Post Harvest Management Practices Manual for Trainers

HARVESTING, SORTING, DRYING, PACKAGING AND STORAGE

FIPS AFRICA
Small Farms, Big Futures

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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

SAVING GRAINS

CONTENTS

01 HOW TO USE THIS MAIZE POST-HARVEST MANUAL

This manual guides facilitators in training farming communities on maize post-harvest management. It includes illustrations, group discussions, and practical demonstrations for easy learning. Training cards with illustrations support content delivery. The manual uses interactive methods to help farmers improve maize handling, drying, storage, and transportation, reducing losses and maintaining quality. Facilitators should use the instructions presented, while also adapting the delivery and contents to the participants' needs when appropriate.

LEARNING OBJECTIVES: Facilitator to state the objectives of the training clearly to the participants.

DURATION: The facilitator to state the approximate time the training will take - 2hrs depending on the group size

TRAINING MATERIALS AND TOOLS: The training materials should be available in advance.

QUESTION: The facilitator to read the questions to the participants.

GROUP WORK: The facilitator to guide the participants in forming groups that will be used throughout the training.

PRESENTATION: The facilitator to guide the groups to make presentations.

DEMONSTRATION: The facilitator to lead and ensure everyone participate in the demonstrations.

02 FACILITATOR ROLES AND TRAINING OBJECTIVES

FACILITATOR ROLES

1. **Create an inclusive learning environment** where all farmers, regardless of social status, feel comfortable participating.
2. **Time sessions appropriately** (so as not to interfere with other work responsibilities, at home or on the farm, and provide support to participants when possible to assist in child or elder care or meals).
3. Choose a **training location** that is safe and accessible for women, men, and youth.
4. Address all participants equally (e.g., "farmers" instead of "men" or "husbands").
5. Use case studies that feature both **men and women farmers** in decision-making roles.
6. **Encourage active engagement** by ensuring men, women, and youth contribute equally and encourage both men and women take leadership roles in group discussion and demonstration.
7. **Promote gender-equitable decision-making** in post-harvest management practices.
8. Use **visual materials** (flipcharts, posters, videos) that depict **women, men, and youth** in agricultural activities.
9. After each discussion acknowledge the contribution of all the participants.
10. Have a co-facilitator write down the objectives and any key points from the group on the flipchart and also the points during the discussion session

INTRODUCTION

OBJECTIVES

1. Build knowledge & skills

Equip farmers with practical post- harvest handling techniques across the value chain.

2. Improve decision making

Help farmers make informed choices on drying and storage based on quality standards.

3. Strengthen adoption of safe practices

Encourage the use of clean, hygienic and safe methods in handling and storage.

4. Introduce modern storages solution

Promote innovative tools like hermetic bags.

5. Support community training

Provide a structured, visual and interactive learning tool for facilitator.

OUTCOME

Improved farmer competence

Farmers will be able to apply the best practices.

Reduced post- harvest losses

Adoption of safer and more hygienic practices

03 INTRODUCTORY LESSON: MEANING AND IMPORTANCE OF POST-HARVEST PRACTICES

STEP 1: Group Discussion (15 minutes)

In groups of 5-7 and ask them the following questions and have them discuss.

1. List the practices /activities you do from when maize matures in the field to when you sell or eat it,
2. For each activity, what challenges do you face?
3. What is the importance of these practices?

STEP 2:

Group representative to present their points and allow participants to check for clarification.

FACILITATOR DEBRIEF

Summarize responses given on a flipchart and refer below to ensure they are correct

Meaning of Post-Harvest Management Practices

Post-harvest management refers to the processes and practices involved in handling crops after they have been harvested, from the point of harvest to consumption or sale. This includes various stages such as cleaning, sorting, drying, storage, transportation, and pest control. The goal is to maintain the quality of the crops, prevent losses, and extend their shelf life.

