

# LINKING BREEDING - SEED INTO A FUNCTIONAL SEED SYSTEM IN WEST AFRICA



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# Constraints in seed system in West Africa



- Long dry season
- Water availability for seed production
- Poor quality of source of planting material to start seed production
- No isolation of seed production fields from old fields
- Unprotected fields from livestock
- No experienced or well trained DVMs or seed companies in QDS production
- Under-developed seed systems
- Seed producers dominated by informal system producing local white variety seed

# Take-off of breeding program in West Africa

- Five OFSP varieties released in Burkina Faso in 2014 and registered, five other in the pipeline for release
- 12 released varieties in Ghana and 2 OFSP (one dark – Apomuden originally from Bangladesh and one light orange-CIP199062.1)
- 2 OFSP varieties (Mother's Delight – dark orange introduced from CIP and King J – light orange – bred in Nigeria)
- Breeding programs are active with new variety evaluations at different stages.
- Many traits considered including quality, disease and pest resistance, drought, appearance traits and shelf-life attributes

# **How do we link Breeder Seed into a functional seed system?**

**Proposed model from**  
**Jumpstarting Orange-fleshed Sweetpotato in West Africa through**  
**Diversified Markets**

From this part, the "seed" is not a "true" seed but planting material

Varieties, Breeders, Elite, pre-basic, foundation

Breeding

Seed System  
Tissue culture, greenhouse

Dissemination:  
pre-basic, foundation

Potential for cost recovery

Foundation Seed ← - CERTIFICATION

➤ QDPM  
➤ Positive & Negative Selection

Primary ('1')  
Multiplication

Large scale multiplication, on station, managed by researcher, contracted private sector working together with Researcher/breeder, market driven

DECENTRALIZED VINE MULTIPLICATION (DVM)

