

# Rwanda Super Foods Project: Key Findings from the Endline Survey



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SWEETPOTATO ACTION FOR SECURITY AND HEALTH IN AFRICA

# Objectives of 4 Year Proof-of-Concept Project



## Northern Districts

- Gakenke
- Rulindo
  - Better Production Conditions
  - Private sector partner *Urwibutso Enterprises* located in Rulindo
    - 11 stores – 8 districts
    - 4 stores- Kigali

## Southern Districts

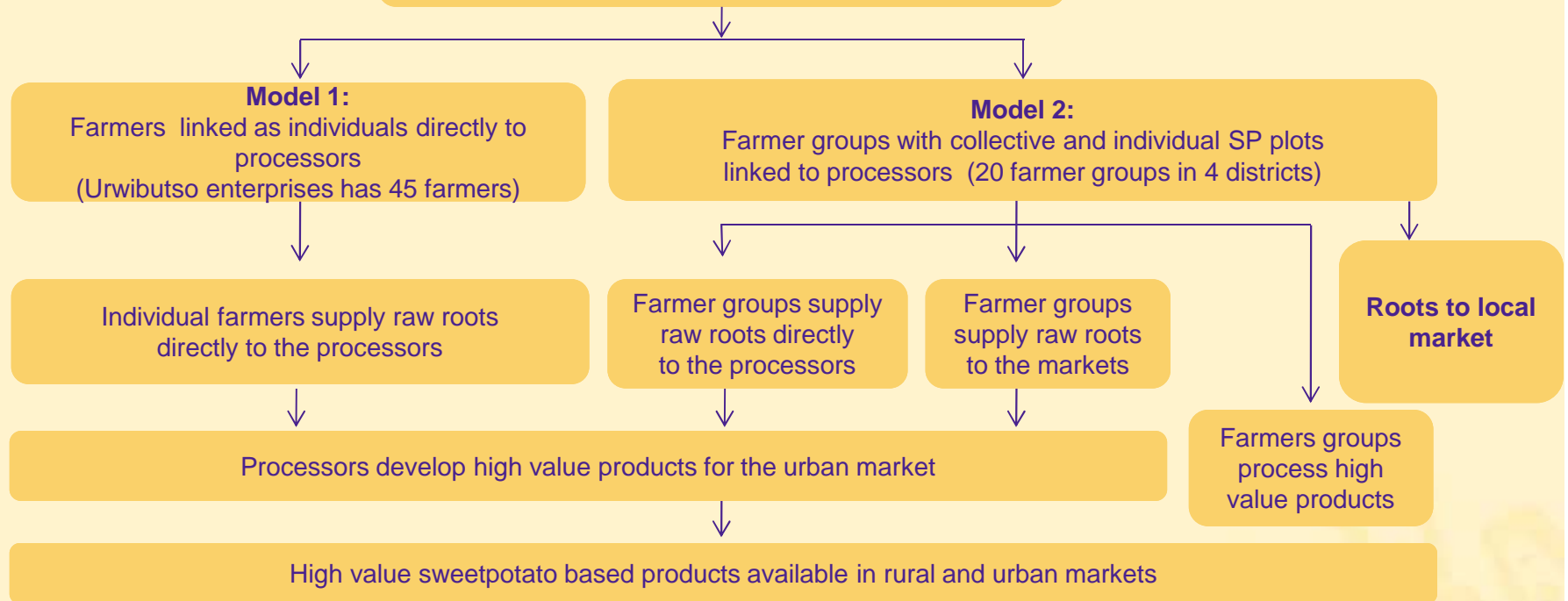
- Muhanga
- Kamonyi

1. To develop, compare, and evaluate the relative efficiency of two sweetpotato product value chains and their potential to increase farmer income with gender equity
2. To re-position white and orange fleshed sweetpotato (OFSP) and its products in the rural, urban and semi-urban consumer markets.

