Rwanda Super Foods Project

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SWEETPOTATO ACTION FOR SECURITY AND HEALTH IN AFRICA

Outline

- Objectives and approach of 2 value chains used
- Seed system developed
- Processing of OFSP products
- Promotion and awareness creation
- Way forward
- Acknowledgement

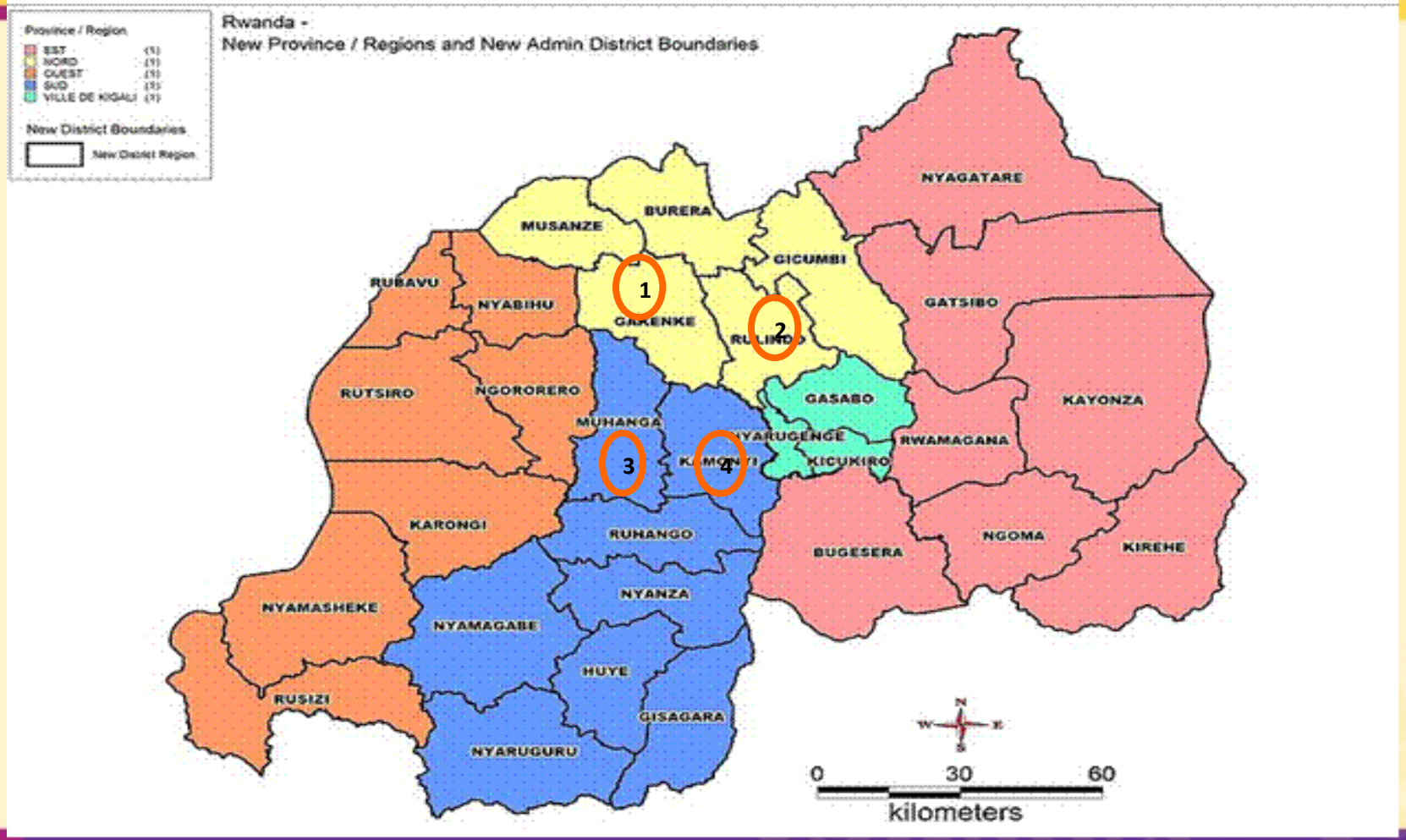
Objectives

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.