Supervision by Extension agent

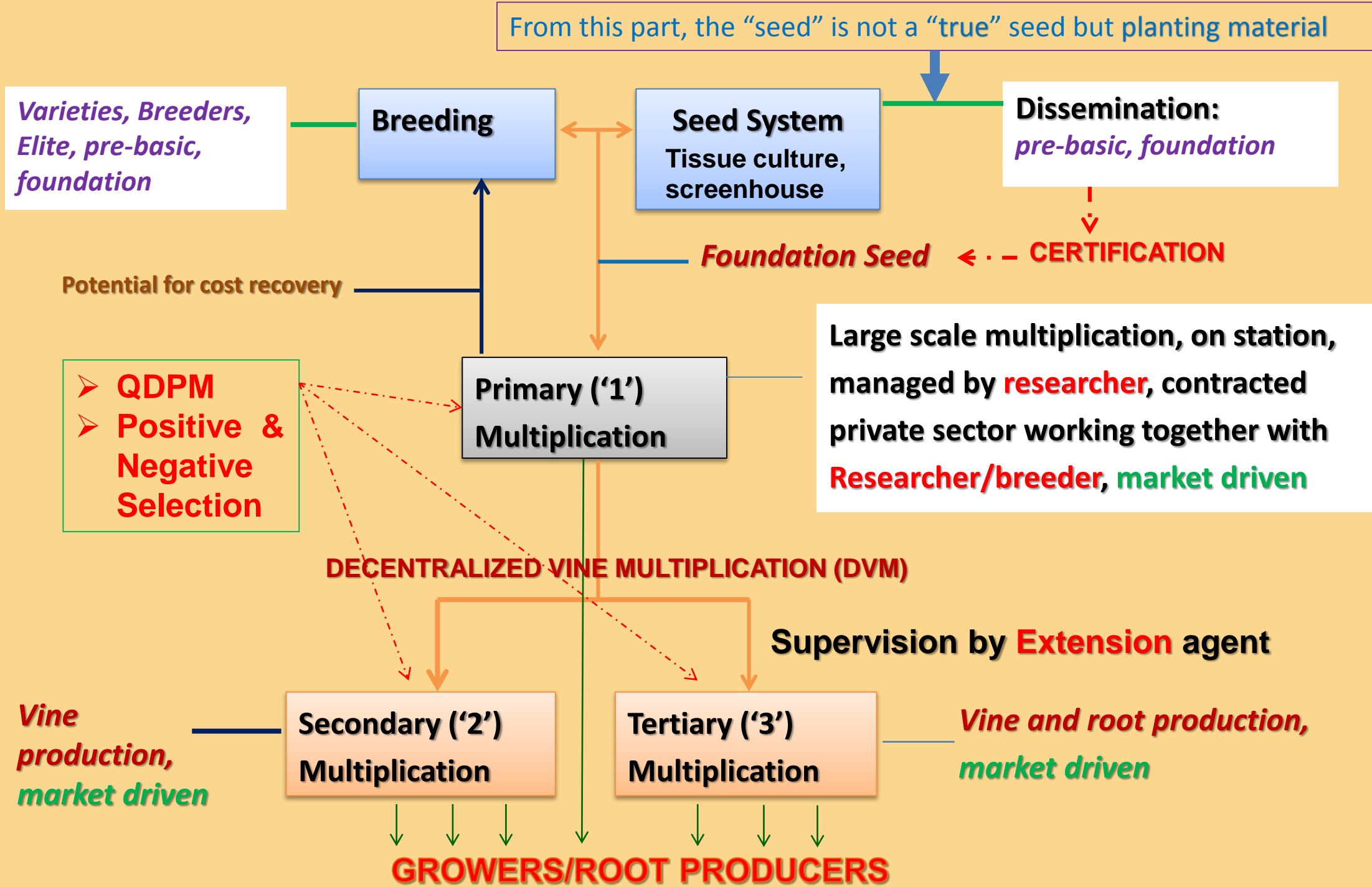
Vine production, market driven

Secondary ('2')  
Multiplication

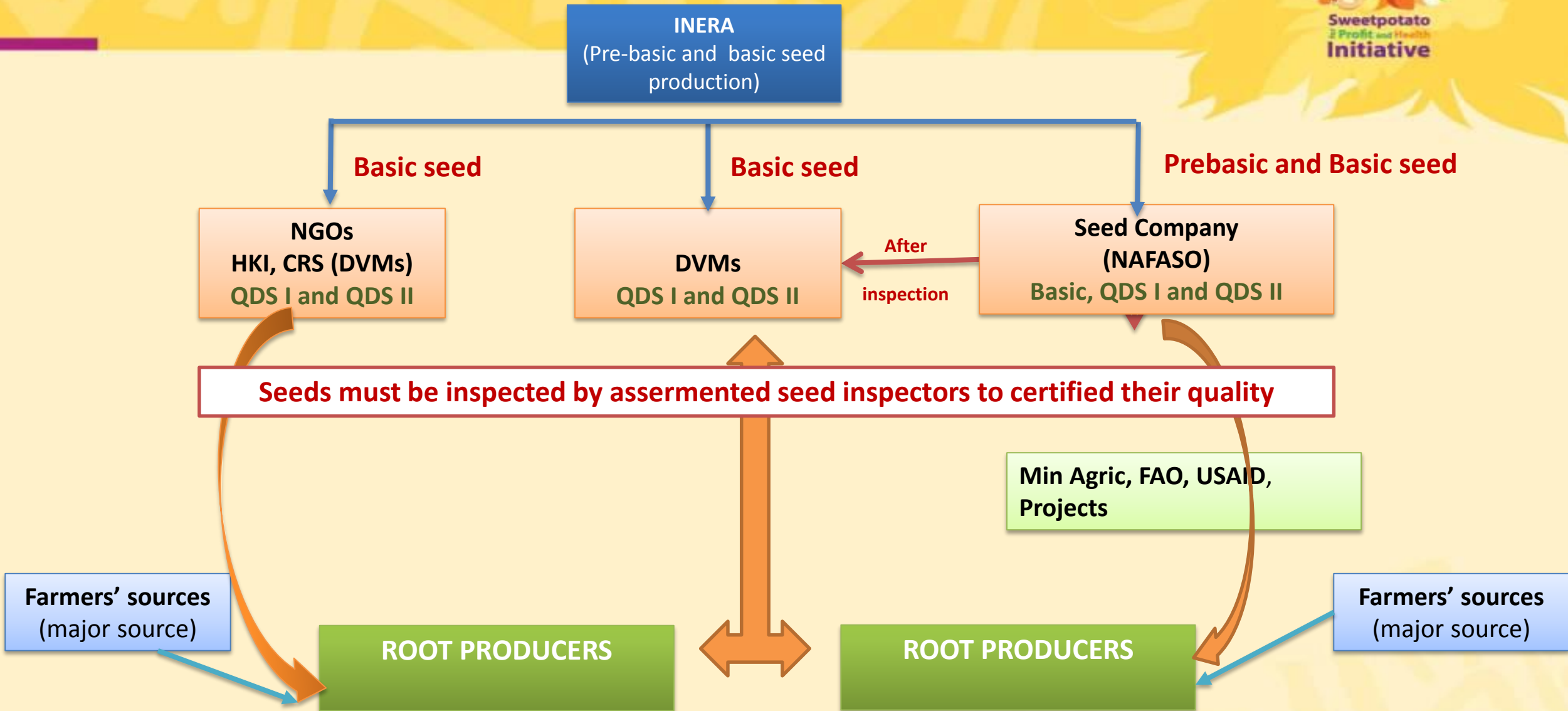
Tertiary ('3')  
Multiplication

Vine and root production, market driven

GROWERS/ROOT PRODUCERS



# But ... how is the Seed System scheme in Burkina Faso



# SWEETPOTATO VARIETY VIRUS-TESTED OR UNDERGOING CLEAN-UP AT CSIR-CRI



Source Country	Virus tested	Materials to be cleaned
Burkina Faso	BF59XCIP-4	Jewel, BF 19
	TIEBELE-2	BF 82X CIP-13, BF 82X CIP-17
	BF92XTIB-2	BF59X TIB-4, Ejumula-2
		BF82X Tainung -8
		BF24X TIB -3
		BF82X TIB-8
		BF59X TIB-6
		All to be cleaned by June, 2016



# Breeder seed (prebasic) produced under screenhouse by INERA



## Training DVMs and seed company: highly required



- The training package including:
  - ❖ variety descriptors and recognition
  - ❖ QDS production techniques
  - ❖ Pest and disease management under QDS production
  - ❖ Isolation
  - ❖ Field labelling and maintenance
  - ❖ Harvest and packaging
  - ❖ Etc;
- A total of 96 multipliers were trained as DVMs, half of them are producing QDS
- NAFASO: a seed company involved produces and distribute Planting material in Burkina and out of the country