# Individual vs Group Models



## 4 sweetpotato models developing



# EVALUATION FRAMEWORK: IMPACT PATHWAY



Areas	Outputs	Outcomes	Outcomes	Impact
	<b>What project produces that other people use</b>	<b>The results of use or influence of outputs (next user)</b>	<b>The results of use or influence of outputs (end user)</b>	
Strengthening Market demand	Campaign including information products about nutritional benefits of SP/OFSP	Producer and Consumer awareness of nutritional benefits of SP/OFSP		
	Information products on role of SP for food security and income opportunities	Producers', processors', and decision makers' awareness of role in FS and income		
Strengthening Value Chain support services	Prototypes of new marketable products from WFSP and OFSP	Farmers, farmer groups and private sector processors adopting new processing	More products with SP in the market	<b>Increased consumption of SP based products</b>
		Processors develop new products and launch them on the market	Consumers purchase new nutritious products from SP	<b>Increased farmers' income from SP and increased processors' income from SP based products</b>
	Information on processing technologies			
	Innovation platform engaging value chain actors and support services	Improved trust among VC actors	Increased number of market linkages	
			Value chain actors more able to work	
Strengthening seed systems	Improved varieties available which respond to market preferences	Vine multipliers multiply appropriate clean SP vines	Improved productivity of SP lowering cost of SP roots per unit	
		Vine multipliers linked to VC processors and producers and responding to prioritized demand		
Policy	Evidence of efficacy of VC approaches: contract farmers & farmer groups	NGOs and development partners use the evidence for scaling up VC approaches with SP		

# Monitoring & Survey Work



- Formative research: OFSP purée products more economically viable than OFSP flour products
- Monitored yields annually and root & product sales monthly
- Baseline survey: 2012: 596 households;
  - 279 Northern Districts
  - 317 Southern Districts
- Endline survey (# hhs): September 2014, 852 households
  - Control (213): No participation in project activities
  - Participants (327): Linked to project activities directly
  - Spillovers (312): Obtained vines from project multipliers but no direct access to market opportunities

# Test 1: Possible to develop economically-viable sweetpotato processed products, acceptable to Rwandan consumers?



Golden Power Biscuits & Fried Doughnuts/Mandazi  
Most popular

- Launch in Nov 2012
- From November 2012 through June 2014, Sina earned \$364,410 in sales of OFSP products
- *Post-project*  
Sales from July 2014-July 2015, \$403,559  
--mandazi 81%  
--biscuits 19%

# Biscuit Development Required Substantial Investment & Training



## Old technology

Farmer sorting out SP roots



Manual biscuits making



Wheat flour Biscuits



Biscuits packaged



## New technology

EIL Support



The Golden Power Biscuit



Packaging targeting high end consumer



Packaging targeting lower end consumer





## Test 2: If a value chain for processed products linked to a private sector actor leads to better returns for male and female producers than just accessing the local market

- % of households selling any sweetpotato (SP) in 2013/2014
  - 50% Control 80% Participant 60% Spillover
- Female participants accounted for 42.5% of total sweetpotato sales transactions, compared to 11.5% for male participants.
- Both participant female and male SP growers received higher average prices (145 and 149 Rf/kg, respectively) if they sold to Sina than if they sold to traders (111 Rw/kg) or directly to consumers (103 and 88 Rf/kg, respectively)
- **Note SINA encouraged to pay slightly above going market price**



# Participant males had the highest profits & economic efficiency



## Sweetpotato Revenue, Profit and Efficiency by Gender of the Principal Sweetpotato Grower across Categories

Variables	Control		Participant		Spillover	
	Female (N=119)	Male (N=88)	Female (N=247)	Male (N=80)	Female (N=220)	Male (N=92)
Sweetpotato output value (\$/ha)	137	69	223	463	205	233
Variable cost (\$/ha)+	120	121	142	146	104	139
Profit (\$/ha)	104	31	134	365	139	144
Profit margin++	75%	45%	60%	79%	68%	62%
Economic efficiency*	<b>0.86</b>	0.25	0.94	<b>2.49</b>	<b>1.33</b>	1.04
Profit efficiency**	47%	35%	<b>55%</b>	42%	56%	43%

Source: Rwanda Super Foods Endline Survey, September 2014.

