

# Scaling Up Sweetpotato Through Agriculture and Nutrition (SUSTAIN)

## Results and Lessons

Simon Heck, Kiriimi Sindi, Fred Grant, Penina Muoki, Julius Okello, Hugo  
International Potato Center (CIP)

SUSTAIN

Technical approaches

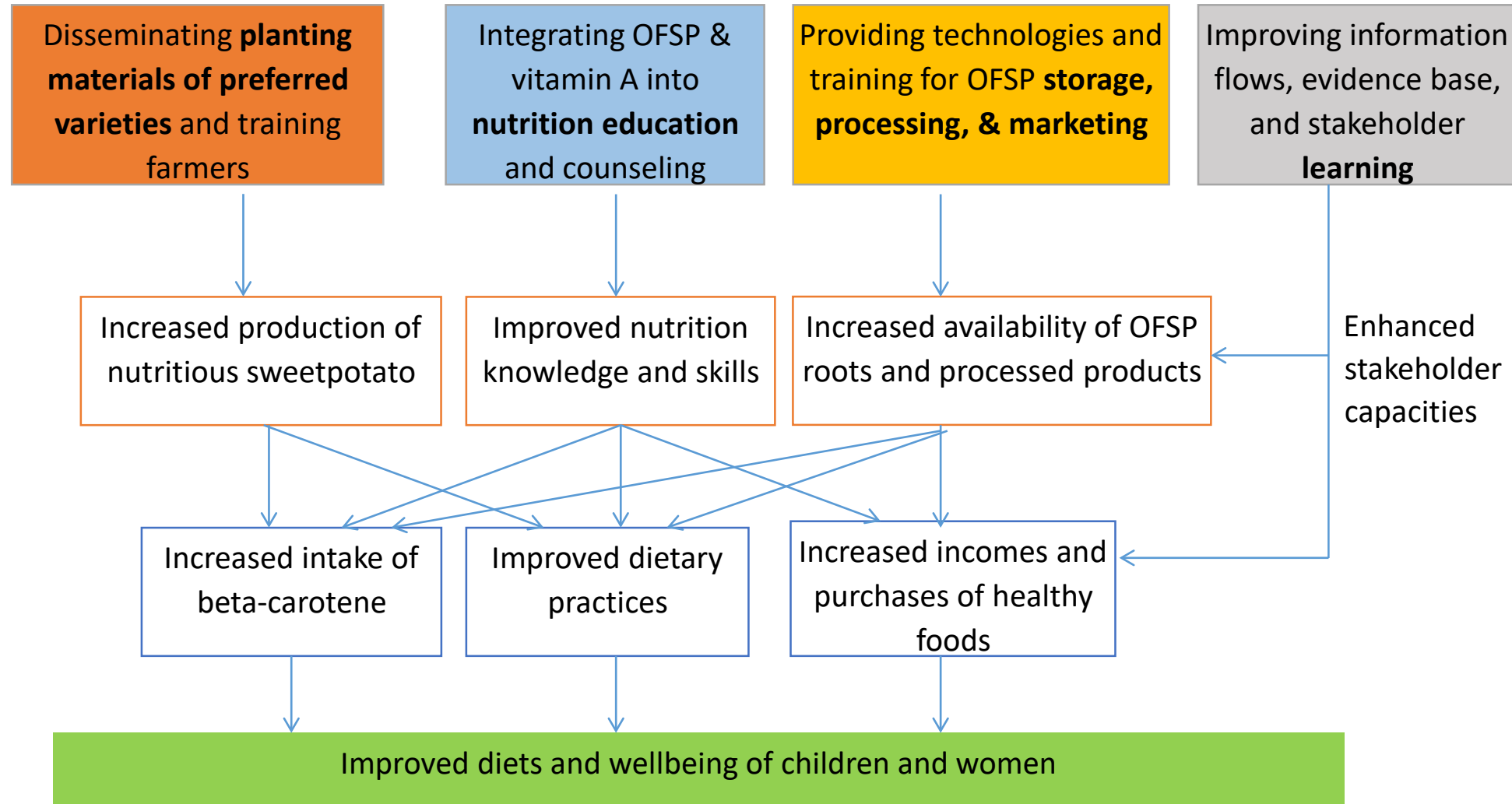
Results and outcomes

Lessons learned

What is next?