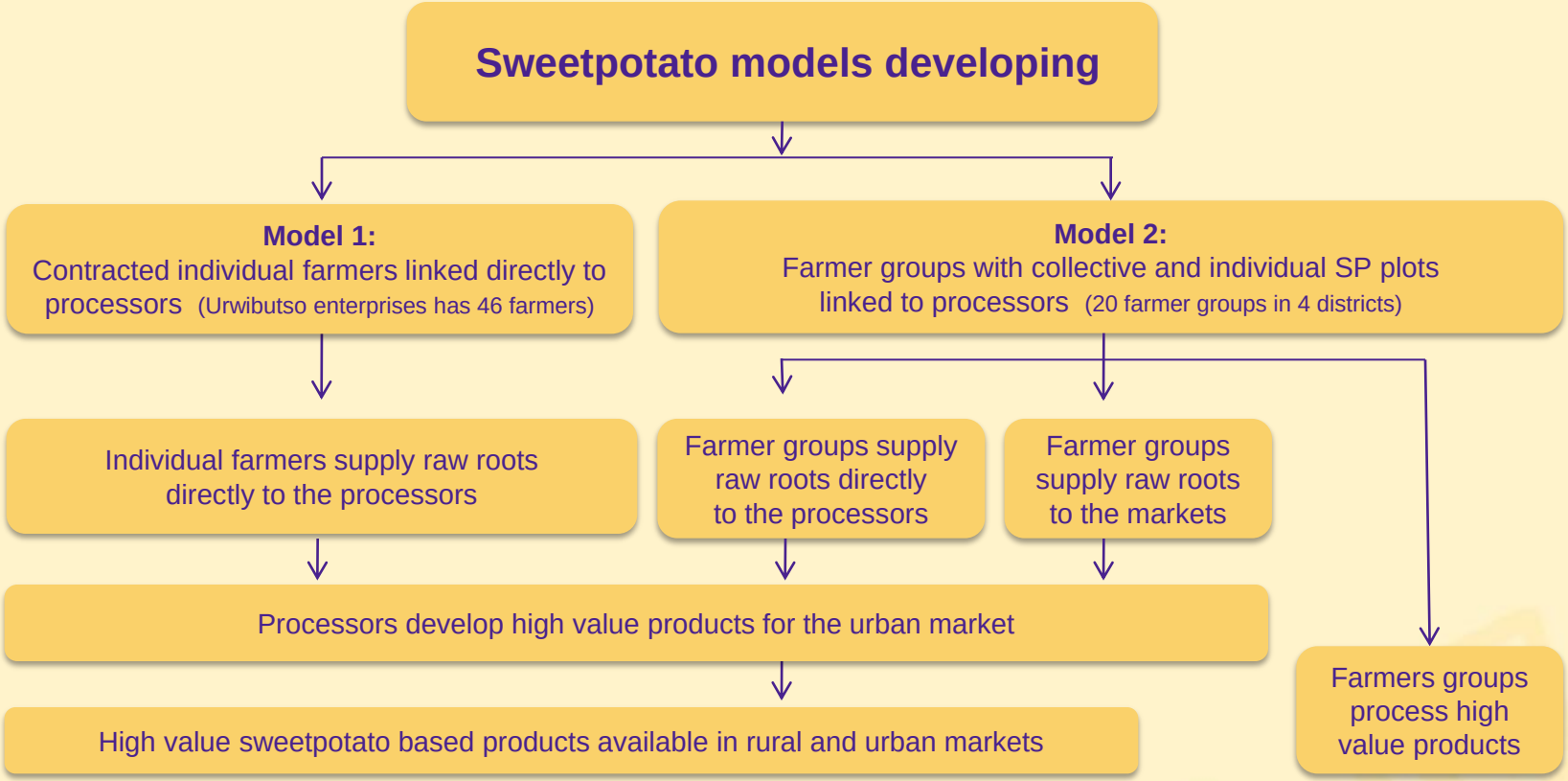
Hypotheses

1. Private-sector led development of processed SP products results in increased farmer incomes (test 2 Models)
2. Partial/full processing of roots by farmers results in greater participation and revenues for women and youth farmers (compared to factory-based processing).
3. Effective marketing can establish SP as a high value crop in urban markets.