+ Variable costs to not include an attributed value for family labor.

++ Profit margin: profit as a percentage of the revenue (output value).

\*Economic efficiency= profit per hectare/ variable cost per hectare. It is the profit made from unit cost of production; for instance 1.8 indicates a 1 dollar investment in sweetpotato production system generates a 1.8 dollars net profit.

\*\*Profit efficiency (PE) is computed by using stochastic profit frontier function, which combines technical, allocative and scale efficiency in profit function. PE is defined as the ability of farmer to achieve highest profit given the output price and cost of inputs used and profit gained from potential.



# SP remained a staple part of the diet. Food Security still #1



Quantity of Sweetpotato Produced and Sold by Gender of Principal Grower across Categories\*

Group	Sample Size	Total produced (kg/HH)	Sold (kg/HH)	% Production sold	Value of Sales (\$/HH)
Control Female	119	409	116	28%	174
Control Male	88	333	147	44%	181
Participant Female	247	<b>1118</b>	364	33%	277
Participant Male	80	<b>1099</b>	321	29%	143
Spillover Female	220	487	134	28%	110
Spillover Male	92	750	206	28%	109
<b>Total</b>	<b>846</b>	<b>731</b>	<b>226</b>	<b>31%</b>	<b>187</b>

\*Source: Reported production and sales by plot by season for 2013-2014 from Rwanda Endline Survey.



Disease-free seed from RAB raised yields & enabled surplus for sale

Test 3: If men and women farmers benefitted more by being in groups backstopped by NGOs, than by being linked as individuals to the agro-processor



Table 4. Characteristics of Participant Households in Super Foods Value Chain

Very distinct sub-groups	Type of Supplier/Grower	Individual	Group	Group	Total
	Technical Support Provider	SINA	IMBARAGA	YWCA	
	Sample Size	37	169	121	327
	<b>Characteristics of HH head</b>				
Market-oriented Imbaraga	HH head is female (%)	32%	27%	<b>49%</b>	36%
	HH head is single (%)	8%	5%	<b>18%</b>	10%
	HH head is widowed (%)	24%	18%	<b>26%</b>	22%
	HH head is <30 years old (%)	8%	11%	<b>22%</b>	15%
Vulnerable YWCA	Mean years of formal education	7.26	5.81	<b>5.48</b>	5.85
	<b>Household Level</b>				
	Wealth index (N, 1-12)	7.67	6.75	<b>6.41</b>	6.73
	Total Livestock Units (2014)	1.75	1.12	<b>0.71</b>	1.04
	Land under sweetpotato production (ha) in 2013/2014	0.08	0.10	<b>0.05</b>	0.06

Source: Rwanda Super Foods Endline Survey, September 2014.

Imbaraga farmers had the highest profits & profit margins, and were the most economically efficient.



Average Revenue, Costs, Profit per Hectare, Profit Margin, and Economic and Profit Efficiencies by Category

	Control	Participant	Participant	Participant	Spillovers
Category of Beneficiary		SINA	IMBARAGA	YWCA	
<i>Sample size</i>	213	37	169	121	312
Sweetpotato output value (\$/ha)	112	249	<b>357</b>	209	214
Variable cost (\$/ha)	115	<b>185</b>	145	123	113
Profit(\$/ha)	78	153	257	136	141
Profit margin	69%	62%	72%	65%	66%
Economic efficiency	0.7	0.8	<b>1.8</b>	1.1	1.2
Profit efficiency	44%	48%	52%	56%	54%



Source: Rwanda Super Foods Endline Survey, September 2014. For definitions see Table 2.

# Project set target that 75% of beneficiaries should be women



Qualitative gender research found: Income-wise, there were greater benefits from **personal plots than group plots**, but women saw groups as platforms for sharing technical and personal information.



