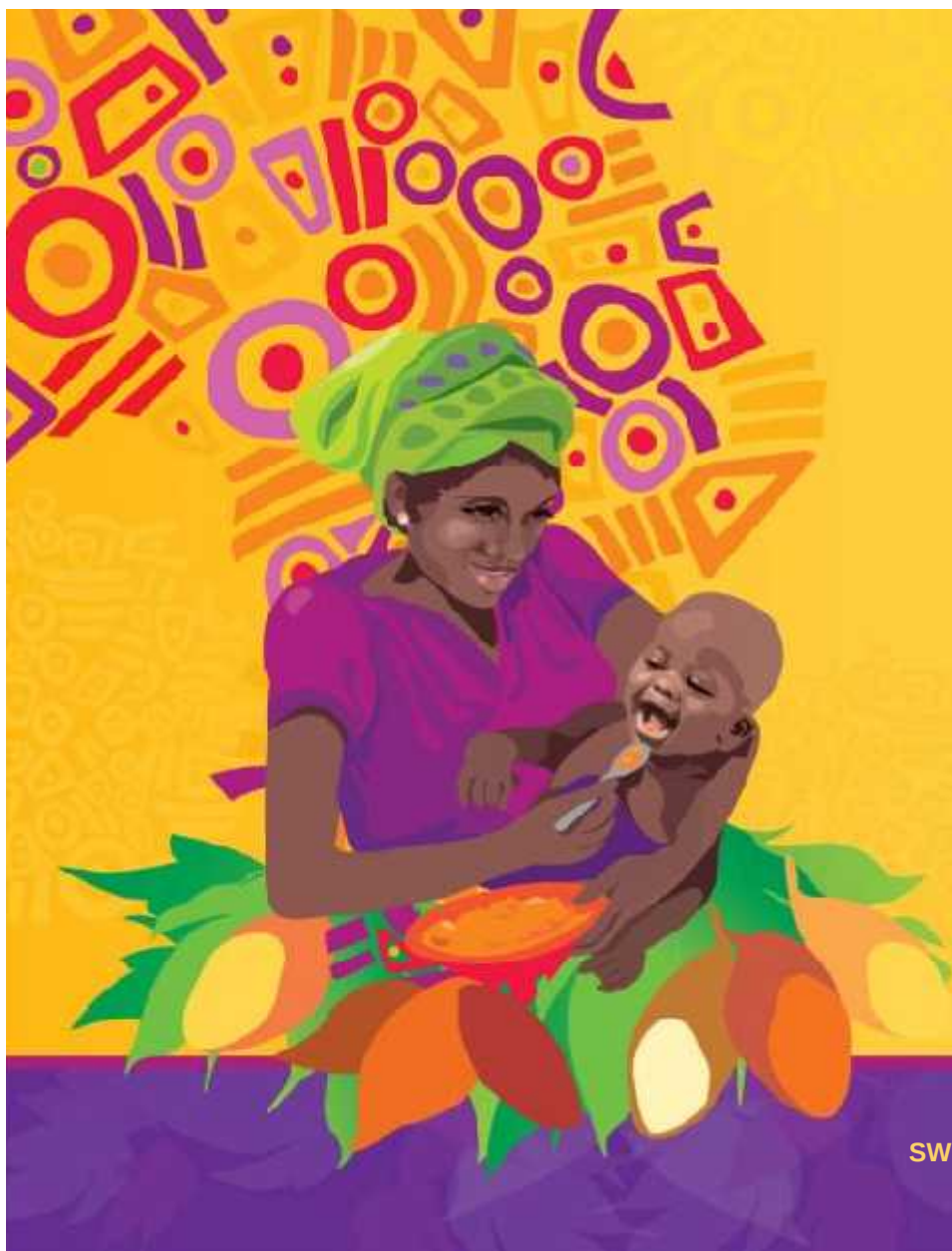




Sweetpotato report for Southern Africa 2014/2015

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SWEETPOTATO ACTION FOR SECURITY AND HEALTH IN AFRICA

Introduction



- Sub-region covered: Southern Africa
- Countries covered: Madagascar, Mozambique, Malawi, Zambia, South Africa
- Important constraints
 - Variable climate patterns: Irregular rainfall, drought, floods
Drought stress= up to 25% crop loss & flood
 - Susceptibility to diseases and pests
Sweetpotato weevil damage=up to 73% crop loss & SPVD
 - Cold (frost) and dry; conservation of vines (SA, MAD)
 - High post-harvest losses and limited value addition (MAL)
 - Declining soil fertility (MAL)



Objectives



Madagascar	Mozambique	Malawi	South Africa	Zambia
• Food and nutrition securities	• Drought tolerant (CFSP) with high yield, high dry matter & tolerant to pests & diseases	• High and stable yields ($\geq 20\text{t/ha}$) • Resistant/ tolerant to major and prevalent diseases (SPVD and Alternaria) and sweetpotato weevil	• Sweet taste & med high dry matter • High β-carotene content • High yield, good storage root quality and storability	• Tolerant to major pests and diseases with high yield and adaptable to various ecological conditions • Develop processing technologies
• To improve the livelihood of poor and especially vulnerable populations	• Increase availability of OFSP vines for farmers to mitigate the effects of droughts, floods and minimize the effects of VAD	• Desired root quality/colour to meet local cooking and consumption requirements (high dry matter content, sweetness)	• Tolerance to Alternaria blight (OFSP); • Tolerance to Fusarium wilt (CFSP) • Drought tolerant	• Production packages for subsistence farmers • Identify post harvest problems;