Project sites



Models developing



Core beneficiaries of the project so far

Name of sub-grantees	Location (District)	# of organized farmer groups	# of Beneficiaries	# of Women	# of Men	Women
Imbaraga	Rulindo and Gakenke	8	209	164	45	78%
YWCA	Muhanga & Kamonyi	12	262	184	78	70%
Total		20	471	348	123	73%
SINA	(Farmers contracted directly by one processor)		45	32	13	71%
Total			516	380	136	74%

How do farmers obtain sweetpotato planting materials

- In most areas sweetpotato seed systems are mainly informal
- Very few commercially available seed systems
- Hence it is a challenge getting the high quality new or improved varieties to the farmers when they need it
- Use positive selection to select roots from healthy, high yielding, true-to-type plants.

Developing a clean seed system in Rwanda to tackle the challenge

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Plantlets hardening

In-vitro plantlets multiplication at Rubona lab we are multiplying 10 OFSP and 1 WFSP

Transfer of plantlets to the field

Farmers have access to quality planting material – distributed over 1.5 vines in the last one year

SP Vine conservation tunnels construction in Rwanda for sustainability (35 tunnels)

1132 cuttings/ tunnel to 9056 through rapid multiplication

What is the results so far from our seed system effort at farmers conditions?

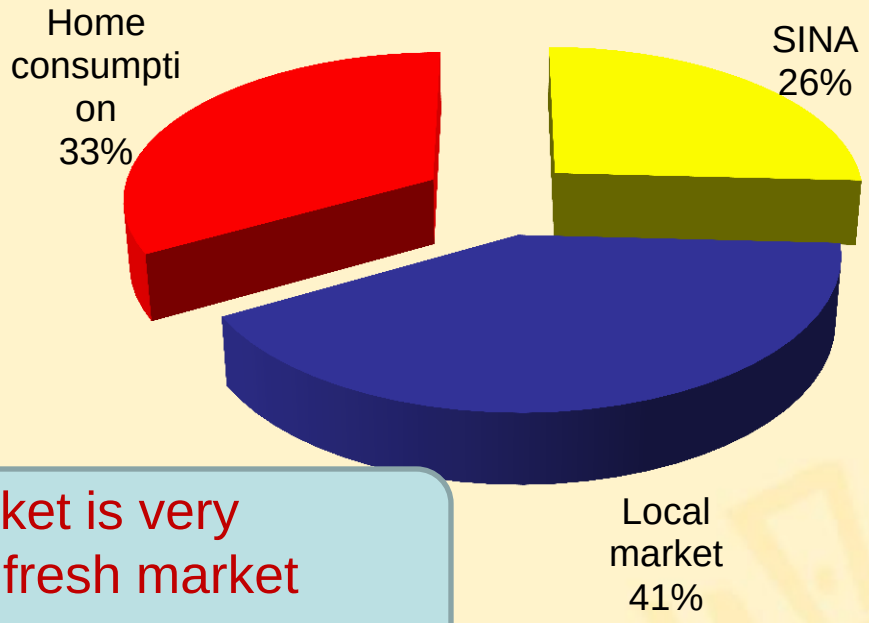
	Highest production Kg/ha	Average yields in three crop cut sites average Kg/ha
Cacearpedo	19,366.39	12,539.74
Naspot 9	18,606.44	13,279.87
Naspot 10	19,578.31	15,446.78
Gihingamukungu	16,529.29	12,575.50
Local variety	15,849.12	10,285.89

So far we have distributed over 3.5 million cuttings of virus-free planting material in the last three years, however the plan is to distribute 12 million vines by year 4

This year SP roots harvested and utilization

- A total of 122 tons of sweetpotato roots were produced
- 31.4 tons sold to SINA
- 50 tons sold to local markets
- 40.5 Home consumption

