THE VITAA PARTNERSHIP
VITAMIN A FOR AFRICA

CENTRO INTERNACIONAL DE LA PAPA
CIP

Evaluation and large-scale dissemination of orange-fleshed sweetpotato in sub Saharan Africa

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Implementors

National Agric. Research Institutes

East and Central Africa:
- Uganda
- Kenya
- Tanzania
- Rwanda
- Ethiopia
- DR. Congo

Southern Africa:
- Mozambique
- Zambia
- Madagascar
- South Africa

West Africa:
- Nigeria
- Ghana
- Burkina Faso

IARC: International Potato Center –SSA and Lima, Peru (W. Gruneberg)

Linkages with other Institutions:
Louisiana State University (D. La Bonte)
Tanzania Food and Nutrition Center , Tanzania (G. Mulokozi) and
Medical Research Council, South Africa (P. van Jaarsveld)

Sweetpotato breeding approach-SSA

- Collection, characterization, screening and improvement of farmers' local landraces
- Breeding with global (CIP-Lima) and the national crossing programs
- Introduction and exchange of popular cultivars from other parts of the world and within the region
- Systematic variety screening with partners using participatory methods, based on multi-locational and genotype by environment studies.
- Farmer variety selection and participatory plant breeding
- Multiplication and dissemination of basic planting materials (breeder's seed)

Progress in OFSP variety development, selection and dissemination SSA

Germplasm collection and maintenance (ex-situ) by selected NARIS

Country	Total no. of germplasm	No. of local landraces	No. of OFSP cultivars	
			Local	Improv / intro
Zambia	258	86	28	65
Madag.	95	3	2	41
Uganda	1370	1300	26	30
Rwanda	159	23	5	33
Tanzania	455	259	25	104
Mozambi.	67	48	4	20
S.Africa	444	21	34	158
Nigeria	90	5	0	31
Ethiopia	319	31	1	68
Ghana	167	120	11	33
DR. Congo	120	95	1	24
CIP-SSA	141	34	26	41

Population Development: Polycrosses / Crossing blocks by NARIs

Country	Station	Total no. of entries	Proportion of local landraces
Uganda	Namulonge	24	6
S. Africa	Roodeplat	38	0
Ghana	CRI-Kumasi	15	6
Zambia	Mansa	12	2
Tanzania	Maruku	22	7
Mozambique	IIMA-Maputo	24	11
Kenya	Kabete	34	8

Major traits bred for:

Stress factors: SPVD, Drought, Frost, Fusarium wilt, Alternaria

Root qualities: High Dry matter (≥27 %) , high root yield (≥ 20 tonnes/ha)

Nutrition qualities: High beta-carotene content (≥ 100 µg/ 100 g) Zinc, and Fe

Adaptability & acceptability of OFSP varieties through variety testing and farmer participatory selection

Activity	Country	Sites
Multi-location trials	Tanzania	Zanzibar, Eastern Zone, Central zone, Lake zone
	Uganda	Namulonge, Ngeta, Serere, Kachwekano, Kasese
	Kenya	Western Kenya, Costal low lands, Eastern dryland
	Zambia	Mutanda, Mansa
	Madagascar	Soanindrariny, Andoharanomaitso, Fianarantsoa, Miandrivazo
	Ghana	Forest, transition, coastal savannah zones
GXE regional trials	Uganda	NAARI, SAARI, Ngeta, & Kachwekano
	Kenya	Western Kenya, Costal low lands, Eastern dryland
	Rwanda	Rubona, Kibuye, Bugesera, Gitarama
	Madagascar	Fianarantsoa, Antsirabe
	Tanzania	Zanzibar, Eastern Zone, Central zone, Lake zone

Continued…...

Activity	Country	Sites
On-farm variety verification trials	Uganda	Southern, Central, Eastern & North Eastern
	Kenya	Western Kenya, Costal low lands, Eastern dryland
	Tanzania	Zanzibar, Eastern Zone, Central zone, Lake zone
	Rwanda	Butare, Kibungo, Kigali-rural
	S.Africa	Badplaas, Jagersfontein, Polokwane, Nongoma and Lusikisiki.