# SUSTAIN – Technical approach

## The basic idea: An Integrated Approach





## Seed systems

- Build capacity at NARS
- Establish DVMs
- Empower DVMs
- Link the DVMs to NARS

DVMs are Disruptive Innovations





# High quality vines to the beneficiaries

Vines delivery systems have been Efficiency innovation

# IMPROVE NUTRITION KNOWLEDGE AND OFSP CONSUMPTION

- Training of Trainers of partner staff (ToT)
- Training of Community Health Workers (CHWs)
- Strengthen partnership with the government nutrition program
- Delivery of nutrition and agronomic messages at vine delivery points
- Utilizing different media for messaging





# Methods

Counselling cards is and efficient innovation

Actual food  
preparation  
using OFSP







Cooking  
demonstrations in  
the field

Cooking demonstrations are  
disruptive innovations





# Markets and Processing

- Work with DVMs to develop vine markets
- Improve roots markets
- Provide technologies for processing to private sector
  - Restaurants
  - Private sector making puree
  - Private sector processing into final products

# Roadside market

## Road side market

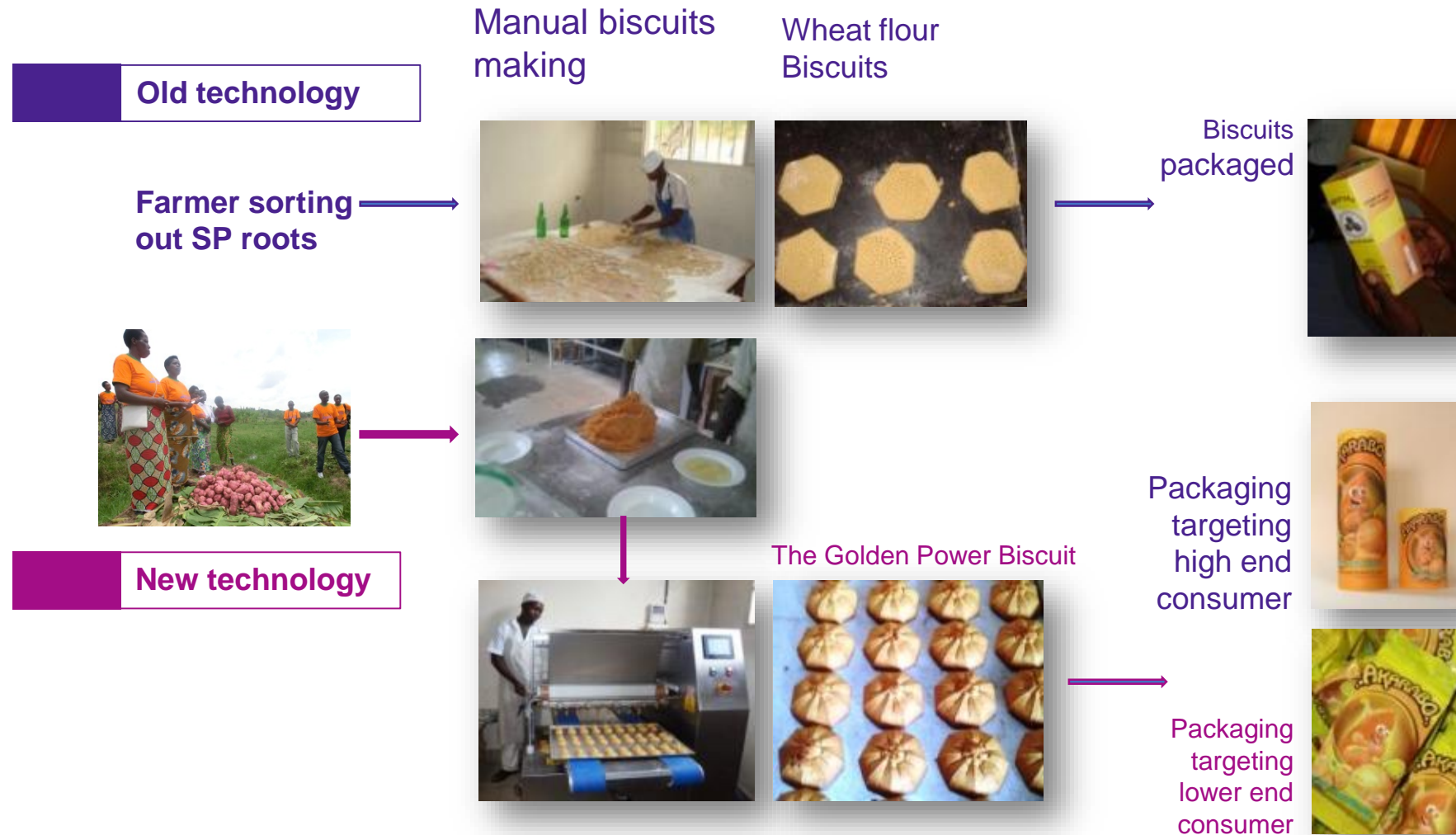
- New concept to brand/build a roadside markets
- Pro
  - If located at a strategic location it will be an important vehicle to build an OFSP brand and expose the brand to more potential consumers
  - Provides market for farmers throughout the year
  - Stable prices
  - Opportunity to provide more nutrition information
- Cons
  - Can be capital intensive
  - When new it takes time to build or brand
  - Takes time to build clientele