# Niangoloko, NAFASO start in December 2014



# DVM Field in Eastern Burkina, March 2016



# Drip irrigation for planting material production (Sokouraba)



# STATUS OF SEED SYSTEM IN GHANA



## ➤ **IMPLEMENTING PARTNERS:**

**CIP's** role: backstopping

**NGOs:**

- ACDEP and iDE Ghana** – Identify/establish commercial seed producers of various sizes.
  - Train and monitor activities of seed and root producers.

**Relevant Government Agencies:**

- CSIR-CRI & SARI** – Clean up of released varieties, advanced materials from breeding programs, and other commercially important varieties.
  - Conduct experiment to evaluate various methods of planting material maintenance and multiplication.
  - Supply quality foundation seeds to multipliers
  - Provide technical backstopping to NGO partners

**MOFA-extension** – Assist NGOs with training and field monitoring activities

- **JOINT PROGRAM PARTNERS:** MEDA, TRAX-Ghana, World Vision International, 4-H Ghana, USAID-RING

# SWEETPOTATO VARIETY VIRUS-TESTED OR UNDERGOING CLEAN-UP AT CSIR-CRI



Source Country	Virus tested	Materials to be cleaned
Ghana	<b>Bohye</b>	Patron (June 2016 )
	Ligri	Apomuden (June 2016 )
	Dadanyuie	Hi-starch (June 2016 )
	Otoo	Obare (December, 2016 )
	Sauti	Kuffour (December, 2016 )
	Faara	<b>Nangungungu</b> (December, 2016 )
	Ogyefo	<b>TU-Orange</b> (December, 2016 )
	Santom Pona	TU-Purple (December, 2016 )
	Okumkom	