In the case of maize, post-harvest management includes activities like:

Harvesting at the right maturity stage

Cleaning to remove foreign matter

Drying to reduce moisture content

Sorting to separate damaged or diseased grains

Storage in suitable facilities

Pest control to prevent infestation

Importance of Post-Harvest Management Practices

1. **Improves food quality and safety** ensures maize is free from contaminants, mold and aflatoxins.
2. **Boosts farmer income**– quality produce fetches higher prices and improves long-term profitability.
3. **Prevents Pests & Diseases** – Proper storage methods like hermetic bags and metal silos protect maize from pests and contamination.
4. **Minimizes Contamination** – Cleaning and sorting remove damaged grains, reducing the risk of food-borne illnesses and aflatoxin exposure.
5. **Extends Shelf Life** – Effective drying and storage ensure maize remains edible and usable for months, preventing seasonal shortages.
6. **Promotes Sustainability** – Reducing waste and using eco-friendly storage and pest control methods support long-term, sustainable farming. Which is also another way of reducing costs and improving the soil.

What is next?

SAY: We will discuss each stage, the challenges you mentions and good practices that will help you improve our post-harvest management.

04 HARVESTING AND SORTING

INSTRUCTIONS FOR THE FACILITATOR

- *Materials needed: good and infected maize*
- *At the end of this card, refer to the list of challenges, if any relating to harvesting is not addressed, facilitate a discussion for the farmers to share possible solutions.*

STEP 1: Group Discussion

1. How do we tell their maize is ready for harvest?
2. What are our harvesting techniques?
3. What are some of the precautions we take during harvesting?
4. When and how do we sort maize?

Group presentation

Timing of Harvest

Maize should be harvested at full maturity to ensure quality and minimize losses.
Signs of maturity include:

- Brown, dry husks
- Dry, brown silk
- Hard grains with a dent when pressed
- A sharp snap when the stalk is bent

Harvesting Techniques

Manual harvesting is common in small-scale farming, where cobs are hand-picked carefully to avoid damage.

Sorting

- **Manual Sorting:** Used for small-scale farming.
- **Emphasize:** Remove damaged, diseased, or immature cobs to maintain quality for storage or sale.

Handling During Harvest

- Handle maize carefully to prevent; breaking that creates an opening that pests can easily enter. Also, for the wet kernels, ensure to dry to reduce the moisture that is perfect environment of mold that produces aflatoxins.
- Avoid placing maize directly on the ground; use clean sacks or containers.
- Use clean and dry tools for transportation to prevent contamination.

Dehusking - your harvested maize reduces the risk of it harboring insects and pest like weevils or borers. Also, dehusked maize is easy to handle during drying, shelling and sorting.

05 CLEANING AND DRYING

INSTRUCTIONS FOR THE FACILITATOR

Materials needed: Clean tarpaulins, winnowing baskets and moisture meter apparatus

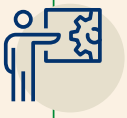
STEP 1:

Ask the questions below and let them discuss

1. How and what do we use to clean our maize grains?
2. How do we dry maize grain?
3. How do we know that the grains are dry enough?
4. When it is raining, how do we ensure our maize still dries enough?
5. How do we properly shell/thresh maize grains to avoid damage?

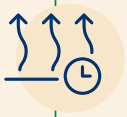
STEP 2:

Group discussion



STEP 3:

Group representative to present their points and allow participants to check for clarification.



STEP 4:

Demonstrate how to clean and dry properly.

Cleaning

Methods:
Use manual winnowing or a mechanical cleaner if available.

Best Practices; Clean maize immediately after harvest to remove dust, chaff, and pests. This helps prevent mold and reduces spoilage.

Drying

Methods:

1. **Sun Drying:** Spread maize on tarpaulins or mats under direct sunlight for even drying.
2. **Mechanical Drying:** Use drying equipment to regulate moisture levels.

EMPHASIZE: Ensure uniform drying and avoid placing maize directly on contaminated surfaces like the soil

Threshing / Shelling

- Avoid rough shelling methods; e.g. beating cobs with sticks- breaks the grains, making them more vulnerable to pest attacks and mold
- Use manual or mechanical shellers there are more efficient and gentler on the grains
- When shelling by hand, do it carefully and in a well-ventilated clean space.
- Sort out the broken or damaged kernels to improve storage life and grain quality of the whole grains.

Moisture Test

Method:
Salt-test;mix maize with dry salt in a glass jar, shake for 1 minute, and observe for 15 minutes: If salt sticks to the jar, maize moisture is above 13.5% and requires further drying. If salt remains dry, moisture is at the recommended 12%-13.5%.