# Promoting Diversified Use: Gender-Aware OFSP Product Value Chains

Puree as an ingredient is  
a disruptive technology





# Communication and Branding (The Sweet that Gives Health)



Building the Orange Brand:  
Radio programs and market advertising to  
increase awareness of Vitamin A rich  
foods & increase demand



SUSTAIN Adaptation to countries  
contexts

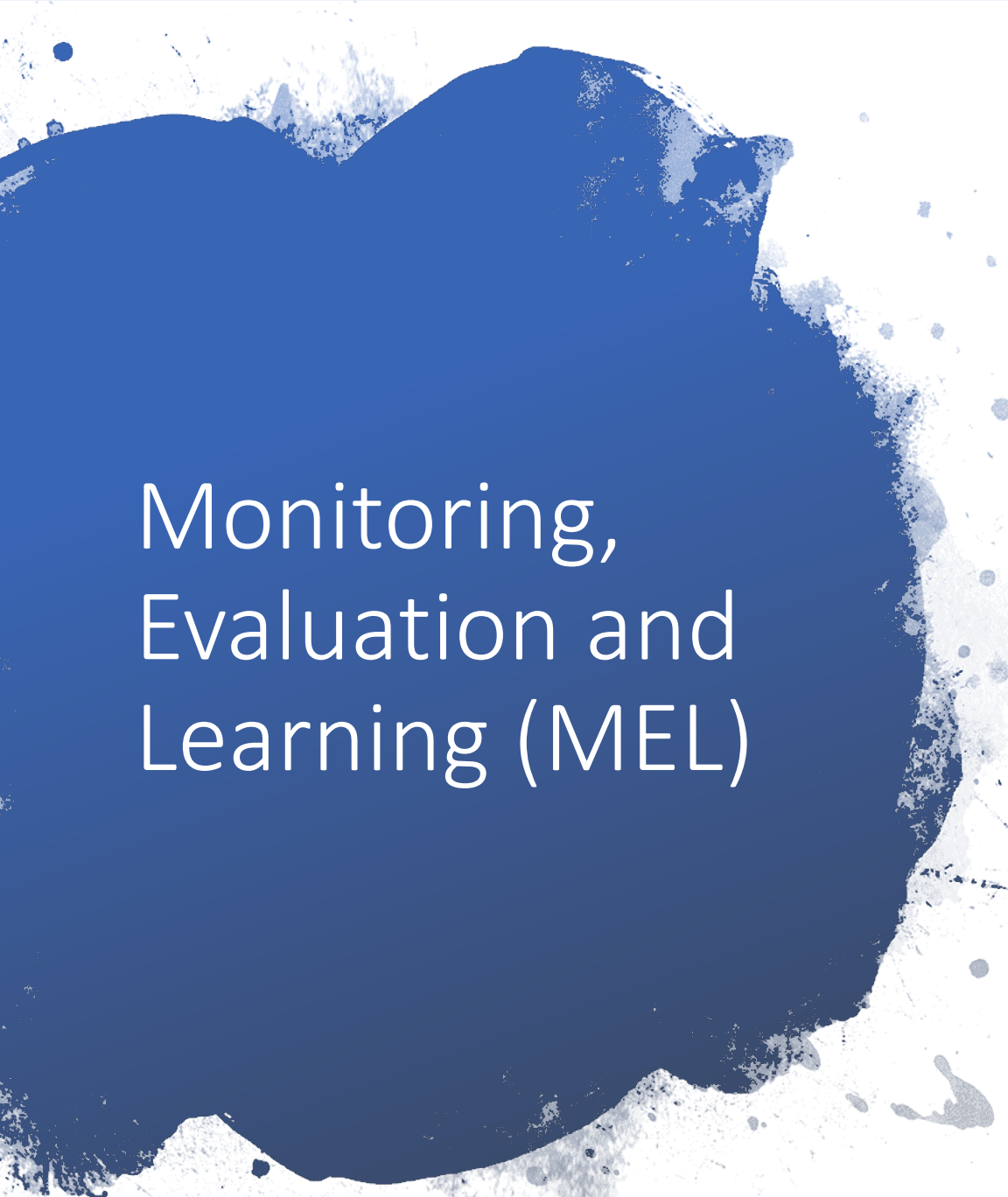


# Seeds and Nutrition Delivery Approaches

	Kenya	Malawi	Mozambique	Rwanda
Varieties promoted	3	6	9	5
Multiplication strategy	Decentralized multipliers (farmers)	Centralized commercial multipliers	Decentralized multipliers (farmers)	Mixed approach: Government (RAB), farmer groups, CIP, DVMs
Dissemination partners	Government extension, 3 NGO's	More than 12 NGO's	Government extension, 1 NGO	Government extension, 1 farmer organization, 1 NGO
Delivery mechanism	Vouchers, Mothers groups	Mass distribution and NGOs	Vouchers	Mass distribution

# OFSP processing

	Kenya	Malawi	Mozambique	Rwanda
OFSP puree supply chain	Separate puree producer	Integrated puree – final processing	Integrated puree – final processing	Integrated puree – final processing
Products produced	OFSP bread	OFSP bread, crisps	Juice, some bakery products	Range of bakery products
Trajectory	Growing	Limited	Limited	Stagnating for Sina but others enterprises coming up
Scale	Small scale Puree and Large scale products production	Large and small scale production	Medium scale in small market	Large scale and small scale in all markets



