



# The Journey Integrating ICT in Commercial Production of Quality Sweetpotato Planting Material in East Africa (ICOPSEA)

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**MIMEA**



# The ICOPSEA & other Partners



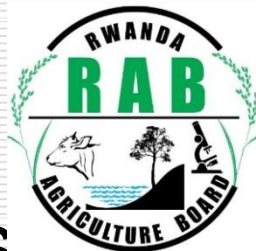
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- Private Players



MIMEA

- Research Institutes



- Universities



# Project team members and their Institutional Affiliation

Team Member	Organization affiliation
<b>Prof. Samuel Kyamanywa</b>	School of Agric. Sciences, Makerere University(MAK), Uganda;
<b>Prof. Elijah Ateka</b>	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya.
<b>Dr. Settumba Mukasa</b>	Director, SENAI Farm Supplies Limited, Uganda.
<b>Ms. Ann Kitisya</b>	Director, MIMEA International Kenya Limited, Kenya.
<b>Dr. Fred Tairo</b>	Principal Agricultural Research Officer, Mikocheni Agricultural Research Institute (MARI), Dar Es Salaam, Tanzania. <a href="mailto:emateka@yahoo.com">emateka@yahoo.com</a>
<b>Dr. Placide Rukundo</b>	Research Fellow, Roots and Tubers Program, Rwanda Agriculture Board (RAB)

Sweet potato  
is an  
important root  
crop in the EA  
countries.

- Vital staple crop..
- Stores very well -famine reserves crop
- High productivity per unit area.
- Adapted to a very in a wide range of agro-ecologies in E A – hence ideal food security crop .
- Cheapest source of food calories and can be used as cash crop.
- Can be processed to produce industrial starch, puree for confectionary and livestock feeds.
- Health attributes

# Project Background

S/potato has potential for increasing household income through:

- selling of tubers,
- vines,
- processed products such as puree and flour confectionaries.

The crop has the potential to contribute to:-

- the NEPAD/STISA priority area 1 of ensuring food and nutrition security, and
- priority area 6 of wealth creation .

## Challenges

- The potential of sweetpotato hampered by low productivity levels.
- Low yields are mainly due to high incidence of viral diseases.
- Farmers use planting material from their own fields without controlling the quality.
- Yet there is over 80% yield increase when virus-free planting material are used
- There is extreme scarcity of planting material during onset of planting seasons



There is a need for a seed system that produces and delivers quality seed

- varieties with good farmer and market attributes
- at onset of rains or when demanded by farmers.

How is quality planting materials accessed?

- Rapid seed multiplication system
- robust and rigorous inspection and certification'

# Project Background

Since  
2006 a  
consortium  
of  
scientists

- Department of Agricultural Production Makerere University,
- National Crops Resource Research Institute Namulonge
- Kenya Agricultural Research Institute
- Jomo Kenyatta University of Agriculture and Technology (JKUAT),
- Uganda National Agricultural Research Organisation,
- Tanzania Agricultural Research institute Mikocheni (TARI-M),
- Addis Ababa University, .
- Department of Applied Biology University of Helsinki
- Department of Plant Biology and Forest Genetic SLU



## **Towards Sustainable Cassava and Sweet potato production in East Africa” funded by SIDA**

**Goal:** Generate technologies and strengthen human resource capacity to facility S/potato genetic improvement and clean seed production.

- Characterised sweetpotato genotypes with special reference to SPVD resistance and dry matter content.
- Optimised protocols for invitro multiplication sweetpotato.
- Developed diagnostic protocols for sweetpotato viruses.
- Optimised *invitro* and thermotherapy techniques for elimination of sweetpotato viruses (SPFMV and, SPMMV)
- Trained 7 MSc and 5 PhD students
- Published over 10 article in international referred journal

# Progress- 2011-2015- Bio-Innovate Africa Program.

## **Enhancing Food Security through improved seed systems of appropriate Varieties of Cassava, Potato and Sweetpotato Resilient to Climate Change”-SIDA**

- Over 16 elite S/potato genotypes resistant/tolerant to drought and diseases pressure, identified.
- Low cost tissue culture-based protocols for high throughput production of quality sweetpotato seed were developed.
- Guidelines for nursery handling of tissue culture plantlets developed
- Studied the potato seed systems in the region and noted (a) lack of a regulated seed system, (b) there was lack of adequate quantities of quality planting and an efficient distribution system..
- A 3-tier seed production, multiplication and delivery model was piloted in Uganda

## **Integrating ICT in Commercial Production of Quality Sweetpotato Planting Material in East Africa (ICOPSEA)**

# ICOPSEA

- Thus project is taking advantage of advances in Biotechnology and ICT to commercialise production and selling of high quality sweetpotato seed.
- Addressing the challenge of poor access to and availability of quality seed of elite varieties.

