## TOOLS4SEEDSYSTEMS:

### WORKING TOWARDS RESILIENCE THROUGH ROOT, TUBER AND BANANA CROPS IN HUMANITARIAN SETTINGS

# BANANA & PLANTAIN SEED PRODUCTION PRACTICES

TOOL BOX FOR WORKING WITH ROOT, TUBER AND BANANA SEED SYSTEMS

**OMONDI BONAVENTURE AMAN • TOOLBOX FOR SEED SYSTEMS VIRTUAL TRAINING •** MAY 25, 2023

USAID FROM THE AMERICAN PEOPLE

CGIAR INITIATIVE ON Seed Equal

CIP INTERNATIONAL POTATO CENTER CGIAR

# *Musa* spp : Banana and Plantain

## Banana and Plantain: diversity

- Differences: economical and historical
- Banana and plantain – one crop multiple uses
- Variations in starchiness
- Growth habit – dominance of the main stem
- Fruit characteristics
- Plantains – more lowland forms, (not clear cut)
- Shared cropping methods
- Shared pests and diseases
- Seed systems are mainly informal between farmers
- Formal seed of high multiplication rates; often safer.

# Banana propagation

Banana suckers

Corm fragments

Tissue culture propagation and rooting


Hardening nursery

# Site selection for seed multiplication

- **Sucker mother gardens**
  - Soil fertility
  - Pests and disease risk (Soil, vector borne)
  - Access (and security)
  - Security – significant consideration

**Hardening Nursery:**

- Security
- Accessibility
- Water availability
- Pest and disease risk
- Rooting medium
- Facilities e.g. sterilisation and potting

# Selection of varieties and sourcing of seed

- **Variety selection:**
  - Who will plant? Why? Price
  - Production systems, adaptability
  - Consumption and market price

- **Seed sourcing:**
  - Availability, trusted source, seed
  - Quality of seed (seed, mother plant)
  - Adaptability (sucker, plantlets?)
  - Quantity and timing

# Planning seed production

Banana suckers

Corm fragment techniques

Tissue culture propagation and rooting

| Delay | Week - months | Weeks | 2 – 3 months | 4 – 6 months |
|---|---|---|---|---|
| Proliferation | < 3 – 10 a year | ca 10 | 10 - 25 | >> 1000 |
| Adaptability | Medium to high | need rooting | need hardening | Low @planting |
| Disease risk | High if informal | | | Low if indexed |
| Transport | Low | Medium | medium | Stage dependent |

# Pest and disease management

- **Main pests**
  - **Banana weevils:** tunnel in the corm limiting nutrient and water flow
  - **Nematodes**: destroy roots
  - **Control:**
    - Paring to minimise carry over
    - Hot water treatment
    - Trapping

Bunchy top disease

Banana bacterial wilt

- **Main diseases**
  - Banana bunchy top disease – virus, seed borne, aphid transmitted
  - Bacterial wilt (mostly in East Africa) – limited vector borne
  - Fusarium wilt (multiple races)
  - Black/ yellow leaf streak (Sigatoka)

Fusarium wilt (TR4!!)

# Support tools

Training manuals on Macropropagation: Link

Tumaini App: Google Play Store

BBTD training course: **https://classes.afrique-learning.com/**

Bacterial Wilt training course: crop health courses

- **Online Course on BBTD management (FREE!)**

  **https://classes.afrique-learning.com/**

  **Email: b.a.omondi@cgiar.org (to register)**



TUMAINI App – Free in Google Playstore

Some decision tools for disease detec

# VPC seed systems concerns

| Challenge | Effect | Tweaks and options |
|---|---|---|
| Low multiplication rates | Poor timing with the planting season | Mother garden – decapitation, false decapitation<br>Low tech micropropagation: corm splits/ bucket system |
| Bulkiness, transportation | Bulkiness, perishability, loss of vigour | Localized acclimatization nurseries (for TC plantlets)<br>Sucker local splitting and macropropagation |
| Packaging and handling | Space and spoilage during transportation | Trimming roots and leaves<br>Wet gunny bag packaging (fast rooting necessary) |
| Storage: short shelf life | Rapid perishability in storage,<br>loss of vigour during storage | Suckers, high ability to regenerate, cut off leaves<br>Plantlets: possibility of 2nd bud/ trim leaves, roots<br>**Planning** – late or early delivery common issue |
| Disease and pest transmission | Risk of rapid spread of diseases<br>Do no harm engagements! | Match disease risk with distribution rates<br>Disease hazard management steps<br>Paring suckers/ sterilize soil and use rich organic matter. |
| Varietal fidelity | Seed provided not cultivars desired<br>Diversity of cultivar desires | Local mother garden tweaks to enable association<br>Explore labelling details |

## Multiplication rates

## Sterilisation

**Paring** – minimize pest carry over


**Protection** – keeping off vectors

**Sterilisation** – corms and media

**Logistics** – planning and delocalization

TOOL BOX
FOR WORKING WITH ROOT, TUBER AND BANANA SEED SYSTEMS

# Thank you

USAID FROM THE AMERICAN PEOPLE

CGIAR INITIATIVE ON Seed Equal

CIP INTERNATIONAL POTATO CENTER CGIAR