# Monitoring, Evaluation and Learning (MEL)

- ‘SMILER’ M&E approach
- CIP M&E tools
- Seasonal indicator surveys
- Additional operational research
- Evaluation studies by CIP
- Independent Evaluation (Michigan State University)
  - Qualitative evaluation (Kenya and Malawi)
  - Quantitative evaluation (RCT) with a focus on Rwanda



# Randomized-Controlled Trial (RCT) Design

- The research design consists of randomly assigning project villages to one of the following six treatment arms:
  1. Base model: All the components of the integrated Agriculture, Nutrition and Marketing approach
  2. Base model less nutrition counseling
  3. Base model less marketing
  4. Base model less nutrition counseling and marketing
  5. Base model, but only one season
  6. Base model with the second time vine distribution at a higher price

SUSTAIN

# Results

# SUSTAIN – Results -OFSP dissemination

Indicators		Kenya	Malawi	Mozambique	Rwanda	Bangladesh	Total
<b>HH with children &lt;5 receiving OFSP planting material</b>	Target June 2018	35,000	75,000	35,000	60,000	5,000	210,000
	Program participants	44,448	95,585	53,737	113,882	7,527	315,179
	<i>HH reached through diffusion and related projects</i>	253,352	544,832	306,302	649,127	42,906	1,796,518
<b>OFSP multipliers operational</b>	Progress to June 2018	More than 60 (50% female)	3 large commercial	More than 90 (25% female)	More than 40 (54% female)	More than 300 (79% female)	More than 500 (64% female)