Roots utilization

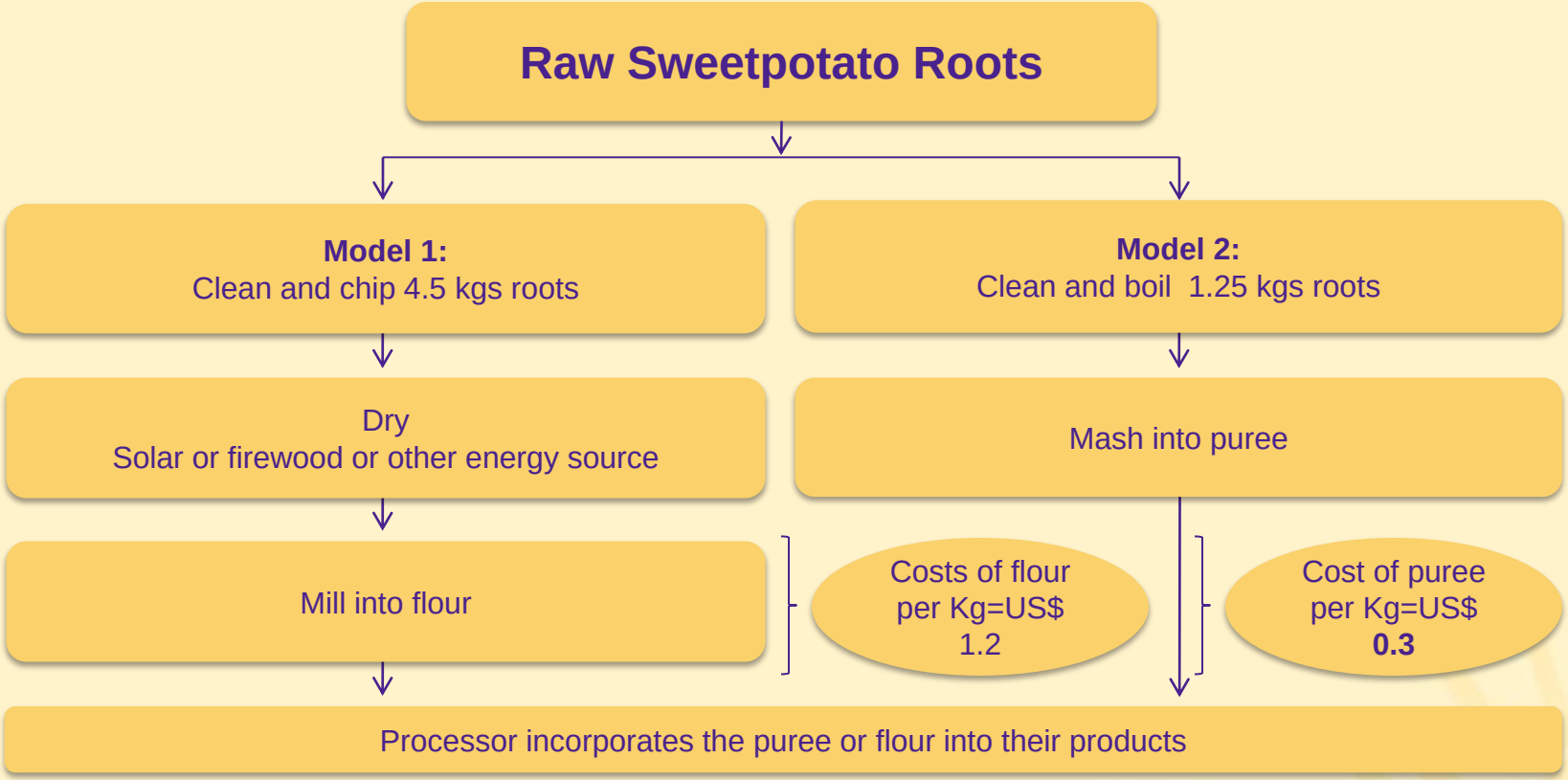


Take home message is that local market is very important and we are looking at local fresh market development

Condition necessary for a new technology to be accepted and adopted

- It only makes sense to incorporate SP into products if:
  - Processors can increase their incomes
  - Have a marketing edge due to nutritional content or any other desirable attributes
  - Technology is easy to adopt and adapt
- The products have to be better or as good as the 100% wheat based products

Processing technology development



Progress in biscuit development

From the launched date SINA has sold biscuits of gross value of US $ 50,945, and a combined value of sales of US $ 160,373 in the current year an increase of about 150% from last year

Old technology

Manual biscuits making

Wheat flour Biscuits

Farmer sorting out SP roots

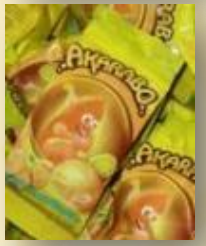
Biscuits packaged

New technology

The Golden Power Biscuit

Packaging targeting high end consumer

Packaging targeting lower end consumer



Does it make economic sense to incorporate sweetpotato puree into bakery products?

