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|   | Crop: Cassava Function: Trial Management | SOP # | IITA-CS-SOP03 |
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Standard Operating Procedure (SOP): Trial Management

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1. Introduction

Field trials are important in cassava breeding research. Cassava breeders conduct a variety of field trials in the process of developing improved varieties. The results of these trials are used to take informed decisions regarding the variety to release. Good field management can help ensure consistency and repeatability of field trials. Therefore, proper management of field trials is critical for making accurate decisions.

2. Purpose



This SOP aims at ensuring proper execution of field management activities from establishment to harvesting. This includes routine field monitoring for identifying and addressing any issue that could threaten the success of the trials.

3. Scope

This standard operating procedure (SOP) covers the period from trial establishment to harvesting and handing over of the field to RFU. This document describes the trial management procedure used by the IITA cassava breeding, including herbicide and fertilizer applications, fire tracing and perimeter fencing with wire mesh to guard against rodents, soil erosion control, hand weeding and cleaning of the surrounding as and when due.

4. Definition of terms

- RFU: Research farm unit
- SOP: Standard Operating Procedure
- PPE: Personal Protective Equipment
- Fencing: Erection of wire net around the field to prevent rodents
- Spreader: This refers to an approved susceptible genotype as inoculum
- WAP: Week After Planting

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5. Roles and Responsibilities

Field Trial manager:

- Monitors and co-ordinates responses to emergencies that threatens the success of field trials (erosion control, lodging, uncleaned and unlabeled field, spreader row in nursery field etc.).
- Takes record of trial management activities. For instance, date of pre-emergence herbicide application, gap filling DAP, weeding times, post-emergence herbicide application, fencing, data collection, fertilizer application, production, and erection of trial sign board etc.
- Coordinates the production of a field trial's calendar, including the dates of field establishment and harvesting.
- Coordinates the field evacuation and release of the field to the IITA RFU.

Research Supervisor/Field Technician (After trial establishment):

- Ensures a pre-emergence herbicide is sprayed on the field, shares trial information with the scientist, the field trial manager, the data management team, and other stakeholders.
- Conducts a routine trial visit to share any anomaly with the field trial management or any other designated authority to arrange corrective measures.
- Supplies missing stands at 2-3 week after planting (WAP); ensures timely evaluation and data collection.
- Supervises the construction of perimeter fencing of field trials against rodents.
- Carries out pre-harvest evaluation (plant type, lodging, height at first branching, and VR) just before harvest.
- Ensures field evacuation after harvesting.

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Field Technicians/Field Workers:

- Apply pre-emergence herbicide to a newly established trial at the recommended dose, wearing the appropriate Personal Protective Equipment (PPE)
- Prepare a signboard with trial details and place it on the field.
- Report completion of spraying activities of a trial to the supervisor
- Assist in trial maintenance by covering any exposed cassava roots and notify the supervisor or field trial manager of any incidents in the field.
- Remove signboards, pegs, and other labels from the field at the end of trials.

6. Procedure/Protocols

• Pre-emergence herbicide application:

- The field supervisor informs the team responsible for preparing and applying pre-emergence herbicide of the completion of trial establishment activities.
- The spraying team should consult the field trial manager regarding the herbicide to be sprayed. The field trial manager provides instructions on the suitable pre-emergence herbicide and application rate.
- The PPE kit should be worn by the spraying staff.
- The spraying staff should ensure that the backpack Knapsack spraying equipment is in good condition before use. Sprayer calibration is also necessary for efficient application.
- Some of the pre-emergence herbicides available for use include Fierce (ai. Flumioxazin + pyroxasulfone @ 0.32 kg/ha) or Lagon (Aclonifen + isoxaflutole @ 1.25 L/ha).
- Refer to cassava weed management SOP for herbicide application calibration and its safe use.



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• **Management of established field trials, growth, and development**

- Walk through the field to verify the clones are correctly assigned according to the field lay-out. Notify the appropriate staff member of any change in the layout.
- Ensure a signboard showing important information about the trial is placed in the field.
- Carry out replacement of dead stakes at 2-3 WAP.
- The data management team should produce trial barcodes and ensure that the labels are stuck to pegs of each plot not later than 2-3 WAP.
- Field trials are to be hoe-weeded as and when due. Record weeding dates and number of workers.
- Ensure weeds debris and trash that are packed out of the plots to obtain a clean field.
- Make a request at RFU for mowing of the trial field surrounding as and when due.
- Visit the trial field regularly - weekly, if not daily, to monitor the field conditions for any needed action or correction.
- Field supervisor should rogue off-types from the field, refix fallen labels, among other activities during routine visit.
- Provide a copy of the schedule of operations to staff carrying out trial evaluation for their reference for timely data collection.
- Daily, weekly, monthly, and tri-monthly field operations carried out should reported by a designated staff to the field manager for the records.