Productivity gains from 3-5 t/ha to 12-15 t/ha for OFSP  
3-5 t/ha to 10 t/ha for local varieties



# SUSTAIN – Results - Nutrition education

Indicators		Kenya	Malawi	Mozambique	Rwanda	Bangladesh	Total
Caregivers reached through training	Program participants	35,362	50,600	38,691	115,779	10,080	250,513
	<i>HH reached through diffusion and related projects</i>	<i>201,562</i>	<i>288,420</i>	<i>220,541</i>	<i>659,943</i>	<i>57,456</i>	<i>1,427,921</i>

# SUSTAIN – Results

- OFSP processing and marketing

Indicators		Kenya	Malawi	Mozambique	Rwanda
Annual sales volumes of OFSP products	Program participants	Puree: >\$100,000 Bread: >\$330,000	Crisps: >\$15,000	Bread: >\$11,000	Bakery products: >\$212,000 per year
Farmers selling OFSP into commercial processing	Program participants	619	300	130	400

# Effect of nutrition SBCC participation on KAPs among caregivers, adjusted for covariates (multi-linear reg)

- In adjusted analyses<sup>1</sup>, participation in nutrition SBCC was significantly associated with
  - HH dietary diversity scores, and
  - HH & young child VA intake
- Compared to no exposure to nutrition SBCC, exposure to nutrition SBCC was positively associated with greater
  - maternal dietary diversity ( $\beta$  (SE): 0.07 (0.14),  $p < 0.01$ ).

<sup>1</sup>: maternal age, marital status, education, employment and size of the household

Knowledge Attitude and Practices (KAPs)



## Effect of nutrition SBCC participation on KAPs among caregivers in, adjusted for covariates: odds ratio<sup>2</sup>

- Caregivers who were exposed to nutrition SBCC were three times more likely to meet the recommended dietary VA intake of at least 6 days per week compared to those who were not exposed to nutrition SBCC (OR: 3.22; 95% CI: 1.69 – 6.16).
- Similarly, their children were twice more likely to meet the recommended dietary vitamin A intake of at least 6 days within a week (OR: 2.24; 95% CI: 1.05 – 4.79).

<sup>2</sup>: controlling for caregiver age, educational status and employment status

**QUALITATIVE**



## **Rwanda: Infant and Young Child Feeding Practices:**

6-9 months-

- Women have an understanding of what to do but are not always doing it
- Many women did not have knowledge on the right consistency of child's meal from six months onwards.

### **Infant and Young Child Feeding Practices:**

- 9-11 months- Thicker porridge (ground nuts, soybeans, less milk), mashed sweetpotatoes (OFSP)/Potatoes/bananas and leafy vegetables, Ugali and vegetable or meat soup, mashed fruits
- 12-24 months- OFSP, limited quantities of vegetables, animal proteins and beans
  - Protein foods introduced at 12-24 months: general fear of infant choking at earlier age of introduction
- Eggs not introduced until development of speech by infant: belief that eggs delay speech development
- Milk is provided when available



# **Main obstacles to adherence to nutrition advice during pregnancy, lactation, infant feeding:**

- Availability & access to nutritious foods
- Poverty, teenage pregnancy
- Cultural taboos: across all communities
- Agricultural seasons influence how the child is fed.
  - Lack of time to care for their children.
  - Hunger periods
- In contrast, during harvesting time, there is a lot of food and variety to feed to children and they also have time to monitor their growth

# Effects of VISTA-SUSTAIN nutrition interventions on maternal & caregiver KAPs

- Both male & female nutrition group meeting participants listed some health/ nutrition benefits attributed to OFSP
- Women listed more diverse benefits of OFSP than men
  - most frequently cited benefit among men was OFSP being a good source of vitamin A and good for eyesight; these benefits were also the most frequent ones listed by women in addition processing of OFSP into various food products.
  - only one group of men indicated that OFSP can be processed into various food products