Sweetpotato puree+wheat flour+other ingredients

Bread
(30% SP+70% wheat)+others

7% decrease in per unit production cost

Doughnuts (Mandazi)
(40% SP+60% wheat)+others

15% decrease in per unit production cost

Biscuits + other cookies
(45% SP+55% wheat)+other

12% decrease in per unit production cost

Development of value added final product at farmer level

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Transforming OFSP to commercially acceptable Juice

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OFSP roots

Initial processing

Measurement of PH

Final stable juice stable and no sedimentation

Cookies made from the juice by products (grates)

How can we supply the puree to processor?

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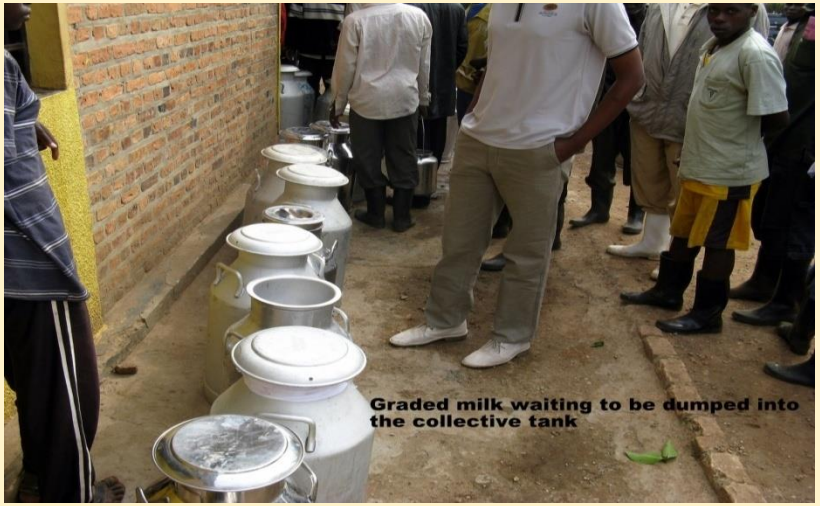