06 PACKAGING AND STORAGE

INSTRUCTIONS FOR THE FACILITATOR

- *Identify a household for demonstration on packaging and storage in advance.*
- *Materials needed: Different packaging materials (gunny bag, hermetic bags).*

STEP 1:

Ask the questions below and let them discuss

1. What do we use to package our dried maize grains?
2. Where do we store our grains?
3. Can you make more money by storing and selling later?
4. What are the properties of a good store for our dried maize grains?
5. Who decide gets to decided when to sell the maize and how much of it to sell?

STEP 2:

Group discussion

STEP 3:

Group representative to present their points and allow participants to check for clarification.

STEP 4:

Demonstrate how to use a hermetic bag.

Packaging

Methods:

1. Use clean, pest-free bags such as hermetic bags.
2. Use durable containers for bulk storage.

Best Practices; packaging is clean, strong, and pest-free.

Storage

Methods:

1. Use of gunny bag or durable container- ventilated space, OR
2. Use hermetic bag - well dried, cut grain loss caused by insects, rodents and mold, the grains remains high-quality and the bag is durable
3. Grains should be placed in a raised platform and not placing the sack / containers on the ground to avoid dumbness from the ground

Best Practices; packaging is clean, strong, and pest-free.

07 PEST AND DISEASES

INSTRUCTIONS FOR THE FACILITATOR

- *Materials needed; Ash, dried peppers and neem leaves, Samples of good and moldy maize for comparison, Protective gloves for handling contaminated grains.*

STEP 1:

Ask the questions below and let them discuss

1. 1. What are some of the methods we use to prevent and control pest during storage?
2. What is aflatoxin and why is it dangerous?
3. How can we tell if maize is contaminated with aflatoxin?
4. How can we prevent aflatoxin contamination

STEP 2:

Group discussion

STEP 3:

Group representative to present their points and allow participants to check for clarification.

Pest and rodent Prevention & Control

Prevention Methods:

- Inspect maize regularly during drying and storage to detect early signs of pest or rodents activity.
- Use natural pest deterrents e.g. Neem leaves, wood ash or dried pepper.
- Keep cats around storage areas to help control rodents.

Control Methods:

- Store maize in airtight containers e.g. hermetic bags to reduce exposure to pests.
- Monitor storage regularly for signs of infestations, and take immediate action if pests or rodents are detected to prevent loss.

Aflatoxin Prevention

Recognizing Contaminated Maize:

- Moldy maize appears discolored, soft, and has a musty smell.
- Aflatoxin is invisible, but mold is a warning sign.

Prevention Methods:

- Dry maize to 13.5% or lower as quickly as possible. Use raised platforms or tarpaulins to avoid ground contact.
- Separate and discard visibly damaged, discolored, or moldy grains/cobs before drying.
- Harvest on a **dry day** to minimize moisture. Wet conditions favor mold growth.

Dangers of ingesting contaminated maize

- Can cause **acute liver failure** or **long-term liver damage**.
- Weakens the immune system, making the body more vulnerable to infections.
- Stunted growth and malnutrition in young children
- When dairy cows eat contaminated maize, aflatoxin passes into the milk (as aflatoxin M1), posing serious health risks to humans consuming the milk.

07 MARKETING

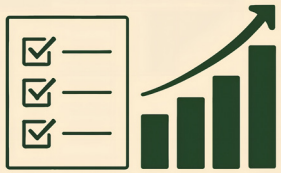
The questions below should be discussed collectively.

Who do farmers sell to?

Farmers may sell their maize to:

- Middlemen or brokers
- Local market traders
- Cooperatives societies
- Government agencies
- Agro-dealers or VBAs
- Millers or grain buyers

What should the coop do in selling?



A coop should;

- Aggregate produce for collective storage and selling
- Connect members to reliable buyers
- Negotiate better prices and terms with buyers
- Keep records of sales and transactions.

Could you sell as a group from the farm gate?

Selling at farm gate may present the following challenges;

- Interference from brokers
- Dependency on few buyers
- Limited market information
- Logistical constraints
- Limited storage capacity
- Difficulty in aggregating Uniform-quality grain

Are you part of a coop?

Importance of a coop

- Consolidate resource for group activities
- Linkages to financial services
- Promotes better quality
- Attracts bulk buyers
- Collective storage
- Facilitates easy access to services like training, transport

How can you improve it?

How to improve market for grains;

- Promote better policies and regulations
- Facilitate access to market information
- Standardize weights and measures
- Improve infrastructure and services

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