# Project Background



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## Objectives

- Ensuring availability of adequate quantities of quality sweet potato seed for smallholder farmers in EA
- Developing mobile field sweetpotato diagnostic tools to facilitate delivery of disease free sweetpotato seeds;
- Developing a web based mobile application to facilitate information access, seed inspection, production and marketing of the sweetpotato seed

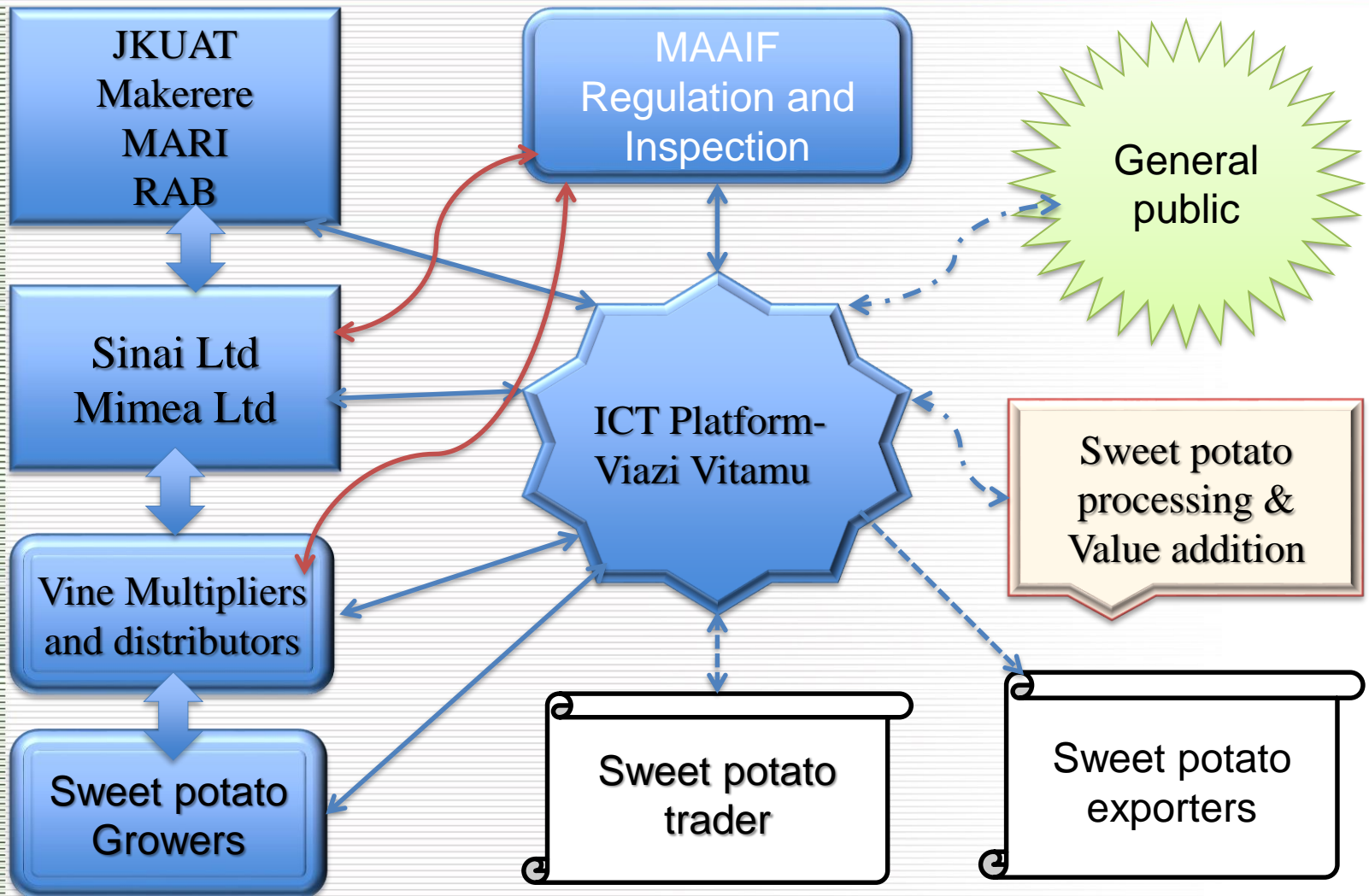
# Deliverables



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- Clean planting materials
- Portable virus diagnostics kit
- *Viazi Vitamu App*
- Capacity Building
- Institutionalized sweet potato seed system

# Integrated Sweet potato seed system





# Varieties, for commercial certified seed production and delivery, Identified

- 24 varieties JKUAT, MAK, RAB & MARI.
- 16 of them have been are in the seed system.

Kenya	Rwanda	Tanzania	Uganda
Chebololo	Kabode (	Mataya,	NASPOT 01,
KENSPOT 4,	Wadada	Kabode,	Semanda,
Mtwapa,	Ukerewe	Jewel,	Ejumula
Kemb 10,	NASPOT 9	Kiegea	NASPOT 13
Ex-shimba,	Tura	Kakamega	NASPOT 8
Vita	NASPOT-10	Polista	New Dimbuka
Kabode	Vita		Araka (White) Beauregard Jewel Kakamega Mataya

# Achievement: Infrastructure to support seed production is in place



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- Expanded screenhouse production capacity.
