



# **BASICS PROGRAM: Breeder's Seed** *(Chiedozie Egesi and Peter Kulakow)*



Research  
Program on  
Roots, Tubers  
and Bananas

**Ibadan**  
**18 April 2016**

# Component Overview: Vision

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- 1. A regular supply of certified nucleus and pre-basic seed for released cassava varieties is produced and sold to basic seed producers in Nigeria**
- 2. A new rapid multiplication system, SAH, increases the rate of multiplication and delivery of prebasic seed with starting material initiated from tissue culture**

# Component Overview: Vision

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- 3. Variety demand by diverse end users in differentiated cassava markets is determined by communication with end users, demand creation trials and results of cassava variety adoption studies**
- 4. Certification standards and practice for prebasic and basic seed result in increased commercial exchange of high quality stems**
- 5. Backstopping and co-learning with project partners improves project performance and increases exchange of high quality seed**

# Cassava Varieties Released in Nigeria



S/N	Official clone name	Original Name	Variety Name	Year of Release	Tissue Culture
1	IITA-TMS-IBA30555	TMS-30555	NICASS 10	1976	yes
2	IITA-TMS-IBA30572	TMS-30572	NICASS 1	1984	yes
6	IITA-TMS-IBA8200058	TMS-82/00058	NICASS 5	1986	yes
14	NR8082	NR-8082	NICASS 14	1986	yes
10	IITA-TMS-IBA50395	TMS-50395	NICASS 15	1986	yes
15	NR8212	NR-8212	NICASS 16	1986	yes
9	IITA-TMS-IBA30001	TMS-30001	NICASS 18	1986	yes
19	IITA-TMS-IBA91934	TMS-91934	NICASS 19	1986	yes
<b>24</b>	<b>TMEB 419</b>	<b>TME-419</b>	<b>NICASS 20</b>	<b>2005</b>	<b>yes</b>
20	IITA-TMS-IBA972205	TMS 97/2205	NICASS 21	2005	yes
<b>21</b>	<b>IITA-TMS-IBA980505</b>	<b>TMS 98/0505</b>	<b>NICASS 22</b>	<b>2005</b>	<b>yes</b>
22	IITA-TMS-IBA980510	TMS 98/0510	NICASS 23	2005	yes
<b>23</b>	<b>IITA-TMS-IBA980581</b>	<b>TMS 98/0581</b>	<b>NICASS 24</b>	<b>2005</b>	<b>yes</b>
26	IITA-TMS-IBA920057	TMS 92/0057	NICASS 26	2006	yes
25	IITA-TMS-IBA920326	TMS 92/0326	NICASS 27	2006	yes
<b>28</b>	<b>IITA-TMS-IBA961632</b>	<b>TMS 96/1632</b>	<b>NICASS 28</b>	<b>2006</b>	<b>yes</b>
27	IITA-TMS-IBA980002	TMS 98/0002	NICASS 29	2006	yes
30	IITA-TMS-IBA961089A	TMS 96/1089A	NICASS 31	2008	yes
33	IITA-TMS-IBA010040	TMS 01/0040	UMUCASS 34	2010	yes
32	IITA-TMS-IBA000203	TMS 00/0203	UMUCASS 35	2010	yes
36	IITA-TMS-IBA011368	TMS 01/1368	UMUCASS 36	2011	yes
38	IITA-TMS-IBA011412	TMS 01/1412	UMUCASS 37	2011	yes
37	IITA-TMS-IBA011371	TMS-01/1371	UMUCASS 38	2011	yes
41	CR36-5	CR 36-5	UMUCASS 41	2012	yes
43	IITA-TMS-IBA982132	TMS-98/2132	UMUCASS 42	2012	yes
42	IITA-TMS-IBA011206	TMS-01/1206	UMUCASS 43	2012	yes
44	NR07/0220	NR 07/0220	UMUCASS 44	2014	yes
<b>45</b>	<b>IITA-TMS-IBA070593</b>	<b>TMS-07/0593</b>	<b>UMUCASS 45</b>	<b>2014</b>	<b>yes</b>
46	IITA-TMS-IBA070539	TMS-07/0539	UMUCASS 46	2014	yes

# Initial Target Varieties

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- **Initial target of improved varieties with highest demand**
  - **TME419 – High starch**
  - **TMS-IBA980581 – High starch**
  - **TMS-IBA980505 – High starch**
  - **TMS-IBA961632 – High starch**
  - **TMS-IBA070593 -- Biofortified**
- **26 total varieties are currently in tissue culture**