# Effects of VISTA-SUSTAIN nutrition interventions on maternal & caregiver KAPs

- Female participants of nutrition group meetings had better knowledge of IYCF practices
  - Need to initiate breastfeeding within 1 hour of birth
  - Timely introduction of appropriate complementary foods at 6 months & continuous BF up to 2 years
    - Increased frequency of feeding and thickness of CF, etc. as infant ages
    - Incorporation of OFSP into infant foods
    - Improved WASH practices
- Frontline workers (CHWs, nutrition & ag extensionists) indicated
  - Women had better nutrition knowledge than men
    - Women benefitted from both project's nutrition training as well as health talk at child welfare clinics

Marketing qualitative results



## Farmers' views working with Urwibutso

- **Urwibutso purchased OFSP at 20 RWF higher than the prevailing market price (200-220RWF)**
- When the bakery manager was asked what the trends are on consumer demand for OFSP products, he responds, *'it is increasing'. With a smile he reiterated that 'the bakery is able to meet its costs and make profits.'*

Year	Quantity sold (tonnes)	Value of root sales (USD)
2014	16.7	2912
2015	33.5	33475
2016	56.5	56451
2017	46.7	61202

Increasing trend

## Social responsibility- Government subsidy

OFSP vines were distributed as relief following the drought of 2016.

Likely to have resulted in surplus roots in 2018, that farmers could not market fully

Year	Total value USD (including vine sales from farmer groups)
2015	27,880.87
2016	40,024.49
2017	293,895.96

Value (USD) obtained by multipliers from sales of vines

# Effect of OFSP marketing and processing on well-being of farmers

- Various aspects of improving wellbeing of farmers were cited:
  - pay for family healthcare insurance dues- USD 30 per year/person
  - Purchase of various types of livestock; sheep, pig, cattle for manure was mentioned as part of the benefits farmers have accrued from sale of OFSP
    - Livestock as an indicator of Wealth
    - For manure
  - Construction/rehabilitation of permanent house was seen reported by both gender

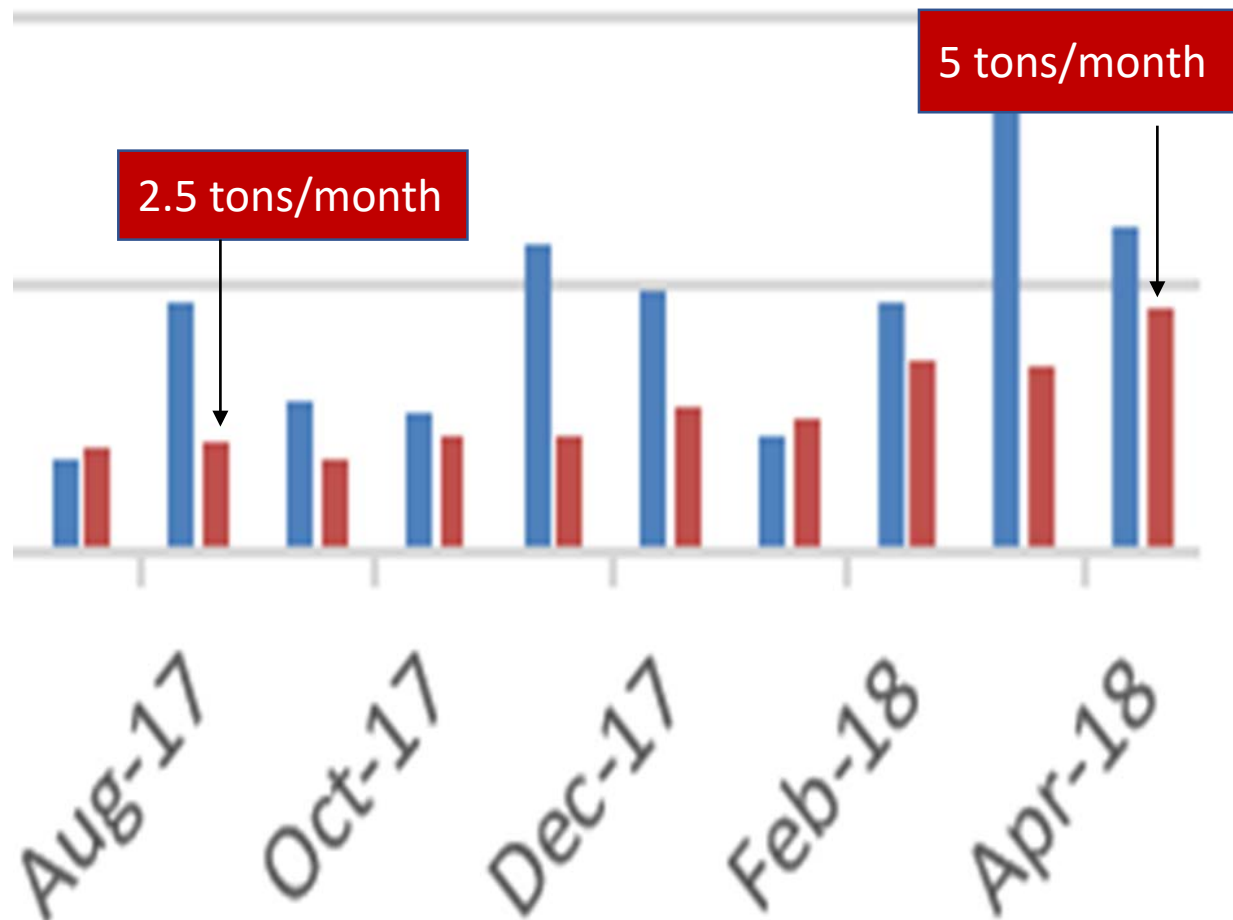
# Improved Nutrition and gender relations