# Test 4: If children under 5 years of age in beneficiary households show increased diet diversity & OFSP intake in a marketing focused intervention



OFSP got into young child diet, but probably at lower levels than if had been a nutrition education component

Group	OFSP consumption: child		OFSP consumption: caregiver	
	N	mean days/week	N	mean days/ week
Control	134	0.22	213	0.37
Beneficiaries	165	1.29	326	2.56
Spillover	161	1.05	312	1.88
<b>T- test for mean difference</b>				
Control vs Beneficiary	-5.99***		-12.69***	
Control vs Spillover	-4.87***		-9.17***	
Beneficiary vs. Spillover	1.17		3.78*	

However, no significant effect on young child diet diversity & frequency of intake of vitamin A rich foods...



**Dietary diversity scores and consumption of vitamin A rich foods**

Group	Child Diet Diversity Score		Weight score of days/week at vitamin A rich foods	
	N	Mean	N	Mean
Control	93	4.05	94	3.86
Beneficiary	97	4.10	99	4.42
Spillover	116	4.16	83	5.69
<b>Total</b>		<b>4.05</b>		<b>4.66</b>
Control vs Beneficiary		-0.26		-1.21
Control vs Spillover		-0.56		-3.19**
Beneficiary vs. Spillover		-0.30		-2.20*

Note: CDDS child dietary diversity score (0-8); Weight vitamin A (plant + animal source)- less than 6 at risk of vitamin A deficiency

**Need investment in nutrition education to get significant impact on diet quality**

# Test 5: If the communication strategy changed SP's image



Mandazi day



RADIO promotion



Exhibitions



Sign post for vines



Monthly newsletter





# Farmer attitudes are clear...



Group	Control	Beneficiary	Spillover	Total
<b>1. Sweetpotatoes that are orange inside are healthier than ones that are white inside</b>				
Strongly agree	20%	63%	44%	<b>45%</b>
Agree	28%	34%	47%	<b>37%</b>
Not know or no opinion	46%	3%	7%	<b>15%</b>
Disagree	6%	0%	2%	<b>2%</b>
Strongly disagree	0%	0%	0%	<b>0%</b>
<b>2. Sweetpotato is the most reliable food crop for our family during times of food shortage</b>				
Strongly agree	54%	66%	54%	<b>59%</b>
Agree	42%	33%	43%	<b>39%</b>
Not know or no opinion	0%	0%	1%	<b>1%</b>
Disagree	3%	1%	2%	<b>2%</b>
Strongly disagree	1%	0%	0%	<b>0%</b>
<b>#. Sweetpotato should be included as part of the Crop Intensification Program in my District</b>				
Strongly agree	38%	48%	37%	<b>41%</b>
Agree	48%	45%	50%	<b>48%</b>
Not know or no opinion	6%	5%	7%	<b>6%</b>
Disagree	5%	2%	3%	<b>3%</b>
Strongly disagree	3%	0%	3%	<b>2%</b>



# Notable effect at district level

## -- Urban attitude not yet measured



- Three of the four districts (Rulindo, Gakenke and Muhanga) have permitted sweetpotato growers to access valley bottom land
- Two districts (Rulindo and Gakenke) have included significantly increased sweetpotato production into their performance targets.
- 4 additional processed product efforts being developed
- One factory is being set-up for OFSP, 1 for sweetpotato in general and two bakeries starting to incorporate OFSP
- **Awareness widely raised in urban areas**



# Conclusions



- Successfully demonstrated economically viable OFSP processed products
- Setting targets for female participation assured women did not lose out of commercialization
- Quality seed in sufficient quantities critical to success, enabling smallholders to have surplus to sell
- Projects will not get major nutritional impacts on young children with just a market intervention



# Partners



- International Potato Center (CIP)
- Rwanda Agricultural Board (RAB)
- Catholic Relief Services (CRS-Rwanda)
- Young Women Christian Association (YWCA)
- IMBARAGA
- SINA GERARD/URWIBUTSO enterprises
- Kigali Institute of Science and Technology University
- Rwanda Bureau of Standards
- Rwanda Environment Management Authority
- Jomo Kenyatta University of Science and Technology

# Murakoze