- SAH is potential game changing technology for rapid multiplication that can increase multiplication rates from the current 1:5 to 1:40 times per year to 1:5 per month or more
- Proof of Concept trial under way in Argentina
- In vitro multiplication suitable for five varieties
  - Ramada Paso
  - Rocha
  - Mpar 75
  - Santa Catarina
  - Palomita
- *Update: In vitro culture has been growing very slow. Micropropagation is used only to keep the initial material.*

- **In vitro transfer to SAH**
  - All different types of explants could be rooted and developed into SAH plants.
  - Initial growth and rooting speed was affected by the in-vitro conditions of the mother plant.
    - ***Success rate: 98% of the in-vitro explants transferred into SAH grew into plants***
      - ***75 initial in-vitro plants were transferred from test tubes to SAH***
      - ***Some adjustment in relation to the number of plants per container needs to be studied***

- SAH multiplication and protocol
  - In-vitro: plants can be cut every 30 days
  - SAH: plants can be cut every 13-15 days
    - In-vitro produces very variable plants, some test tubes show very good growth, other plants are weak. SAH produces vigorous plants in all cases.
    - Cassava multiplies in SAH: from **100 SAH plants = 500 plants were obtained in one month.**
    - Note: there were a few issues with growth room temperature that might have slowed growth because the conditions were adjusted to potato



# SAH Protocols

- A protocol for Cassava SAH multiplication has been developed
  - Optimal environmental factors are being determined (light intensity, temperature)
  - Two different nutrient solutions have being tested
- ***Propagation success:*** 93 % of 500 SAH cuttings developed into plants.



# SAH Protocols and workshop

- *Plants growing in SAH produced many roots and they performed very well after transplant. SAH plants transplanted into pots grew to 22 cm in 20 days.*



- *SAH Workshop scheduled for 25-28 April 2016 in Mar del Plata, Argentina*

# 2016 IITA Seed Multiplication Farms



- **Managed by Dr. Richardson Okechukwu**
- **Utilizes current best practices for basic seed production**
- **Oyo state Cassava farms are located in 3 contiguous locations around Iddo local government area near Ibadan.**
  - *Akuffo Farm Settlement – 5 ha (multiplication and research)*
  - *Akinsola Farm – 10 ha (multiplication and demonstration)*
  - *Oyenuga Farm- 25 ha (multiplication farm)*
- **Available varieties --**
  - *Primarily TME419 in abundant supply*
  - *Smaller quantities of IBA980581, IBA961632 and IBA980505*

# 2016 IITA Seed Multiplication Farms



- **Establish at least 2 isolated and irrigated seed multiplication farms for first generation pre-basic production of products of SAH**
- **Utilize current best practices for prebasic and basic seed production**
- **Coordinate prebasic production with certification process**
- **Production of prebasic stems for sale to commercial basic seed producers – NRCRI, IITA and other prebasic stem producers receive income from all stem transactions**

# Key Results: Lead Indicators

**Indicators for breeders seed include:**

- **Variety specific multiplication rates for all stages of stem production**
- **Quality management records**
- **Seed flows tracked**
- **Cost tracking**
- **Revenue generated**
- **Details will be developed in M&E planning**



# 2016 Work Plan: Milestones



- SAH technology introduced to three labs in Africa
  - SAH workshop held in Argentina
  - SAH installations developed in Africa
  - Pilot testing of SAH in Africa using backstopping support from SAHtechno.
- First year demand creation trials established
  - Initial varieties selected for the processor group and for village seed entrepreneur group
  - Protocols developed
  - First year trials established in 4 locations on station and 4 locations on-farm by NRCRI and IITA
- First year delivery of 100K QPM to Context Network

# 2016 Milestone- Interdependencies



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- **Stability of markets**
- **Seasonal weather variability**
- **Demand for planting materials**
- **Cost and price stability for stems**
- **Prebasic supply chain functioning**
  - **Tissue culture –**
    - **identify confirmed,**
    - **virus indexing,**
    - **Multiplication goals achieved**
  - **SAH and rapid multiplication**
  - **Pre-basic seed nurseries established**
  - **Delivery/sale of stems to basic seed producers**
- **Certification of prebasic seed initiated and feasible**
- **Coordination with other projects and stem suppliers**