

# Integrating orange in Zambia Project

First year experiences implementing  
the on-farm trial protocol

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# Activities

- Some activities undertaken were
  1. On-farm trials
  2. Seed multiplication
  3. Seed multiplication training

# **On - farm trials**

# Objectives

- To **introduce** the varieties to farmers
- To **test performance** of OFSP promising varieties under farmer growing conditions and researcher-farmer management
- To **test farmers' acceptance and ranked preference** of the varieties for yield and quality attributes (including taste tests)
- To obtain **feedback (in terms of what farmers like in a variety)** to breeders
- To **build farmers' capacity** on variety assessment



# STEPS

- **Step 1:** Identification of local partner(s) and areas for on-farm trials
  - Selection of areas for on-farm trials **prioritized capturing the range of different agro-ecological** (rain, soil, temperature) and socio-economic conditions
- **Step 2.** Identification of farmers or farmers' groups: This was done by the researcher and the local partner or the local partner alone depending on the level of collaboration and mutual trust.
  - Have **at least ½ of the on-farm** trials with women

# STEPS

- **Step 3.** Planning for the trials with farmers: This is an important step and a training was scheduled with the entire group of farmers or group leaders at Katopola Farm Institute in Chipata.
- **Step 4.** Planting the trial: The researchers again explained the trial objectives and design
- 1) Plot sizes of about **30 sq meters arranged in 5 rows 6 meters long were used per candidate variety**. Ridges were at least **40 cm high**. In each ridge, vines were planted at **30 cm apart**. Thus **100 cuttings were used per plot**.

# TRIAL LAYOUT

*Example of trial layout*



# Individual Plot

*Example of individual plot layout (5 rows, 6 m long and 1 m apart)*

X	X	X	X	X
X	X	X	X	X
X	X	X	X	X
X	X	X	X	X
X	X	X	X	X
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
X	X	X	X	X
X	X	X	X	X
X	X	X	X	X

*For  
piecemeal  
harvest  
by farmer*

*For yield assessment with  
researchers*

*For in-  
ground  
storage*

# Ground rules

- The middle 3 rows **could not be harvested** during the growing period
- The farmer would keep all of the roots **except a sample of roots**, that the researcher needed for **lab assessments** and **organoleptic assessment**
- The 1<sup>st</sup> row on the outside could be used by the farmer for **piecemeal harvesting**. Leaves for evaluating quality when cooked were harvested from the **1<sup>st</sup> row**
- The **last row was not piecemeal harvested**, because it was intended to be used to assess **in-ground storability 2 months after harvesting**.

# STEPS

- **Step 5. Monitoring the trial:**
  - a) checked on the establishment and ensured timely gap filling;
  - b) ensured timely weeding of the trials by the farmers and
  - c) ensured general good progress of the trials.
- **Step 6: Evaluation of the trials:**
  - **SPVD assessment and 1<sup>st</sup> Weeding:** The first weeding was done 3 weeks after planting and farmers were instructed to do so
  - Virus incidence at 6 weeks

- **Step 6: Evaluation of the trials:**
  - Harvested from the **border rows leaves and root**. Leaves were cooked in a **simple local fashion**. The prepared leaves were evaluated for 1) **taste** 2) **appearance** and 3) **texture** using color card system
  - **Leaf taste-test evaluation** --- **Three** months after planting, leaves or leaves and petioles (**depending on local practice**) were harvested from each candidate variety and **prepared for consumption using the local preparation method**.
  - While the leaves were still on the plant, farmers were asked to evaluate whether each variety was good for cooking and why

## **Consumer acceptability assessment:**

Roots from each variety were labeled; boiled and small pieces were then served on plates for 'blind' assessment using A, B, C etc or 1, 2, 3 etc to code each variety

- Care was taken not to overcook the roots, especially those with lower DM. The use of cards in the consumer acceptability exercise was done in a much similar way as for the field evaluation