- SENAI renovated an old screenhouse and also put up a new insect proof screenhouse at Busega.
- MIMEA put up new screen house.
- MARI renovated 1 screen and put up 1 new screen house
- JKUAT put up 1 Screen hse

	No of Screen houses	Irrigation System
<b>Mak Univ.</b>	0	0
<b>Senai Farm Supplies</b>	2	1
<b>Jkuat</b>	1	
<b>TARI-M</b>	1	
<b>Mimea Intern.</b>	1	
<b>RAB</b>	-	
<b>Kenyan Farmer</b>	2	
<b>Ugandan Farmers</b>	2	2
<b>Tanzania Farmers</b>	1	2
<b>Rwanda's Farmers</b>		

# Infrastructure to support seed production is in place



Ms. Fortunata Uronu the MD AFCO investment stand under the 5,000 L water storage tank



Ms. Shamsa Kileo the MD Imara Initiatives (II)



Figure 1. Virus free Elite sweetpotato varieties bulked at JKUAT (A), SENAI (B), MARI (C) and MIMEA (D) in the newly built screenhouses

# Adequate amounts of sweetpotato seed Produced



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- Vine Multiplier groups have been Identified and are linked to private companies for seed
- 7 companies linked to JKUAT and MIMEA
- 2 Private vine multipliers linked to TARI
- 4 private vine multipliers linked to (SENAI)
- RAB linked 4 private multipliers

Country	Institution	Vines produced	Vines sold	
Kenya	JKUAT	55,000	7,000	
	MIMEA	75,000	75,000	
Rwanda	RAB	450,000	132,750	
	Jeanne D'Arc	17tones	17 tones	
Tanzania	TARI-M	20,000	20,000	
	Imara Initiatives	2,100,000	2,100,000	
	AFCO investments	15,000	15,000	
Uganda	SENAI LTD	600,000	600,000	