Akarabo sensory test

Objectives

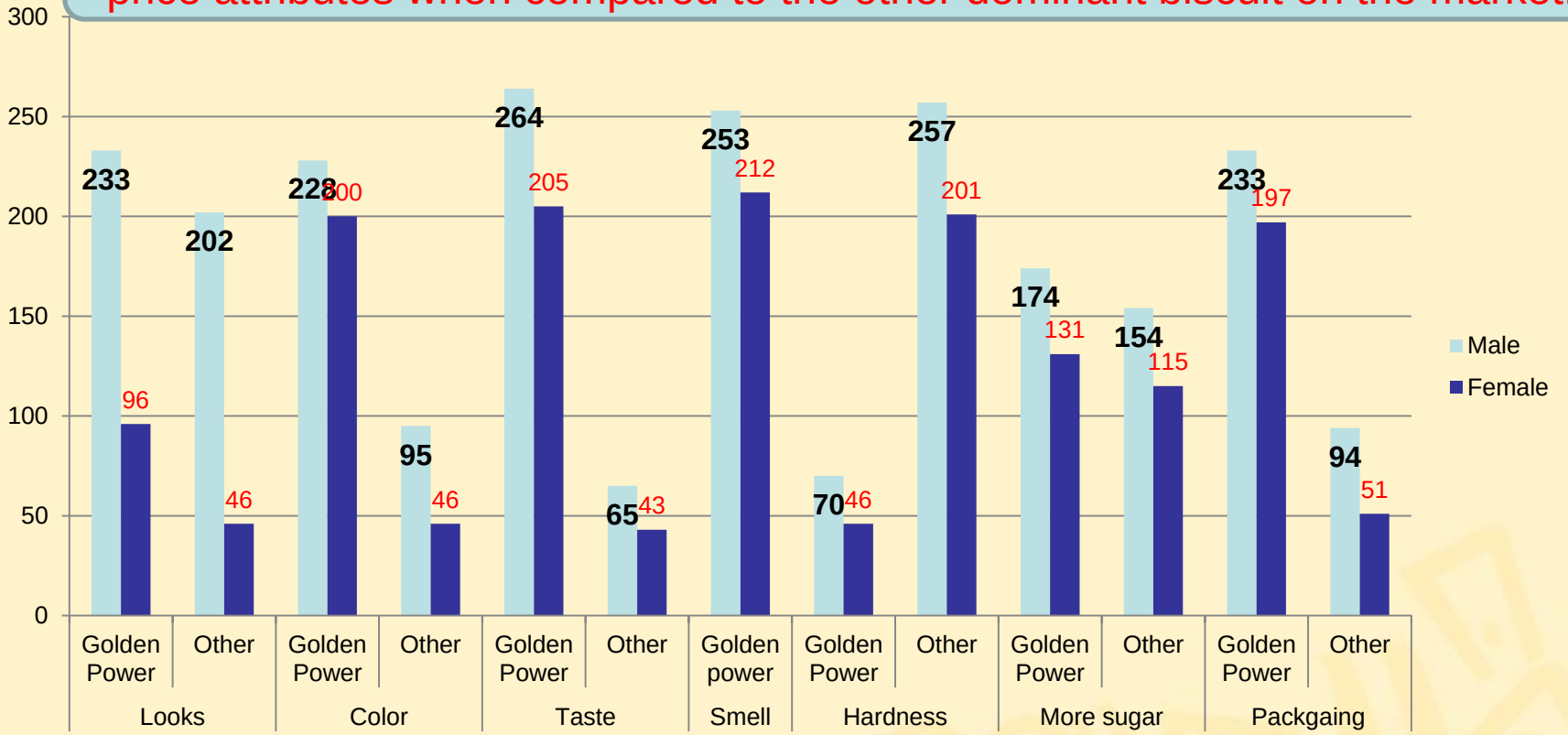
- To assess how the newly introduced Golden Power Biscuit compares in terms of acceptability to the most popular purchased biscuits in Rwanda
- To assess the willingness of consumers to pay for the Golden Power biscuit, and whether having knowledge of the nutritional benefits of vitamin A influences willingness-to-pay.

Method

- Low-end markets: Musanze local market, Muhanga local market, Kimironko (Kigali) local market
- Low-/middle-end markets: SINA Nyirangarama, SINA Nyabugogo (Kigali), SINA Kigali town, SINA Musanze, SINA Muhanga
- High-/middle-end markets: Ndoli Supermarket (Kigali)
- High-end markets: Union Trade Centre (Kigali)