Multiplication & dissemination of basic planting material of OFSP popular varieties

Activity	Country	Sites
Primary multiplication of basic planting materials	Tanzania	Zanzibar, Ukiriguru, Maruku, Kibaha
	Uganda	NAARI and SAARI
	Rwanda	Rubona, Karama, Gitarama
	Zambia	Mansa, Mutanda
	Madagascar	Manandona, Betafo, Ampitatafika, Antsoantany
	Kenya	Kakamega, Alupe, Kisii, Embu, Mtwapa, Katumani, Kabete
	Ghana	Komenda Edina Eguafo Abrem, Twifo Hemang Lower Denkyira, Nkoranza
TOTs on multiplication of basic planting materials	Uganda	NAARI
	Tanzania	Ukiruguru, Maruku, Kibaha & Kizimbani
	Zambia	Mansa

ASSESSMENT OF ATTRIBUTES AT FARM LEVEL

FPR- Field Evaluations

Partners

NGOs, Farmers
Agricultural Researchers
NGO's, CBOs,
Farmers groups (more especially women)
Farmer Field Schools
Schools
Consumers (all community more especially children)

Score sheet for field assessment of SP varieties tested on-farm

Name of evaluator: … … … … … … … Sex: … … … … … … …
Date: … … … … … … … … . Village: … … … … … … … … … … … …

Give your rank on … … .	Variety				
	A	B	C	D	E
Foliage coverage					
Resistance to diseases					
Resistance to pests					
Drought tolerance					
Maturity/ earliness					
Yield of roots					
Shape of roots					
Size of roots					
Colour of the skin					
Colour of the root flesh					
Overall assessment					

Subjective score: 1 = very bad; 2 = bad; 3 =moderate; 4= good; 5= very good

Consumer acceptance

Sample score sheet for consumer assessment of sweetpotato cooked roots

Name of evaluator: … … … … … … … Sex: … … … … … … …
Date: … … … … … … … … . Village: … … … … … … … … … … … …

Give your rank on the:	Variety				
	A	B	C	D	E
Colour of the roots					
Smell					
Sugariness					
Chewiness					
Starchiness					
Fibrounessness					
Overall assessment					

Subjective score: 1 = very bad; 2 = bad; 3 =moderate; 4= good; 5= very good

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Yields and dry Matter contents of popular OFSP varieties in SSA

Vitamin A for Africa

Country	Popular varieties	Yield ranges (t/ha)	Average yield(t/ha)	Dry matter (%)
Uganda	SPK 004*****	5.0 – 47.0	26.4	32.6*****
	Ejumula*****	4.0 – 45.7	30.4	34.9****
	Kala******	3.5 – 47.0	31.5	31.2****
Mozambique	Resisto	3.3 – 21.0	14.7	26.4
	Lo 323	3.0 – 18.9	14.4	21.6
	Japon	5.0 – 25.0	15.1	23.4
	Kandee	2.8 – 23.5	14.6	25.0
	Jonathan	5.0 – 26.8	15.6	21.0
	Caromex	5.0 – 31.6	17.4	23.2
	Tainung 64	4.4 – 21.4	15.3	22.2
	NC 1448-49	3.2 – 20.6	14.8	25.8
Ethiopia	Zapallo	13.3 – 49.3	28.4	27.6
	Lo-323	10.1 – 45.5	27.0	29.8
	Tis-8250	7.0 – 49.0	35.4	21.2
	Japon Tres	9.0 – 40.3	23.0	22.5
	Kaka 12******	8.8 – 39.8	21.8	23.1
	Gunttute (AJAC-I)*****	7.0 – 39.0	24.1	24.7

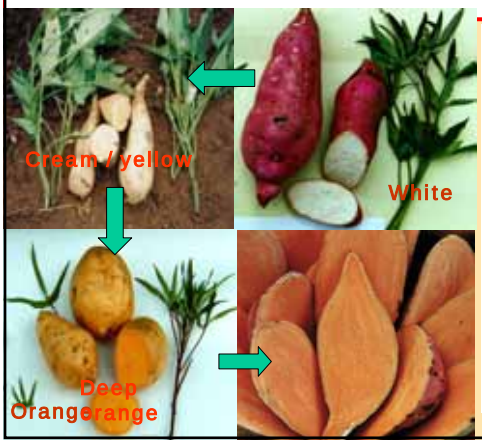
***** Local checks

Popular varieties with ≥100 µg/g

Cultivar	β-carotene content (µg/g)	Country
Karoti Dar	102.8	Tanzania
Tainung 65	105.7	Tanzania
Jewel	145.3	Tanzania
Resistor	175.3	Tanzania
MGCLD1	131.3	Mozambique
Tainung	117.6-173.3	Mozambique
SPK 004/6	133.4	Uganda
Ejumula	133.4 – 152.9	Uganda