# Summary of Results

# On-farm Trials

DISTRICT	CAMP	NUMBERS OF FARMERS	NUMBER OF FEMALES
Chipata	Chiwoko	6	4
Katete	Kamphambe	6	2
Petauke	Chimtanda	6	2
Lundazi	Kaithinde	6	2
<b>Total</b>		<b>24</b>	<b>10</b>

## Varieties Planted

1. Zambezi
2. 15/1
3. L4-140/4/4
4. L2-103/8/1
5. Orange Chingovwa
6. Farmer's preferred variety (control)

All trial sites were established in the target districts. Despite the relatively low precipitation. Replanting had to be done due to poor plant establishment

# Monitoring visit



Harry Ngoma from USAID in baseball cap





# Leaf tasting test for vegetables

District	Male	Female	Total
Chipata	5	13	18
Petauke	19	8	27
Lundazi	14	11	25
Katete	5	6	11
<b>Total</b>	<b>43</b>	<b>38</b>	<b>81</b>

# Leaf tasting test for vegetables

Clone	Methods of preparing the sweetpotato vegetable					
	Boiling with water					
	Chipata	Katete	Petauke	Lundazi	Overall	
Twatasha	5	1	1	4	2	
Orange Chingovwa	2	2	2	4	1	
Olympia	3	4	3	3	3	
Chingovwa	1	3	5	1	1	
Kokota	4	6	1	2	3	
Zambezi	6	5	4	5	4	

# Leaf tasting test for vegetables

Clone	Methods of preparing the sweetpotato vegetable					
	Frying in oil after washing the leaves					
	Chipata	Katete	Petauke	Overall		
Twatasha	2	3	3	2		
Orange Chingovwa	5	2	4	4		
Olympia	3	5	1	3		
Chingovwa	1	3	2	1		
Kokota	4	4	1	3		
Zambezi	6	1	1	2		

# Leaf tasting test for vegetables

Clone	Methods of preparing the sweetpotato vegetable					
	Frying in oil without washing the leaves					
	Petauke	Lundazi	Overall			
Twatasha	5	5	4			
Orange Chingovwa	3	6	3			
Olympia	2	1	1			
Chingovwa	6	3	3			
Kokota	1	2	1			
Zambezi	4	4	2			

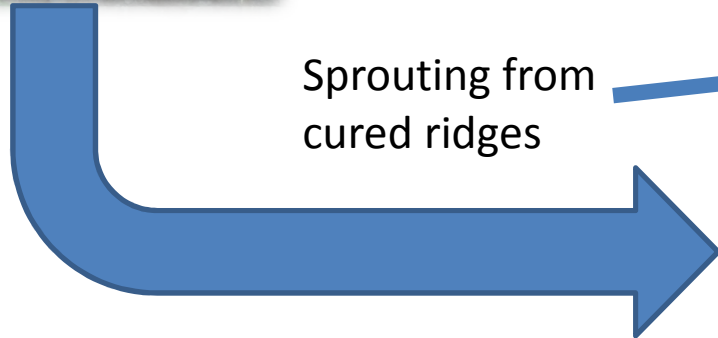


# Variety Field Evaluation by Farmers

Clone	Eastern Province Districts				Overall (Across districts)
	Chipata N=17	Katete N=7	Petauke N=24	Lundazi N=12	
Twatasha	4	4	4	4	4
Orange Chingovwa	5	5	6	2	5
Olympia	2	2	2	1	1
Chingovwa	1	1	1	5	2
Kokota	3	3	3	3	3
Zambezi	6	6	5	6	6