- *'Eating in the family has improved due to the kinds of foods we purchase from the money we got from vines' Another respondent said 'we got money that helped us to buy various foods'*
- *Women have gotten money from vines and roots. Before it was not easy for a woman to get money for her personal needs or even be able to contribute to household needs such as food and clothing'. In specific, one woman said that women have gotten money that they can spend without asking men.*
- *In a male group, men indicated that their participation in OFSP value chain was minimal at the start of the project. However, gradually they became interested when women started making money from OFSP. One of the men retorted 'When a woman comes home with 100,000RWF from OFSP, will you stay at home or you will follow her?'*



# Puree production by Organi

## Production expanding



## Other players entering the chain

- Large bakery firm started OFSP bread production
  - ✓ Targeting western Kenya market
  - ✓ To expand to other markets
- New puree processor
- >> Injected competition

# Collective action

- Farmer organizations – identified and screen farmers, monitored production, received roots (product aggregation)
  - ✓ Reduced transportation and transaction costs
  - ✓ Shares/reduces some of the risks
- Farmer organizations acted as a platform for:
  - ✓ Distribution of clean planting material
  - ✓ Joint agronomic and postharvest handling training – quality specifications, harvest regime
  - ✓ Negotiation/renegotiation of price
- Organi experimenting with 2 other approaches
  - ✓ Controlled group approach
  - ✓ Individual farmer growers



# Strategy #3: Vertical (backward) integration

- Securing sweetpotato vine production for sustainability
- Setting up own production unit - will sell roots under interlinked credit scheme
- High risks:
  - ✓ Diseases/weather
  - ✓ Side-selling – can be reduced by monitoring



# Processing of OFSP in Malawi

- Processing of OFSP is still at its nascent stage
- The main processor is Universal industries
- Tahila
- New Bread Talk – Concern Universal





# Consumer perception of OFSP products

- Consumers liked OFSP products (Bread, Crisps, Mandazi, doughnut)
- Retailers were also happy with the sales of OFSP products across the board
- However, there was lack of consistency in production of OFSP products for different reasons





Lessons learnt

# Lessons learnt under seeds system

- Markets for planting material develop only after root markets have strengthened. As a result, the initial “hands-on” role for CIP and public sector partners (e.g. national agricultural research systems [NARS]) remains important for longer than expected.
- Markets for OFSP planting material is initially driven by institutional buyers (NGOs and government programmes, etc.).
- Farmers are starting to value quality planting materials
- CIP has to work with all the main institutional players to develop standards, quality assurance, and training programmes for OFSP.