Most important landraces in Madagascar



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPVD	Alt	Wee vil	Remarks (E.g. Yr/released)
Galona / Sihanaka	L	12.5	W (light purple)	0.03	36	L	-	-	S	High dry matter content
Rakotozafy mijoro	L	9	W	0.03	25	L			S	
Vony	L	9	Y	0.02	27	L			S	
Votavo	L	7	Y	0.12	35.6	L			S	High dry matter content

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important landraces in Mozambique



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Xipone	L	5.42	W	0	31.25	L	R	NA	R	Parent
Xitsekele	L	6.85	W	0	33.25	L	R	NA	MR	Parent
Cinco Minutos	L	6.65	Y	0	33.12	E	R	NA	MR	
Mwamazambane	L	7.71	W	0	31.71	L	R	NA	MR	Parent
Manhissane	L	5.59	W	0	32.34	L	MR	NA	MR	
Chulamete	L	7.04	W	0	32.69	L	MR	NA	MR	
Canassumana	L	6.67	Y	0	31.95	L	MR	NA	MR	

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important landraces in Malawi



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Zondeni	L	8-16	o	9.000	32	L		r	mr	β -carotene
Yoyera	L	3-7	w	-	36	L		r	mr	DM
Kamchiputu	L	3-7	lo	-	36	L		r	mr	DM
Babache	L	5-7	cr	-	34	L		r	mr	DM
Mfumu	L	7	cr	-	34	L		r	mr	DM

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important released varieties in Madagascar



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Bôra (199062.1)	B	25	O	4.61	28.2	E				2008
Mendrika (199004.2)	B	24	O	1.65	24.5	E				2007
Naveto (440131)	B	24	W	0.03	22	L				2001
Zambezi		24.5	do	7.76	36.6	E				2011
Ejumila		24.7	o	3.76	32.7	E				2011
Ukerewe		20	o	0.12	40.5	E				2011 / tasty

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important released varieties in Mozambique