Sprouting from  
cured ridges









# Farmer participatory root taste test evaluation

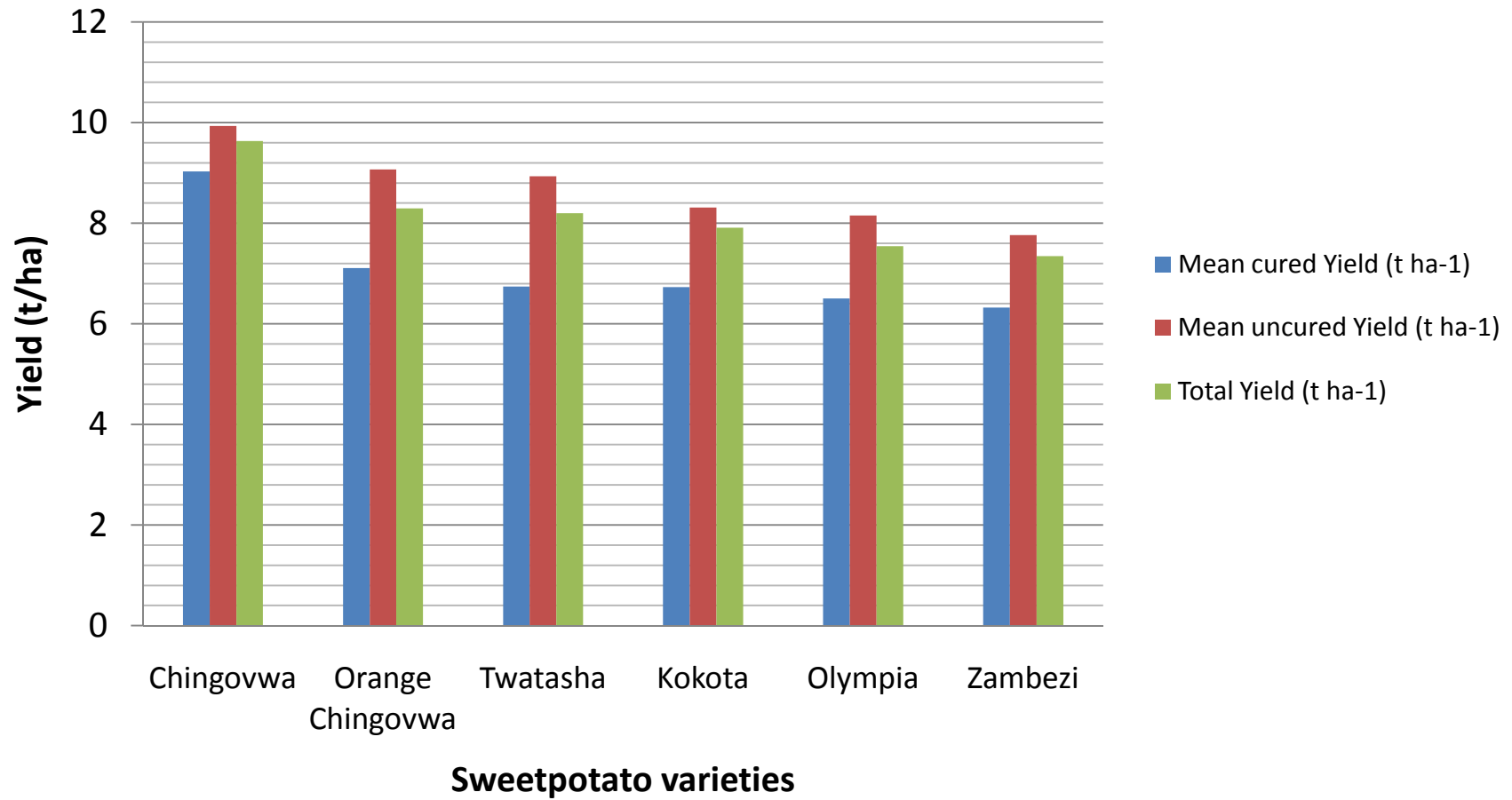
<b>District</b>	<b>Camp</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Chipata	Chiwoko	2	19	21
Katete	Kamphande	25	31	56
Petauke	Chimtanda	9	10	19
Lundazi	Kaithinde	9	9	18
<b>Total</b>		<b>45</b>	<b>69</b>	<b>114</b>