# BREEDER SEED MAINTENANCE



- **Pathogen-free breeder/ foundation seed maintenance by researchers**



SCREENHOUSE FOR MAINTENANCE OF HEALTHY PLANTING MATERIALS

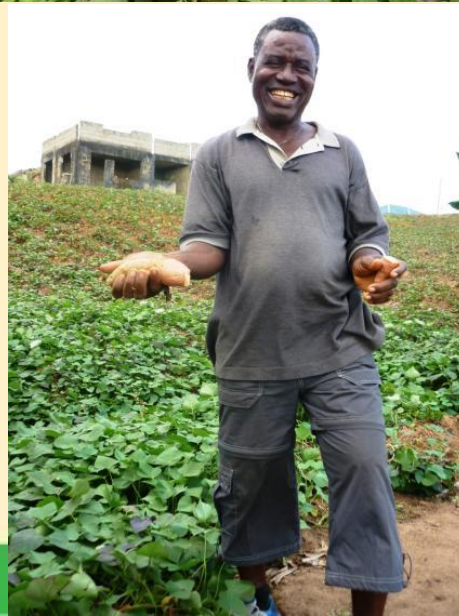


# PRIMARY MULTIPLICATION

- Managed by researchers (CSIR-SARI/CRI & CIP)
- Multiply breeder seeds
- Produce clean planting materials for multipliers



# SECONDARY AND TERTIARY MULTIPLICATION



- Worked with partners and we have identified **72** Decentralized Vine Multipliers (DVMs; 113 farmers; 16% women) in Northern, Upper East, Upper West, Volta and Central regions of Ghana.

- DVMs were trained and supplied with **10,800,300 cuttings** of Apomuden (OFSP) planting material (**2015 & 2016 through Aug ~ 1.5 years**).

- Registration of DVMs was done using a **Open Data Kit** (tablet based system).

## DISSEMINATION EFFORTS:

### In Ghana



- Multipliers sold vines in bundles of 100 cuttings through “**Ghana Health Service** Willingness to pay intervention”
- The price is based on vine production costs, currently: **GHc 5 (US\$ 1.25) per bundle**
- Bundles were tagged with labels that provided name and contact of multiplier, number of cuttings, date of harvest, name of variety and recipes
- Vine dissemination forms were filled by multipliers to keep track of distribution.
- **4,728 pregnant women & lactating mothers** obtained Apomuden (OFSP) planting material from 15 DVMs through a voucher scheme introduced by the project. Only a few pregnant & lactating women bought the vines



# FINDINGS THROUGH THE DISSEMINATION EFFORTS:



## **In Nigeria and Ghana → School Feeding Program (formal markets)**

- Multipliers are mostly becoming the root producers. The OFSP roots are sold to the pilot schools of the “**School feeding program**”
- All of the OFSP root producers, who sold the OFSP roots in 117 schools in Osun State (Nigeria) and 2 schools in Ghana, bought clean planting materials from DVMs.

## **In Ghana → Product development, i.e. bread (formal markets)**

- Multipliers can be vine multipliers and sell the vines to the root producers
- Multipliers can become the root producers
- Roots producers sell the OFSP roots to the bakeries, i.e. Volta Region and Great Accra

## **In Burkina Faso and Ghana → open markets (informal markets)**

- In Ghana: (1) multipliers are the vine multipliers and (2) multipliers become root producers
- In Burkina Faso: multipliers become root producers

# INITIAL IMPACTS DETERMINED FROM THE EFFORTS, i.e. through Jumpstarting ...




Country	Revenue from Vine sales in rainy season of 2015 & 16, and one dry season of 2016 (US\$)	What type of the intervention in the OFSP value chains has influenced
Burkina Faso	55,362	Open markets (informal markets)
Nigeria	27,230	School Feeding program (formal market)
Ghana	21,989	Open markets (informal), Ghana Health Service (27% due to subsidized voucher; formal market), Ghana school feeding program (formal market) and bakeries (product development from OFSP, formal market)
<b>Total</b>	<b>104,581</b>	<b>Through diversified markets? YES, Commercialization can be provoked</b>

**QUESTIONS:** Before the Jumpstarting project was launched in April 2014, (1) how did farmers obtain the planting materials? (2) Did the multipliers make money out of vine sales?

# LET US THINK FURTHER, HOW ARE WE STRENGTHENING THE LINKAGE BETWEEN BREEDING AND SEED SYSTEMS?

What happens after handling the pre-basic seed? we are always discussing about pre-basic seeds ...




**GHANA**



**STANDARDS AND INSPECTION PROCEDURES**

This protocol is part of the project framework and represents one of the outputs / outcomes of the CIP-led project "Jumpstarting orange-fleshed sweetpotato in West Africa through diversified markets." Tested and executed in 2016, the protocol can be used for anybody who intends to commercialize the sweetpotato planting materials.

**QUALITY DECLARED PLANTING MATERIALS (QDPM)**

JumpStarting QDPM  
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**NIGERIA**



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**Thank you  
for your attention**