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Irene	B	19.6	LO	8.3	28.8	E	R	NA	R	2011
Ininda	B	22.2	O	5.31	29.3	E	R	NA	R	2011,Parent
Sumaia	B	21.6	DO	7.70	25.2	E	MR	NA	MR	2011,Parent
Delvia	B	23.4	LO	5.54	32.8	E	R	NA	R	2011,Parent
Bela	B	25.9	DO	8.39	27.5	E	S	NA	MR	2011,Parent
Gloria	B	20.0	O	7.76	27.6	E	R	NA	E	2011
Cicilia	B	19.3	LO	6.01	26.7	E	MR	NA	MR	2011

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important released varieties in Malawi



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPVD	Alt	Wee vil	Remarks (E.g. Yr/released)
Sakananthaka	B	20	cr	-	31	L	r	r	mr	Adaptable/2008
Nyamoyo	B	35	cr	-	33	L	r	r	mr	High yield/2011
Sungani	B	35	cr	-	32	L	r	r	mr	High yield/2011
Chipika	B	35	lo	-	30	L	r	s	s	OFSP/Drought/2011
Kadyaubwerere	B	30	o	8.900	31	L	r	r	s	β -carotene/2011
Kaphulira	B	35	lo	3.200	30	E	r	r	s	High yield/OFSP/E
Mathuthu	B	25	o	2.900	29	L	r	r	s	OFSP/2011
Anaakwanire	B	25	o	5.500	30	L	r	r	s	β -carotene/2011

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important released varieties in South Africa



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPVD	Alt	Weevil	Remarks (E.g. Yr/released)
Blesbok	B	40.2	c	0	16.6	E	s	r	mr	1989
Ndou	B	35.0	c	0.2	26.6	E	s	r	s	2004
Monate	B	35.5	c	0.1	24.5	E	s	r	s	2004
199062.1	B	36.0	lo	2.9	22.4	E		r	r	Promoted since 2009
Impilo	B	30.0	o	5.1	22.5	M	s	mr	s	2007
Bophelo	B	31.0	do	6.7	22.5	M	s	mr	s	2011

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important released varieties in Zambia



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Lukulu	B	33.8	Cr		27.1	e	r	mr	t	2003
Lukusashi	B	37.1	lo		26.9	e	r	mr	t	2003
Lunga	B	29.5	w		29.3	e	r	mr	t	2003
Mulungushi	B	29.4	y		33.2	e	r	mr	t	2003
Kalungwishi	B	27.6	lo		32.8	e	r	mr	t	2003
Chingowwa	B	18	c		24.9	e	r	mr	t	1993
Luapula	B	17.4	w		25.7	e	r	mr	t	1993
Kanga	B	21.4	c	0.002	28.25	e	mr	mr	t	2014

Most widely grown variety in Madagascar



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Galona / Sihanaka	L	12.5	W (light purple)		36	L	-	-	S	High dry matter content
Rakotozafy mijoro	L	9	W		25	L			S	
Ebokely	L	6	W		20	E			S	

As Madagascar is a big country, each region has its variety.

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible. mr: moderately resistant). Alt (Altenaria blight resistance. r: resistant. s: susceptible. mr: moderately res.)

Most widely grown variety in Mozambique



Name variety	Status (L/ B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Xipone	L	5.42	W	0	31.25	L	R	NA	R	Parent
Cinco minutos	L	6.65	Y	0	33.12	E	R	NA	MR	
Mwamazambane	L	7.71	W	0	31.71	L	R	NA	MR	Parent
Irene	B	19.6	LO	8.30	28.8	E	R	NA	R	2011
Ininda	B	22.2	O	5.31	29.3	E	R	NA	R	2011,Parent
Sumaia	B	21.6	DO	7.70	25.2	E	MR	NA	MR	2011,Parent
Delvia	B	23.4	LO	5.54	32.8	E	R	NA	R	2011,Parent

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most widely grown variety in Malawi



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Kenya	B	30	y	-	38	L		r	mr	DM/1988
Mugamba	B	40	cr	-	35	L	mr	r	mr	High yield/1999
Yoyera	L	3-7	w	-	36	L		r	mr	DM
Babache	L	5-7	cr	-	34	L		r	mr	DM
Kadyaubwerere	B	30	o	3200	31	L	r	r	s	OFSP/2011
Chpika	B	35	lo	-	30	L	r	s	s	OFSP/Drought/2011