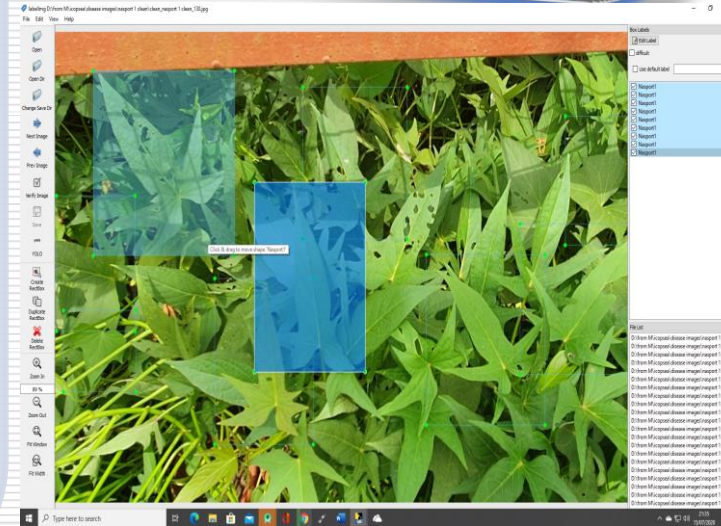
# Field based disease diagnostic kit



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2 MSc  
Students.

- Chemical.- Field-Based Polymerase Chain Reaction Detection of Key Sweetpotato Viruses
- Artificial Intelligence. Mobile Based Device for Variety Identification and Disease Detection: Object Model For Sweet Potato Plants



# Human Capacity Building



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**Name:** Mrs. Nikuze Fidela,

**Degree:** MSc. Crop Science

**Title:** Investigation effects of tissue culture (T.C) technology on sweetpotato production in Rwanda

**Status:**

**Publication:**



**Name:** Christine Wamuyu Mwangi,

**Degree:** MSc. Agricultural Economics

**Title:** Farmers willingness to pay and economic viability of clean sweet potato (*Ipomea Batatas*) seed multiplication in Kenya

**Status:** waiting for defence

**Publication:** 1

# Human Capacity Building



**Name:** Mr Ssengo John :**Degree:** MSc.Crop Science

**Title:** Field-Based Polymerase Chain Reaction  
Detection of Key Sweetpotato Viruses

**Status:** Submitted

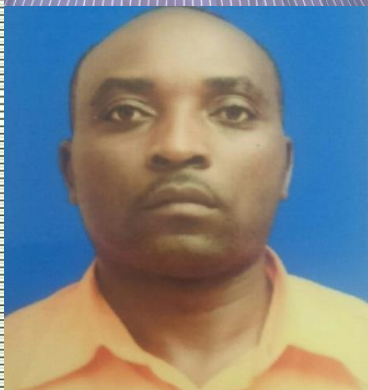
**Publication:** 1



**Name** Mr. Ssagala Paul :**Degree** :MSc Data  
communication and software Engineering

**Title:**Mobile Based Device for Variety Identification and  
Disease Detection: Object Model For Sweet Potato Plants

**Status:** First Draft



**Name:** Mr Castory Kibiki , **Degree:**MSc. Agricultural  
Economics

**Title:** Economic Analysis of Virus Free Sweet Potato  
Production System In Lake And Coastal Zones

**Status:** -----



# Human Capacity Building



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- **Name:** Mr. Charles Musoke
- **Degree:** PHD Rural Innovationst
- **Department :** Department of agriculture and rural innovations Makerere University,
- **Thesis Topic:** Determinants of uptake od certified sweetpotato seed among small holder farmers in Uganda

# Web-based mobile app for information access Progress

- Website established.  
<http://sweetpotatoeseastafrica.org>.
  - Information in put is still a challenge
- *Viazi Vitamu* Mobile App designed
- Piloted in 3 EA countries
  - Need feed back !!!
- Launch when and How???



## SITY

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# Have we reached



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- A commercial seed system has been initiated and it is going to take root.
- Phytosanitary and certification agencies are now involved in quality assuring of S/P seed.
- Mobile diagnostic tool for s/p viruses.
- *Viazi vitamu* in place.
- Farmers attitude is changing
- Project helped in strengthen institutions

# WHAT NEXT??



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- Strengthening linkages between the seed growers, tuber producers, processors and consumers.
- Strengthen the inspection and certification process and having positive reinforcements for non-users of clean seed. (Policy dialogue)
- Continue production of clean seed – support champions
- Targeting niche markets



# Acknowledgements

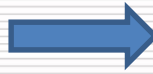


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# Clean seed production: Multiply and deliver appropriate clean planting materials to farmers

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(2) Plantlets hardening



(3) Transfer of plantlets to the field



(4) Farmer field multiplication of clean vines



(1) In-vitro plantlets multiplication at Rubona lab (RAB)