# Ranking of varieties after tasting cooked roots

Clone	Taste ranks for sweetpotato varieties for districts				Overall (Across districts)
	Chipata	Katete	Petauke	Lundazi	
Twatasha	5	3	2	5	4
Orange Chingovwa	3	2	3	2	2
Olympia	1	5	4	4	3
Chingovwa	2	1	1	1	1
Kokota	4	4	5	3	5
Zambezi	6	6	6	6	6

Clone	Total Yield (Cured plants) (t ha <sup>-1</sup> )	Total yield (Uncured plants) (t ha <sup>-1</sup> )	Total Yield (t ha <sup>-1</sup> )
Chingovwa	9.031	9.934	9.633
Orange Chingovwa	7.108	9.069	8.293
Twatasha	6.739	8.931	8.197
Kokota	6.728	8.313	7.911
Olympia	6.501	8.154	7.544
Zambezi	6.323	7.765	7.344
Grand Mean	7.07	8.69	8.15

During harvest, it was observed that most of the cured plants had sprouted. The sprouting process used part of the food in the roots hence the slight decrease in yield for cured roots



# District Combined Yields

District	Total Cured Yield (t/ha)	Total Uncured Yield (t/ha)	Mean Farm Yield (t/ha)	Farmer/district
Chipata	7.466	8.184	7.945	-
Katete	8.970	11.71	10.80	-
Lundazi	7.203	9.129	8.487	-
Petauke	4.647	5.752	5.383	-
Best yielding farm	14.24	19.52	17.76	Khonze Phiri/Katete
Least yielding farm	1.895	2.898	2.564	Sofia Daka/Petauke



# Some comments

- The yield data presented here may not show the actual performance of the varieties in the districts, however, they are indicative of the potential.
  - Plants that were planted were not uniform (tips versus the rest)
  - Two varieties were mixed
  - Replanting meant plants being at different growth stages
  - Sources of planting material were different in some cases hence different ages of the vines planted

# Some comments

- Management of the fields was poor in some cases
- Some farmers did gap on their own
- Non participating farmers harvesting vines before time
- Goats ate some vines
- In ground storage was a failure due to failure to control animals and people
- Frequency of measuring stored roots reduced to two weeks from every one week
- Roots required for measurements by researchers were underestimated

# Some comments

- Farmers in Kapiri wanted to fertilize their crop
- Scores of 1–5 were easier to manage than 1–9
- Standardizing the cooking of leaves and roots will be a challenge
- Avoiding use of names during the tests was a challenge by the interpreters
- Cards (red, yellow, green) are not accommodated in clone selector
  - Modified the system when cards ran out
- Used clone selector to create field books

# Farmer/Partner Training

The farmers/partners training was conducted from 13-14 December 2011 at the Katopola Farmers' Training Institute in Chipata, Zambia to train them and plan with them

Some details covered in the training were

- Production Constrains for sweetpotato
- Production of quality planting materials
- Source of quality planting materials
- Multiplication practices
- Conventional multiplication
- Rapid multiplication

# Farmer/Partner Training

Some details covered in the training were

- Modified rapid multiplication
- Sprouts from bedded roots
- Sweetpotato nursery in the net structure
- Challenges of multiplication in drought prone areas
- Factors considering when planning and planting multiplication plots
- Vine conservation
- Multiplication using roots
- Pest and diseases of sweetpotato

An action plan was made that farmers were expected to follow

# Farmer/Partner Training

- Additional trainings were conducted during harvest to show farmers how to store small roots in containers with sand as a medium (Triple “S” system)
- Further seed multiplication for farmers were conducted in Chipata, Katete and Kapiri Mposhi

# Triple “S” training





# Excitement after training





# Challenges

- Unwillingness of partners to participate when an allowance is not provided.
- Eliciting the help of partners to help at their cost
  - Asking Camp Officer to visit farmers when logistics are not provided
- Limited commitment by some farmers
- Accessibility to some farms was not very easy in the rainy season
- Accommodating adhoc important activities that are within and outside the project

Thank you