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most widely grown variety in South Africa



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPVD	Alt	Weevil	Remarks (E.g. Yr/released)
Blesbok	B	40.2	c	0	16.6	E	s	r	mr	1989, Commercial market, export, freezing
Bophelo	B	31.0	do	6.7	22.5	M	s	mr	s	2011, informal markets
Ndou	B	35.0	c	0.2	26.6	E				2004, informal markets

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most widely grown variety in Zambia



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Chingowwa	B	18	c		24.9	e	r	mr	t	1993

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important OFSP varieties in Madagascar



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Bele Karôty	L	n.a	n.a	n.a	n.a	n.a	n.a	n.a		In south of Madagascar
			n.a:	not available						

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important OFSP varieties in Mozambique



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fw)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Irene	B	19.6	LO	8.30	28.8	E	R	NA	R	2011
Ininda	B	22.2	O	5.31	29.3	E	R	NA	R	2011,Parent
Sumaia	B	21.6	DO	7.70	25.2	E	MR	NA	MR	2011,Parent
Delvia	B	23.4	LO	5.54	32.8	E	R	NA	R	2011,Parent

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important OFSP varieties in Malawi



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Chipika	B	35	lo	-	30	L	r	s	s	Yield/drought
Kadyaubwerere	B	30	o	8.900	31	L	r	r	s	sweet
Kaphulira	B	35	lo	3.200	30	E	r	r	s	Yield/Early
Mathuthu	B	25	o	2.900	29	L	r	r	s	softness
Anaakwanire	B	25	o	5.500	30	L	r	r	s	6-8 roots
Zondeni	L	8-16	o	9.000	32	L	r	r	mr	DM/ β -carotene

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.); DT=drought tolerant

Most important OFSP varieties in South Africa



Name variety	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPVD	Alt	Weevil	Remarks (E.g. Yr/released)
Bophelo	B	31	do	6.7	22.5	M	na	mr	s	~ 35 ha by small-holder farmers. 2011
Beauregard	USA	30.3	do	9.6	18.0	E	s	ms	ms	Commercial producers – export, freezing
Impilo	B		o	5.1	22.4	M	S	mr	s	2007
W-119	USA		do	10.5	27.5	E	s	s	ms	Dry areas

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s:susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Most important OFSP varieties in Zambia



Name variety	Country	Status (L/B)	Root yield (t/ha)	Flesh color	β -carotene (mg/100g fwb)	Dry matter (%)	Earl	SPV D	Alt	Wee vil	Remarks (E.g. Yr/released)
Olympia		B	25.5	o	4.9	31	e	mr	mr	t	2014
Chumfwa		B	20	o	3.7	31	e	mr	mr	t	2014
Chiwoko		B	20	do	11.0	34	e	mr	mr	t	2014
Kokota		B	19.5	o	4.9	29.4	e	mr	mr	t	2014
Zambezi		B	15.6	do	10.9	28.5	e	r	mr	t	2003

Status: Landrace (L), breeding line (B). Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Earl (Earliness: Early (E) (about 4 mo), late (L) about 5 mo or more. SPVD/Weevil resistance (r: resistant, s: susceptible, mr: moderately resistant). Alt (Altenaria blight resistance, r: resistant, s: susceptible, mr: moderately res.)