• **Post – emergence herbicide application**

- In addition to routine hoe-weeding, after 12 WAP, post-emergence herbicide can be applied to manage weeds in the cassava field trial.
- Ensure spraying shield compliance during post-emergence herbicide application.
- Glyphosate (systemic) or glufosinate ammonium (contact) at 4 L per hectare are the recommended post-emergence herbicide to control weeds.

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- Refer to cassava weed management SOP for herbicide application calibration and safety recommendations.



• Incidental management operation

- Visit the field after rainfall for potential erosion incident and be prepared to take corrective actions.
- Make plans to repair damaged wire mesh fence to prevent crop damage by rodents.
- Report incidents of burst irrigation pipes and loose sprinklers to the RFU.
- Remove used materials, trash and empty cans from the field.

• Irrigation for field trials:

Cassava breeding trials can be established under rainfed or irrigation conditions. The need for irrigation is majorly for field establishment in dry season or during a dry spell in rainy season.

- The IITA RFU has the Institute's mandate to provide irrigation water for trials.
- Request for irrigation should be made to the RFU by the field manager or supervisor by completing an irrigation requisition form. Sometimes, irrigation might be required for land preparation.
- CBU will provide workers to assist RFU irrigation technician to lay irrigation pipes.
- CBU supervisor should regularly visit field to ensure irrigation schedules are not faltered.
- CBU supervisor should check irrigated plots on a regular basis and notify the CBU manager or the irrigation technician in charge, of observed sprinkler malfunction, burst pipes, or flooding.
- Supervisor should liaise with RFU irrigation technician for the evacuation of the irrigation pipes and sprinklers from the field when they are no longer needed.

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• **Fertilizer application:**

In cassava breeding, fertilizer application is usually carried out for fertilizer response experiments. Fertilizer could also be applied to boost the stem yield for seed systems. In a broad sense, fertilizer application is usually performed to rejuvenate depleted soil with history of low root yield of less than 15 tons per hectare.



Please note that you can only apply fertilizer after the field has been made weed-free and clean.

- Cassava requires different nutrients to grow. The 3 most important nutrients are: nitrogen, phosphorus and potassium
- Nitrogen is required for the growth of stems and leaves.
- Phosphorus provides the crop with the energy needed for growth.
- Potassium is required for the bulking of the storage roots.
- Some fertilizers supply all 3 of these nutrients (e.g., NPK 15:15:15, NPK 17:17:17 or NPK 20:10:10) while other fertilizers only supply 1 or 2 of these nutrients (e.g., urea 46:0:0, DAP 18:46:0 and MOP 0:0:60)

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- The available and commonly used fertilizer type is NPK 15:15:15 and Urea at later growth stage.
- The recommended dose for cassava is 200kg per ha of NPK and urea (4bags of 50kg).
- For non-split fertilizer application, apply NPK 15:15:15 at 4 WAP while the urea should be at 6-8 WAP.
- Urea and NPK 15:15:15 are best split-applied in 2 to 4 equal doses. Apply the first split 1 month after planting. Spread subsequent splits, as rains permit, over the next 2 to 3 months. Apply NPK during the first 1-2 splits, and urea during later splits.
- Fertilizer must always be applied when the soil is moist, after 1 or 2 rain showers.
- Make a 5 cm deep half-moon, or full ring furrow about 20 cm away from each cassava plant. Spread the required amount of fertilizer in the furrow and cover with soil.
- Distribute the fertilizer dose equally to all plants using bottle cap to get the dosage right.

• **Fertilizer calculation**

- Recommendations are provided in kilograms of urea and NPK fertilizer per hectare (100 m x 100 m). Convert these to the rates required for your field using the rule of three.

Area of your field (m²) x Fertilizer needed for 1 ha (kg) 10,000 (m²)

10,000m²

=Fertilizer needed for your field (kg)

7. References

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