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|   | Crop: Maize Function: Harvesting and Seed Handling | SOP # | IITA-MZ-SOP05 |
| | | Revision # | IITA-MZ-SOP05-01 |
| | | Implementation Date | 15/07/2022 |
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Standard Operating Procedure (SOP) for Maize Harvesting and Seed Handling

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1. Introduction

The determination of the grain yield potential is the ultimate goal of most maize variety trials. Harvesting marks the end of the field work for each trial. In most cases, all ears in a designated portion of the plot (for example, the two middle rows in a 4-row plot) are dehusked and removed from the stalk manually. All the harvested ears from a plot are packed in front of the plot for the determination of relevant ear data, such as number of ears, weight of harvested ears, number of rotten, diseased, and insect-damaged ears, ear aspect, shelling percentage, and ear or grain moisture at harvest. Harvesting is normally done by a large number of casual laborers, mostly unskilled and with little or no education. Consequently, harvesting must be supervised thoroughly to ensure that the plots are cleanly harvested and ears from one plot are not mixed with those from nearby plots. The latter is particularly important for single- and 2-row plots. Similarly, the determination of ear weight, shelling percentage, and grain moisture requires careful handling. Balances used in the field are usually mounted on a tripod placed on uneven surfaces. The field assistants in charge of weighing must ensure that the pointer on the balance is at the exact starting point (e.g., zero point) for each plot to be weighed; otherwise some bias would be introduced into the data inadvertently. This should also be done for the grain to be used for moisture determination by the oven method. Ideally,

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grain yield should be determined by shelling and taking the grain weight of all ears harvested from each plot. Plot-size shelling machines may be used for this purpose, otherwise the ears may be shelled by hand or by using hand-held maize shellers that handle one ear at a time. The conversion of grain yield to grain moisture-standardized yield is as follows: Yield (at 12.5% grain moisture) = Grain yield \times (100 – actual grain moisture %)/87.5.

2. *Purpose*

The purpose of this document is to outline the roles, responsibilities, and procedures to be followed in selecting and harvesting maize from different breeding stages.

3. *Scope*



This document contains harvesting procedure in maize breeding. It covers steps to selecting and harvesting in nursery, preliminary and advanced trial plots.

4. *Definition of terms*

Nursery: It is a place where plants are propagated and grown to a desired age. Nursery practices should be geared to produce well-grown and vigorous seedlings free from major pests and diseases.

Trial: A field or planting environment where maize germplasms or varieties are planted for evaluation.

Harvest: When maize is to be consumed fresh, harvesting should be conducted when the silk has turned brown (50–70 days after planting). But when grain is needed, harvest as soon as the grain is dry enough (80– 110 days after planting) depending on the variety.

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During harvest, the cobs can be broken by hand from the plant or the whole plant can be cut with a cutlass.

Shell: To remove the dry kernels from the cob.

Tags: Tags are printed labels attached on the Maize stem for proper identification of germplasm per plot during harvesting.

Ears: It is the grain-bearing tip part of the stem of a cereal plant, such as wheat or maize. It can also refer to "a prominent lobe in some leaves."



5. *Roles and Responsibilities*

All staff involved in implementing breeding activities in the maize improvement program at IITA must use the harvesting and seed handling SOP. No alteration should be made to the procedures unless approved exceptionally by the program leaders. The list of individuals responsible for each section of the harvesting and seed handling SOP in the breeding data cycle is listed below.

Crop Lead (CL) Responsible for the overall management of the trials and for delegating team responsibilities. The CL is the lead breeder and coordinator of Maize Improvement Program at IITA.

Breeder (B): Coordinate the field layout of experiments, planting and checks on the implementation of defined protocols on the different experimental sites. Ensures all trials are established in the on-station and out-stations respectively. This includes trial management and data collection.

Trial Manager (TM): Oversees trial preparations and management protocols, land acquisitions, oversees planting in the outstations. Also supervises planning of inputs and other planting logistics for the various stations.

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Research Supervisor (RS): Coordinates the activities of the Research Technician to ensure that assigned tasks are carried out correctly. The RS involves in planting, field management and post-trial management practices as well as coordinates fertilizer application in on station and outstation experimental fields. S/he involves in the Nursery and seed increase protocols as delegated by the CL and B respectively.

Research Technician (RT): The Research Technician performs field tasks as defined in the trial protocols such as field data collection or field management practices. RT's responsibility is to perform assigned tasks including the use of digital tools defined in the protocol for capturing, storing, transmitting, and ensuring quality of data within defined time periods.



6. Procedure

6.1 Nursery harvest

1. Identification tags will be used as markers to identify selections.
2. Make sure to harvest only the selected plants.
3. Attach tags with cross names and plot numbers, before harvesting.
4. Check the plants are at the right moisture level for harvesting.
5. Carefully harvest ears of plants per plot.
6. Place the harvested ears in a separate bag for each plot.
7. Shell the ears according to the harvesting instruction.

6.2 Advanced and preliminary trial plot harvest

1. Prepare materials to be used for harvesting well ahead of the harvesting time.
2. Make sure you have the field-book or the tablet for electronic data capture.
3. Make sure you have enough harvest bags for the field.

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4. Confirm plot label with trial design before start harvesting.
5. Check proper maturity of plots to be harvested.
6. Harvesting will be made per plot.
7. Count plants/plot at harvesting to obtain harvest count.
8. Attach information (plot #, entry #, pedigree, trial name) to the harvested plot for proper identification.
9. Spread the harvested ears on its own plot for proper data capturing.
10. Make sure all plots are harvested and labels added to each plot.
11. Dry seeds in drying cart to proper moisture level before cleaning.

6.3 Seed Handling

1. Once the seed is harvested, it should be taken to the seed store.
2. Then it is cleaned by removing unwanted materials.
3. Make sure to arrange the harvested materials into trial and plot order.
4. Weigh the net plot i.e. All the seed harvested from the plot and count 100 seed weight and record the data in the field book.
5. Place the seed in the bags for storage.
6. Place bags from the field in order based on plot numbers and trial name.
7. Put the seed in the shelves, record the shelf and cabinet number.

7. *Appendix*

7.1 Contacts for support

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For Issues relating to selection, you can contact breeders: Drs. Abebe Menkir (A.menkir@cgiar.org), Baffour Badu-Apraku, (B. Badu-Apraku@cgiar.org), Silvestro Meseka (S.Meseka@cgiar.org), and Wende Mengesha (W.Mengesha@cgiar.org).

8. *References*