Source: Mulokozi et al 2005

Lessons from the fields: Gradual switch to orange-coloured varieties



Postive aspects

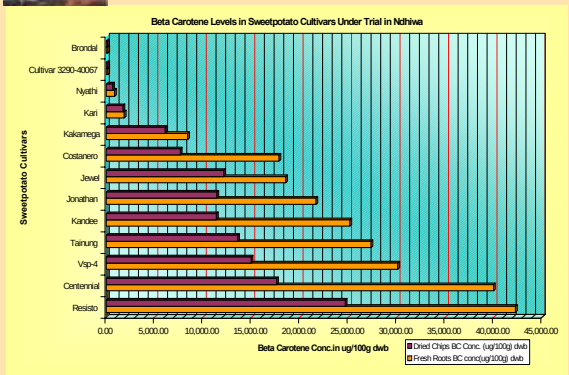
- root texture and not colour
- short cooking time
- early maturing
- high yields
- Attractive products for high marketability
- children like the attractive colour and the sweetness

Feedback from the fields continued—

Negative aspects:

- Low dry matter of varieties
- High susceptibility to viruses and weevils
- Low ability to produce enough planting materials (drought prone areas-ECA and SADC regions)
- Early maturity
- Lack of flexibility for piece-meal harvesting
- Rotting of roots in the soil
- Very deep colour associated with an aroma/ flavour disliked by adults

Processing and beta-carotene contents of different OFSP varieties



Major varieties released/near release in selected countries

Country	Released or near release OFSP varieties
Kenya	SPK004, 566682/03, Salyboro, 566632, Ejumula
Uganda	SPK 004, Ejumula, SPK004/1/1, SPK004/6
Mozambique	Japon Tres., Zapallo, Tainung 64, Mafuta, Zondeni, Resisto, Jonathan, Kandee, L0323, Caromex, Cordinar, CN-1448-49
Tanzania	Zapallo, Japon Tres., VSP 4, Resisto, Jewel (440031), Tainung 65, Salyboro, SPK 004, Ejumula, Carot-C, TIB 4, NC1560
South Africa	Resisto, Japon Tres., Excel, Jewel, W-119
Ghana	Kamala Sundari, AOA 98066, CRI-Apomuden' and 'CRI-Otoo, Jukwa
Zambia	Tainung 64, NC 1560, Zapallo, SPK004, L2-30/2/2, W-119
Ethiopia	Guntute, Koka, Zapallo
Rwanda	SPK 004, Cacerpado, 97-062, Ejumula

Clean Source of Planting Materials

SP Planting material production NARO (Uganda)

SP planting material at Mulungu INERA (DR Congo)

SP Planting material Production at EARO (Ethiopia)

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Other Modes: Farmers groups, School gardens etc.

- Farmers themselves multiply & distribute acceptable varieties
- Rapid dissemination through parents and guardians
- Farmers and schools earn incomes through sales of vines
- It is less costly and farmers can generate incomes through sale of planting materials

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CIP/ PRAPACE/ SARRNET COORDINATED VINE DISTRIBUTION (2002-DEC, 2005)

Country	No. of cuttings distributed	Estimated coverage (ha)	Collaborating partners
Tanzania	9,259,950	309	TAHEA, CARE, World Vision, CCT, AIC, Prisons, ARD – Maruku & Ukiruguru, Plan International.
Uganda	18,896,374	630	BUCADEF, Africare, SOCADIDO, JAF, World Vision, VEDCO, NARO, MPs, NAADS, FFS, MUK.
Kenya	12,093,920	403	KARI, REFSO, Africa Now, CRS, UCRC, Agric. Environmental Prog. Homabay, Akukuranut Development Trust (ADT).
Ethiopia	2,691,920	75	CARE, EARO, Alemaya University of Agriculture, CRS
Mozambique	10,621,185	345	CARE, Action Aid, SARRNET, World Vision, INIA, World Relief, Save Children

Issue: Underestimation due to lack of records from recipients and vine multipliers

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COMMUNITY AWARENESS AND MOBILIZATION :

Total number organized by partners= 12

Messages:

1. Grow OFSP
2. Use clean seed
3. Feed it to your family and keep healthy
4. Give it to children they like it
5. Sell it and become rich

Lessons learnt:

1. Rapid scale-up
2. More demand created
3. Big coverage
4. More partners on-board
5. Expensive
6. Lack of enough dissemination materials

Current / Future research opportunities

- Breeding for sweetpotato weevil resistance requires another dimension (biotech….)
- Breeding and screening varieties for drought resistance- ECA and SADC regions (biotech means may be required--)
- Screening varieties for different maturity periods
- Link with the nutrition group to address the nutrient retention abilities of varieties
- Rigorous development and evaluation of more varieties of OFSP for wider adaptability and acceptance
- Emphasis on the utilization of superior parents from the local germplasm
- Screening for Zn and Fe in addition to beta-carotenes

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Acknowledgements

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- **Mc Knight Foundation**

The SSA OFSP Research Team- 2005

OUR STRENGTH

T-ogether
E-veryone
A-chieves
M-ore