In Rwanda under SUSTAIN DVMs sold vines worth US \$ 361,801

# Nutrition linkages lessons learnt

- Policy support is critical for integration of nutrition activities related to biofortification into national programmes
- Recognising the behaviour change amongst households occurs through community level activities, through working with voluntary groups, farmers clubs, community health organisations and with schools through the curriculum
- Continued communication, advocacy, and branding of OFSP for nutrition in order to support public awareness and policy change

Under SUSTAIN the percentage of households growing and eating OFSP increased but that did not necessary have the same effect in increasing feeding of OFSP to children

# Private sector investment

- One of the limiting factors continues to be the supply of quality OFSP roots from smallholder farmers, and the programme's initial assumptions about the number of farmers that can be engaged at this piloting stage need to be corrected.
- More management and technology research is required to strengthen supply chain management and, in locations with pronounced seasonality of sweetpotato production, investments in storage (of roots or intermediary products).
- Financing from the private sector is more likely to become available once a product has been successfully developed and tested by CIP and its partners. The best example here is the OFSP puree, which as an intermediary product has proven to be a significant technological breakthrough, particularly for the bakery sector.
- Farmers' perception of OFSP as a profitable and nutritious crop, and consumers acceptance of the product e.g in baked products, has been critical to driving OFSP adoption.

SUSTAIN work was instrumental in reversing the government policy from banning sweetpotato to promoting OFSP.

Most nutrition efforts now includes OFSP

# Linkages to other efforts

- SUSTAIN has acted as a catalyst for other related programmes in the four project countries, including projects by CIP and other organisations.
- Country-level and regional platforms are important for influencing government and other stakeholders to include OFSP approaches into their programmes.
- SUSTAIN has enabled several programmes in the four countries to scale out OFSP production and nutrition education.
- Continued gender analysis is needed to identify and promote opportunities for women in the process of technology change (planting material value chain, variety selection) and increased market engagement (processing). Without such a detailed understanding, technological and administrative changes risk marginalising women.

SUSTAIN and other OFSP efforts have encouraged private sector investment in OFSP – Rwanda at least 20 small processors, Kenya larger scale processors, Malawi investment at all levels



# MLE lessons learnt

- It is very important to plan ahead at the planning stage what data will be collected
- Cost the monitoring and data collection well
- Timing is key in data collection because this has a big impact in the results any evaluation will give
  - Yield data
  - Consumption data
- Collecting yield data is hard in sweetpotato

# Future questions

- We need to refine the social and behavior change communication to be more effective
- Will we have a seed system where farmers are the main buyers?
- How do we improve our engagements with the whole OFSP value chain?
  - Aggregators, transporters, wholesalers, retails have been left behind

# What is next?

- Piloting new delivery systems – need an evaluation framework (with H+ and other partners)
- Clearly, we need a diversity of delivery systems to get the benefits of biofortification to different types of beneficiaries. The rural poor, the urban poor, adolescents, under 2 year olds etc.
- The question is how do we find out which delivery systems work best for whom? As CIP, we want to take on this challenge, in a smart way. Together with partners, we will review what we and others have learned about delivering nutritious foods to these demographic groups, and we will develop a design and evaluation framework to support smart piloting of new delivery mechanisms for biofortified crops.
- For the next round of support, we want to prioritize:
  - Roots production to feed the growing OFSP market
  - Partner with more large scale processors to develop mass market products
  - Commercial processing targeting the poor
  - Fresh markets.
  - Nutritious basket approach
  - Humanitarian programs.

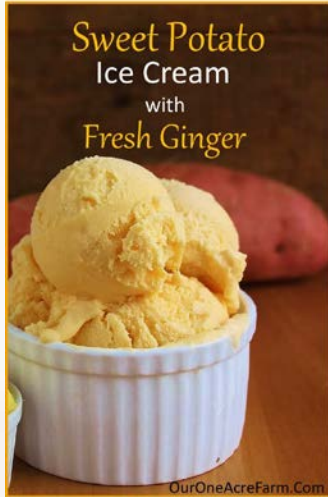


# Some Processing opportunities

Jams and Spreads



Sweet Potato  
Ice Cream  
with  
Fresh Ginger



Sweetpotato juices



Doughnuts



Bakery



Local recipes



Fries