Phase 1 Achievements at the Sweetpotato Support Platform–West Africa

5th Annual Meeting SPHI
Nairobi, Kenya

Sweetpotato Support Platform
West Africa – Breeding, Seed, CoP

Breeding Objectives:
• Population improvement program at a sub-regional level
• Link with participatory varietal selection at the national level

SPHI Target Countries in W. Africa:
Ghana, Nigeria, Burkina Faso, Benin

Important Partners Include(d):
AGRA, WAAPP, MoFA, FMARD, INERA, universities, NGOs, RAC, CGIAR - Dryland Systems
Target areas where sweetpotato is currently important, or benchmark sites of the CGIAR Research Program on Dryland Systems

- Primary breeding site
- Secondary breeding site
- Phenotyping site
- Consortium Research Program (CRP) benchmark sites

CSIR - Savanna Agricultural Research Inst.

CSIR – Crops Research Inst.
<table>
<thead>
<tr>
<th>Region</th>
<th>AEZ</th>
<th>Important constraint</th>
<th>Preferred type of SP (vars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashanti</td>
<td>Forest</td>
<td>SPVD</td>
<td>Not preferred</td>
</tr>
<tr>
<td>Central</td>
<td>Coastal Savanna</td>
<td>SPVD, Drought</td>
<td>Yellow skin, yellow flesh (Blue Blue), OFSP</td>
</tr>
<tr>
<td>Volta</td>
<td>Coastal Savanna</td>
<td>Drought</td>
<td>Red skin, white flesh (CRI-Ogyefo)</td>
</tr>
<tr>
<td>Upper East</td>
<td>Guinea/Sudan Savanna</td>
<td>Drought</td>
<td>Skin color less important, OFSP exist</td>
</tr>
</tbody>
</table>

Low Soil fertility and Weevils are significant constraints
Rapid proximate analysis of minerals, sugars and β-carotene done using NIRS

>15,000 samples since 2012

<table>
<thead>
<tr>
<th>Cleaning</th>
<th>Processing</th>
<th>Drying</th>
<th>NIRS Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washing</td>
<td>Samples ready to be processed</td>
<td>Frozen sample</td>
<td>Filling the cuvet</td>
</tr>
<tr>
<td>Packing</td>
<td>Peeling</td>
<td>Freeze-drying (72h)</td>
<td>Samples ready for scanning</td>
</tr>
<tr>
<td>Storing of samples</td>
<td>Quartening</td>
<td>Milling</td>
<td>NIRS scanning</td>
</tr>
<tr>
<td></td>
<td>Slicing</td>
<td>Milled samples</td>
<td>NIRS spectra</td>
</tr>
<tr>
<td></td>
<td>Weighing the fresh samples</td>
<td></td>
<td>NIRS results</td>
</tr>
</tbody>
</table>

Workflow for sample preparation and NIRS analysis of sweetpotato samples at Quality and Nutrition Laboratory
Cooking effects on sugars vary by method and genotype

Total sugar (% - dwb)

- Apomuden
- Bohye
- Dadanyuie
- Faara
- Hi-starch
- Ligri
- Ogyefo
- Okumkom
- Otoo
- Patron
- Patron
- Sauti

Methods: Raw, Bake, Steam, Microwave
# Accelerated Breeding Scheme Ghana

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crossing block (50 parents)</td>
</tr>
<tr>
<td>Year 2</td>
<td>Seedling nursery (~240 families, 5000 genotypes)</td>
</tr>
<tr>
<td></td>
<td>OT - Kumasi (virus + proximity) OT - Tono (key production area)</td>
</tr>
<tr>
<td></td>
<td>~250 clones selected with top selections going for recombination</td>
</tr>
<tr>
<td>Year 3</td>
<td>PT - UE PT - CR PT - VR PT - AR</td>
</tr>
<tr>
<td></td>
<td>~25 clones selected</td>
</tr>
<tr>
<td>Year 4</td>
<td>AT + OFT AT + OFT AT + OFT AT + OFT AT + OFT AT + OFT</td>
</tr>
<tr>
<td></td>
<td>Decentralized testing and multiplication</td>
</tr>
<tr>
<td>Year 5</td>
<td>Official release</td>
</tr>
</tbody>
</table>

