with wooden club or knife. Pod breaking should be done within 2-3 days after harvesting.

# FERMENTATION

- Fermentation begins the same day the pods are broken and continues for 6 clear days.

**Importance Of Fermentation**

- To remove the mucilage that surrounds the beans
- To kill the embryo and consequently prevent germination
- To develop colour, chocolate precursors and flavour

# FERMENTATION

# FERMENTATION cont'd

- Cocoa fermentation process and occurs in 2 stages.

I. **Anaerobic**
II. **Aerobic**

**Anaerobic**

- Occurs within the first 2 days when the pulp doesn't allow air circulation.
- Yeast and lactic acid bacteria fermentation occurs

# FERMENTATION cont'd

- Yeast transforms the pulp sugar into alcohol resulting in temperature increase.
- The increase in temperature favours the growth of lactic acid bacteria which produces lactic acid.
- The pulp then breaks down, drains away and air penetrates the beans.
- **Aerobic Phase**
- This occurs from 3 day onwards.

# FERMENTATION cont'd

- Aeration allows strong growth of acetobacter which transforms alcohol to acetic acid.
- Temperature then increases up to 50 C.
- Acetic acid then penetrates into the beans causing the formation of the chocolate flavor precursors
- At the end of fermentation, the temperature reduces causing the growth of peutrefaction bacteria.

# FERMENTATION cont'd

## Methods of Fermentation

- Heap
- Tray
- Basket
- Box

## Factors Affecting Fermentation

- Ripeness of the pod
- Pod storage before breaking
- Quantity of beans and pulp during fermentation
- Duration of fermentation
- Type of cocoa


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# FERMENTATION and DRYING

- Turning of fermenting mass
- Seasonal effects
- Diseases that affect pods

**REASONS FOR DRYING**

- Fermented beans must be dried to prevent deterioration

- To reduce the moisture content of the beans to 6-7% which is safe for storage and shipping
- To reduce the bitterness and astringency

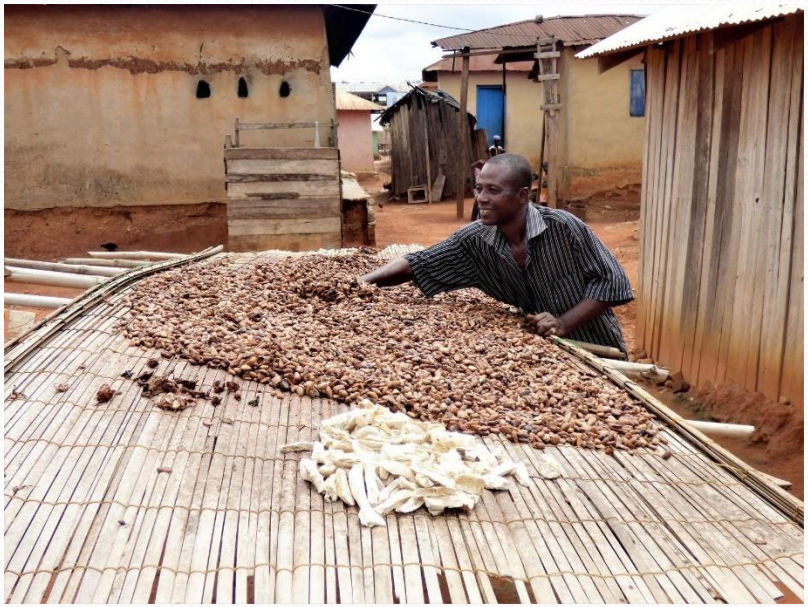
# DRYING

## METHODS OF DRYING

- Sun drying
- Artificial (conventional drying or hot-air ovens)

## Importance Of Sun-drying

- Best for good quality
- Significant lowering of sour/acid flavor
- Volatile acetic acid evaporates through the husk
- More flavour forming reactions still occur



# STORAGE

- Dried beans must be properly stored to avoid contamination and deterioration.
- Dried beans are put in vegetable oil treated jute bags and stored in dry places from fire, smoke, fertilizer , agrochemicals and food crops stored in a well ventilated room.
- The bags are placed on  wooden pallets.
- Cocoa  must not be stored close to a wall to prevent condensation.

| DEFFECT | CAUSES | CONSEQUENSES | HOW TO AVOID IT |
|---|---|---|---|
| Mould | 1. Inadequate drying of beans<br>2. Storage of inadequately dried beans in a sack<br>3. Storage cocoa in a poorly ventilated room | 1. Results in chocolate with a bad flavour<br>2. Spreads quickly to affect good cocoa in a pile<br>3. Affects the value. | 1. Beans must always be thoroughly dry<br>2. Store cocoa in a well ventilated room |
| | | | |
| Slaty beans | 1. Under fermentation or no fermentation at all<br>2. Insufficient fermentation heap size<br>3. Outside temperature during fermentation too low(harmattan) | 1. Bitter taste to chocolate | 1. Ferment under shade<br>2. Heap size of at least 300kg<br>3. Ferment on plantain leaves and cover with it too |
| | | | |
| Black beans | 1. Diseases such as black pod and brown pod<br>2. Pods left on trees long time before harvesting | Reduction in market value | 1. Harvest pods regularly<br>2. Removal of diseased pods from healthy ones |

| DEFFECTS | CAUSES | CONSEQUENCES | HOW TO AVOID IT |
|---|---|---|---|
| Germinated beans | 1. Over ripening of pods<br>2. Leaving an opened pod for a day or 2. | Facilitate the entry of mould through the opened hull of the beans | 1. Harvest regularly<br>2. Ferment beans immediately after pod breaking<br>3. Don't mix sprouted beans with good ones |
| | | | |
| Purple beans | 1. Harvesting of unripe pods<br>2. under fermentation | Bitter chocolate | 1. Harvesting of matured ripped pods<br>2. Fermentation for 6days |
| | | | |
| Smoky beans | Drying or storage of beans in contact with smoke | Taste of smoke | Avoid beans contact with smoke from fire place |
| | | | |
| Chipped beans | Breaking of pods with knife of sharp objects | Facilitate the entry of moulds through the wounded areas | 1. Breaking of pods with wooden club<br>2. Avoid mixing injured beans to good ones |

# COCOA REHABILTATION

- Rehabilitation is the process of bringing back the productivity of an old moribund cocoa farm which has been affected by pest and diseases, neglect, decline in soil fertility of lack of appropriate shade cover.

- A Class – less than 7 years old
- B Class – 8-15 years old
- C Class – 16-30 years old
- D Class – over 30 years old
- E Class – sparse cocoa in bush or food farms.

# COCOA REHABILTATION cont'd

- The models of rehabilitation are;
- Under planting of cocoa
- Complete replanting/ re-establishment of cocoa
- Rejuvenation of cocoa

# USES OF COCOA

- Cocoa is used to produce chocolate.
- Cocoa powder is essentially used as flavor in biscuits, ice cream, dairy drinks and cakes.
- Apart from its use as flavor, it is also used in the manufacture of coatings for confectionery or frozen desserts.
- Cocoa butter is the cream-coloured fat extracted from cocoa beans and used to add flavor, scent, and smoothness to chocolate, cosmetics, tanning oil, soap, and a multitude of topical lotions and creams.

# THANK YOU