Sweetpotato trials/No. of clones planted last season 2014/2015



Trial	Country/No of clones				
	Madagascar	Mozambique	Malawi	South Africa	Zambia
Crossing block	0	1 trial (68 clones)	30	20	30
Observation (OT)	2	2 trials (3203 clones)	87	216 + 3912 seedlings	5679
No. of checks	2	3	4	8	
Preliminary yield (PT)		2 trials, (175 clones)	43	8	100
No of checks		3	4	4	4
No. of locations		2	2	3	1
Advanced yield (AT)	9	2 trials , (53 clones)	39	16	22
No. of checks	2	3	5	8	2
No. of locations	4	3	2	3	1
On-farm	7	24 farmers (9 clones)	15	5 (6 clones)	

Last season (2014) analysis done in CloneSelector (Yes/Y, No/N)



Trial	Country/Analysis					
	Madagascar	Mozambique	Malawi	South Africa	Zambia	
Observation (OT)	N	Y	369	N	N	
Preliminary yield (PT)	N	Y	43	N	y	
Advanced yield (AT)	N	Y	30	N	y	
On-farm	N	N	9	N	Y	
No. of varieties released 2014	2	0	0	0	5	
[No. of OFSP]	1	0	0	0	4	
No. of clones earmarked for release by 2015	4	5	3	1	0	
Foundation seed/ available	40	12.000 plants	Y	Y	5 ha	

Funding source for sweetpotato breeding/Foundation seed activities



Source of funding	Country/Amount					
	Madagascar	Mozambique	Malawi	South Africa	Zambia	
Donor (breeding)	Min. of Agriculture CIP: \$ 20000	AGRA, end June	AGRA * \$150000	Min. of Agriculture \$55460		
Donor (Foundation seed)	Min. of Agriculture CIP	SASHAI (\$90.000)	CIP \$57273 AGRA \$180000	Ministry of Rural Dev \$370000	\$60000	
available (No. varieties)	40	15 varieties	7	7	15	
Number of plants	456	125/variety	6702	5450	3000	
		* = pending				

List of papers published in 2014/2015



Journal papers (in process)

Chipungu F., Grúneberg, W. et al. Breeding of efficient varieties for the changing environments in Malawi- an analysis of variance to predict selection of stable genotypes for root yield.

Chipungu F., Grúneberg, W. et al. Breeding of efficient varieties for the changing environments in Malawi- an analysis of variance to predict selection of stable genotypes for root yield. Plant genetic resources.

List of papers published in 2014/2015

South Africa



- OMOTOBORA, B.O., ADEBOLA, P.O, MODISE, D.M., LAURIE, S.M., GERRANO, A.S., 2014. Greenhouse and field evaluation of selected sweetpotato (*Ipomoea batatas* (L.) LAM) accessions for drought tolerance in South Africa. *American Journal of Plant Sciences* 21(5):3328-3339. Doi:10.4236/ajps.2014.521347
- MBENGWA V.M., MABUSO JRM, DU PLOOY CP, LAURRIE S AND VAN SCHALKWYK HD, 2014. Exploration of Sweet Potato cultivar markets availability in North West Province, South Africa. *International Journal of Biological, Veterinary, Agricultural and Food Engineering* 8(8):886-891
- LAURIE, S.M., MAJA, M.N., NGOBENI, H.M., DU PLOOY, C.P. 2014. Effect of Different Types of Mulching and Plant Spacing on Weed Control, Canopy Cover and Yield of Sweet Potato (*Ipomoea batatas* (L.) Lam). *American Journal of Experimental Agriculture* 5(5): 450-458.
- HUNDAYEHU, M., DU TOIT, E., LAURIE, S., STEYN, M., GREYLING, R., MYEZA, N. 2014. Effect of long-term invitro sub-culturing on quality degeneration of sweet potato varieties: Morpho-anatomic assessment and simple sequence repeats (SSR) analysis. *Journal of Agricultural Science and Technology A&B* 4(10A):811-821.

List of papers published in 2014/2015



- LAURIE, R.N., LAURIE, S.M., DU PLOOY, C.P., FINNIE, J.F. & VAN STADEN, J., 2015. Yield of drought-stressed sweet potato in relation to canopy cover, stem length and stomatal conductance. *Journal of Agricultural Science* 7(1):201-215 <http://dx.doi.org/10.5539/jas.v7n1p201>.
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