OT – Observational Trial (3-plant plots, no reps)  
PT – Preliminary Trial (>14-plant plots, 2 reps)  
AT – Advanced Trial (75 plants, 2 reps); OFT – On-farm Trial  
UE – Upper East, CR – Central Region, VR – Volta Region, AR – Asante Region

---SASHA  
National Program (WAAPP)
## Swetpotato Breeding Trials

**Ghana, 2014**

<table>
<thead>
<tr>
<th>Region</th>
<th>Location</th>
<th>Hybrid</th>
<th>Seed Nurs</th>
<th>OT</th>
<th>PT</th>
<th>AT</th>
<th>OFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asanti</td>
<td>Fumesua</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Brong Ahafo</td>
<td>Ejura</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>G. Accra</td>
<td>Pokuase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Volta</td>
<td>Ohawu+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Kpeve</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>Komenda</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Upper East</td>
<td>Nav+Bawk</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
<td>5 (119)</td>
</tr>
<tr>
<td>Northern</td>
<td>Nyankpala</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2 (120)</td>
</tr>
<tr>
<td>Upper West</td>
<td>Wa</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td>2 (137)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>3</strong></td>
<td><strong>1</strong></td>
<td><strong>3</strong></td>
<td><strong>4</strong></td>
<td><strong>25</strong></td>
<td><strong>9 (376)</strong></td>
</tr>
</tbody>
</table>

**Principal Support:** SASHA, WAAPP, Other
Moving toward:

- More than one trial cycle per year (dry season seedling nursery; possibly trials)
- Two populations, A and B, in order to exploit heterosis in coming years
- Separation of early and later-maturing material at PT in order to ensure advance of OFSP
- Reducing postharvest perishability
- Strengthening breeding capacity in northern Ghana through expansion of ATs and OFTs linked to seed program
- Phenotyping under the new Genomic Tools for Sweetpotato Improvement at 2 sites in Ghana
Capacity Building – Students

Ernest Baafi, WACCI

Vivian Oduro, WACCI

Not shown:
- SOME Koussao, WACCI; Solomon Afruape, WACCI
- Eric Owusu-Mensah evaluating amylase activity in relation processing potential, Ph.D, Food Sci + Technol KNUST
- Jebeh Samba, Hybridization efficiency. MS-AGRA, KNUST
- John Saaka, net tunnels, Undergrad thesis, UDS
- Yussif Alhassan, MS – Root system architecture
- Daniel Akansake MS – Evaluation for dual purpose management

Victor Amankwaah, AGRA
Objective under Seed Systems Research Program

- Establish a regional platform for safe and efficient exchange and maintenance of germplasm
  - Improved indexing, virus cleaning, in vitro maintenance and genetic fingerprinting in each sub-region
  - ISO 17025-compliant germplasm indexing and distribution capacity
  - Upgrade in vitro facilities and tissue culture staff to ensure safe receipt and shipment of germplasm
Regional germplasm distribution – SSP-WA by October June 2014

In vitro maintenance and multiplication routine, and 3 PT clones available. Ongoing cleanup of remainder of Ghana, BF and Nigeria released and advanced materials.
Clean foundation seed is Integral to success of the breeding effort.
Jumpstarting OFSP in West Africa through Diversified Markets

3 year pilot project targeting selected areas of Ghana, Nigeria and Burkina Faso

**Key Concept:** It is possible to simultaneously develop value chains for OFSP and maximize nutritional benefits to vulnerable populations.

Two new IRS:
Erna Abidin, Seed Specialist to Ghana and
Justus Lotade-Manje, M+E Specialist to Nigeria.
Commercial seed systems capable of in responding to increased demand
Regional stakeholder platform served a function under SASHA 1
Thank you

Our vision is roots and tubers improving the lives of the poor