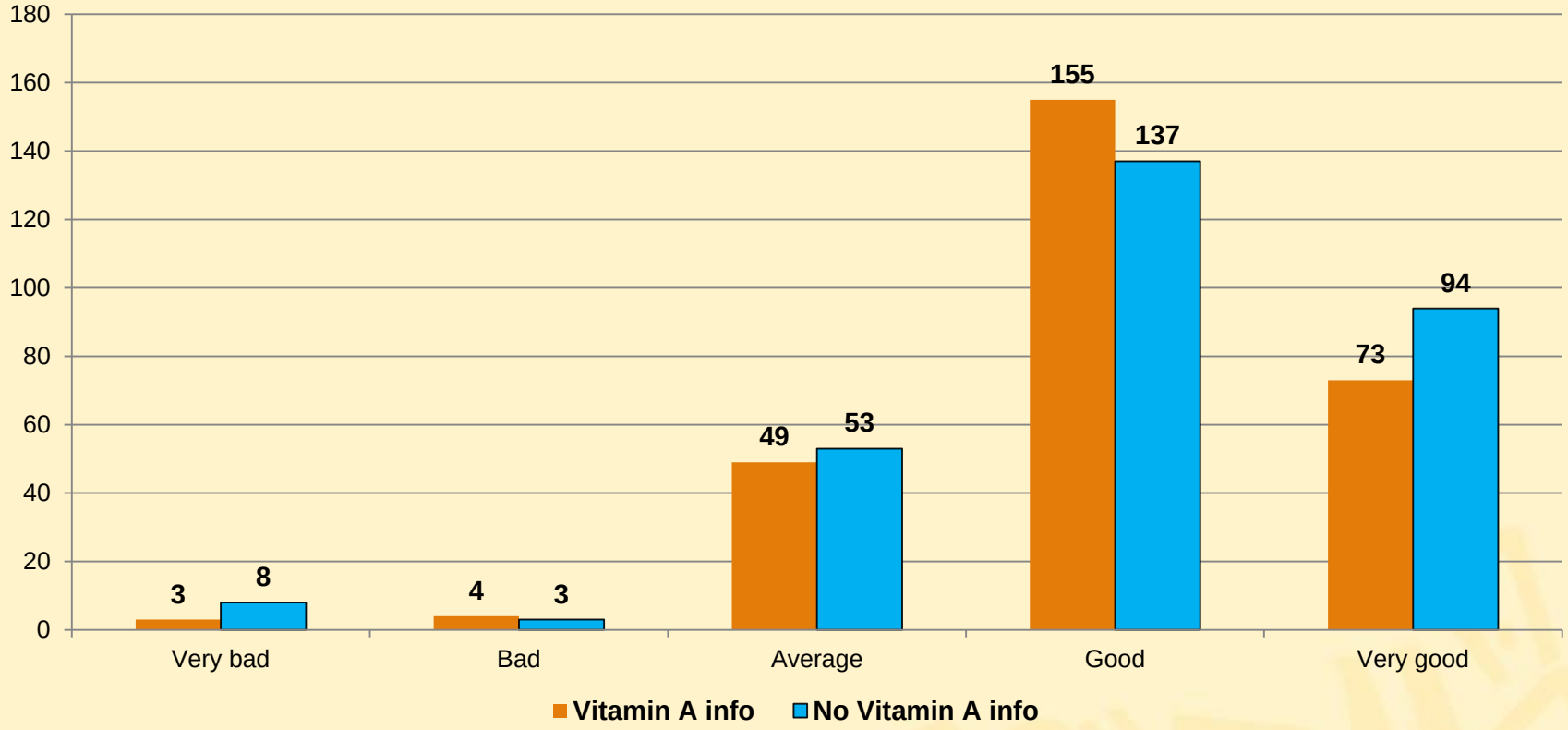
Consumer preference for non-price attributes, by gender (count; N= 542)

More consumers rated the Golden Power more favorably in most of the non-price attributes when compared to the other dominant biscuit on the market.



Consumers' rating of the taste of Golden Power biscuit vitamin A emphasis (Count, N=580)

The majority of consumers liked the Golden Power Biscuits, regardless of receiving knowledge about the health benefits of vitamin A



Rating	Predictors	Proportional odds ratios		
Individual characteristics			Prior knowledge of vitamin A	
	Woman	0.40	vitaknow	0.11
		(3.35)**		(0.93)
	age	-0.01	Informed about vitamin A	
Competing brand			novitA	0.60
	Riham	0.76		(4.09)**
		(2.59)**	vitA	0.68
Purchasing characteristics				(4.66)**
	Frequency of buying biscuits	0.02	Market class location	
		(0.35)	High end	0.54
	Cost of the competing brand per unit (packet)	-0.00		(2.14)*
		(0.27)	High-mid end	1.01
	Number of packets bought at once	-0.01		(4.52)**
Product characteristics			Middle end	0.71
	Smell	-0.51		(3.25)**
		(3.67)**		
	Taste	-0.64		
		(4.08)**		
	How sugary the biscuit tastes	0.22		
		(1.78)		
	Hardness	0.10		

Willingness to pay and ordered logit model results

- First, the positive attributes (color, appearance, and packaging) make Akarabo GP biscuit attractive among the consumers
- Second, consumers, especially those in the low and low/middle neighborhoods, are willing to pay for the biofortified biscuit.
- From willingness to pay, high end consumers have higher WTP for the competing brands.
- However, controlling for all other factors we find that the biscuit is acceptable in all social classes

Ordered Logit analysis of factors affecting puree products consumer acceptability (earlier survey)

	(1)	(2)	(3)	(4)
	Bread	Doughnuts	Cakes	Biscuits
Color	0.062	-0.182	0.886***	0.539
	(0.15)	(0.69)	(2.88)	(1.55)
Shape	0.002		-0.002	0.075
	(1.11)		(1.28)	(0.28)
Structure	0.204	-0.001	0.695**	0.001
	(0.58)	(0.94)	(2.30)	(0.38)
Flavor	2.772***	0.191	1.082***	0.933***
	(5.85)	(0.72)	(3.33)	(2.86)
Texture	-0.001	-0.001	0.005	-0.007
	(0.34)	(0.39)	(0.12)	(0.79)
Age	0.001	-0.001*	0.001	-0.001
	(0.84)	(1.86)	(1.18)	(1.44)
Lycee	0.961	0.907*	-0.740	-0.441
	(1.69)	(1.87)	(1.51)	(0.85)
Tenderness			-0.002	
			(1.24)	
Observations	84	85	86	74

Absolute value of z statistics in parentheses

*** significant at 10%; ** significant at 5%; *** significant at 1%**

CHANGING THE IMAGE OF SWEETPOTATO UTILIZING CHIC MARKETING AND EDUCATION

UTILIZING ORANGE FLESH SWEETPOTATO

Biscuits Nutrient Analysis (per 100 grams)

Parameter	Wheat :SP (60:40)
Moisture (%)	6.4 ± 0.2
Ash (%)	1.4 ± 0
Fat (%)	15.0 ± 0.2
Carbohydrates (%)	68.1
Crude fiber (%)	0.4 ± 0.2
Protein (%)	8.6 ± 0.1
B-Carotene mg/100g	5.4 ± 0.4
Energy (KJ)	1,858.9

Beta-carotene converts into Retinol Activity Equivalents (RAE) in OFSP: 12 units BC: 1 unit RAE

5.4 mg/100 gms = 450 RAE

4 biscuits	43 gms	
RAE (micrograms)	193 ugs	
	Required RAE Daily	% of Daily Req.
Child under 9 years old	400	48%
Non-pregnant woman	700	28%
Adult men	900	21%

According to USA/FDA standards: a product Must meet 20% of daily needs to be marketed as an excellent source of Vitamin A and the Golden Power Biscuit meets the requirements

Communication strategy

SASHA
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Exhibitions

RADIO promotion

Mandazi day

Sign post for vines

Monthly newsletter

Launch of Akarabo Golden Power Biscuits

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Summary of communication and advocacy activities

- Launched a monthly project newsletter an in this period we have had 10 issues published
- 51 media production
- 4 radio shows,
- 26 radio programs in 11 different radio
- 5 TV programs on the two TV station,
- 4 news articles in 2 newspapers
- 12 online media articles in 5 different media outlets including the ministry of agriculture online media bulleting.

Progress so far

- Use of quality planting material enables farmers to increase production from 2011 to 2012 increased from, 4 tons to 12 tons per ha (200% increased)
- From 2012 to 2013 (June) roots production increased from 12 to 122 tons increase by almost 1000%
- At SINA sales of SP products increased from gross income US $ 78,372 to US $160,373 an increase of 105% from last year
- Farmers able to provide about 20% of their vine needs from own conservation
- ***Farmers are selling OFSP planting vines to local government***
- Local policy makers accept sweetpotato in their areas
- Pushed % of sweetpotato in biscuit to 43% while still acceptable to consumers

Opportunities we are working on currently

- Building adequate year round supply of roots
- Establishing efficient roots supply chains
- Establish puree and or grates supply chain
- Appropriate puree supply/storage technologies
- Appropriate roots storage technologies
- Development of fresh roots market in Rwanda
- Test new varieties with farmers and processors
  - Add two new processors in Kigali
  - La Galette and Millennium

Who visited the project?

- Rwanda prime minister
- SP breeding meeting
  - ✓ April 2013 with a field visit at Rubona
  - ✓ Sina factory

FARA

CRS

Visit by CRS president

USE OF THE MEDIA TO MARKET OFSP BASED PRODUCTS

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
- DONATA
- Root Tuber and Banana (RTB)

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Murakoze (Thank you)