Scaling Up Orange-fleshed Sweetpotato through Agriculture and Nutrition (SUSTAIN)

Over the past 5 years, the Scaling Up Orange-fleshed Sweetpotato through Agriculture and Nutrition (SUSTAIN) program has enabled more than 1.7 million farming households with children under 5 years of age in Kenya, Malawi, Mozambique, Rwanda, and Bangladesh to grow and consume Orange-fleshed Sweetpotato (OFSP) – over 40% above the set target of 1.2 million. These households include those that are directly engaged in CIP-led program activities and those indirectly accessing OFSP and nutrition knowledge through farmer-to-farmer diffusion and related partner programs linked to SUSTAIN. The program efforts have also led to an increase in commercial processing of OFSP into puree (steamed and mashed roots) especially in Kenya, Rwanda and Malawi. For example, in Kenya, the Program has resulted in commercial sales of more than 220,000 loaves of nutritious sweetpotato bread per year by one commercial bakery who are projecting increasing demand for commercial products using OFSP as a major ingredient.

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Fig. 1 Women displaying six cooked OFSP varieties in Malawi (Credit S. Quinn)

What is the problem?

In many African and South Asian countries, Vitamin A deficiency (VAD) is considered a major public health problem, affecting almost a quarter of the population, and one that requires appropriate nutrition interventions. VAD causes morbidity, poor cognitive development, nutritional blindness, reduced immunity, and in some cases, death in children especially under the age of five years as well as poor productivity in adults. Orange-fleshed Sweetpotato (OFSP) is a nutritious type of sweetpotato that has a huge potential of reducing VAD, especially among children under five years of age, the group most at risk of VAD. Only 125 grams of most OFSP varieties supply the recommended daily allowance of vitamin A for children under five years of age. In addition, the short maturity (3-4 months), low input requirement and ease of integration into kitchen gardens makes OFSP an excellent food-based approach to reduce the high prevalence of VAD.

SUSTAIN Scaling up Sweetpotato through Agriculture and Nutrition

CIP INTERNATIONAL POTATO CENTER A CGIAR RESEARCH CENTER

UKaid from the British people

SPHI Sweetpotato for Profit and Health Initiative Reaching 10 million African households by 2020

SUSTAIN is a 5-year program (2013-2018), coordinated by the International Potato Center (CIP) with support from UKAid, to scale up the nutrition benefits of biofortified orange-fleshed sweetpotato (OFSP) to 1.2 million households with children under five years of age in children in Kenya, Malawi, Mozambique, Rwanda, and Bangladesh. SUSTAIN supports an integrated set of interventions in agriculture, nutrition, and marketing to increase production and consumption of OFSP. SUSTAIN emphasizes rigorous monitoring, operational research, and independent evaluation to assess the scalability of these interventions and contribute to global evidence on achieving large scale nutrition outcomes through biofortified crops.

What do we want to achieve?

SUSTAIN is a 5-year programme (2013-2018) which works to enhance nutrition and food security of women and young children in East and Southern Africa, through integrated agriculture and nutrition interventions utilizing OFSP. The programme has set out to reach at least 1.2 million farming households with children under 5 years of age with OFSP planting material and nutrition education by 2018. This will be achieved by using an integrated approach that appreciates the critical role that good nutrition plays in assuring the full physical and mental development of children. The program approach has emphasized that farmers be enabled to retain OFSP as part of their mixed farming systems and in their diets after direct programme support has phased out, by producing OFSP at least twice a year and consuming OFSP at least twice per week when it is in season. The program has also aimed to develop effective inroads into urban markets in collaboration with fresh root traders and commercial food processors. The program's aim has been to reach at least 400,000 consumers with a commercially traded product that uses OFSP as a major ingredient. To gain a better understanding of the effectiveness and efficiency of our delivery approach, SUSTAIN is working through Michigan State University to undertake a 4-year rigorous evaluation of selected program interventions using a Randomized Control Trial in Rwanda and qualitative methodologies in all countries.

Where and with whom are we working?

SUSTAIN is implemented in the Eastern and Southern African regions; specifically, in Kenya, Malawi, Mozambique, and Rwanda, and since 2016 in Bangladesh. The programme is led by the International Potato Center (CIP) and the UK Department for International Development. To ensure an integrated agriculture-nutrition-health approach approach, the programme is being implemented with multiple partners (local and international), local and national governments, health institutions and facilities, commercial private sector and NGO's and several technical implementing partners across the target countries.

How are we making it happen?

The program is using different, locally adapted variations of CIP's Integrated Agriculture-Nutrition-Marketing Approach to create sustainable access to planting material, support smallholder production, improve household level utilization and consumption, and strengthen marketing (Fig. 2) and commercial processing. This is achieved by specifically targeting vulnerable households with children under five as producers and consumers, while

Fig. 2 Branded retail traders sell fresh OFSP roots in Maputo, Mozambique (Credit J. Low)

also strengthening their engagement with public sector service providers in the agriculture and health sectors and their participation in markets, once OFSP production has been established. The program pays close attention to increasing participation of women throughout the OFSP value chain.

What have we achieved so far?

SUSTAIN has so far reached over 1.7 million households with children under five years growing and consuming OFSP in Kenya, Malawi, Mozambique, Rwanda and Bangladesh. The program has also reached over 1.4 million caregivers through nutrition education and training in the target countries causing a continuing ripple effect of nutrition support through partners and those already reached. Research conducted by the project demonstrate an improved behaviour change in dietary habits with most communities reached (adult and children) now regularly consuming OFSP, especially during seasons of availability. Through targeted action, the program has improved its inclusion of women who now supply at least 30 percent of all OFSP planting material.

Commercial processing of OFSP has increased in most of the implementing countries. Commercial food processors have started to invest in the utilization of OFSP puree as a major ingredient in the baking industry. Kenya and Rwanda recorded the highest sales volumes of $338,130 and $212,809, respectively, over the past 5 years (Fig. 3). A summary of beneficiaries and SUSTAIN progress by country is provided in Table 1.

Table 1 Summary of SUSTAIN Progress

Indicators		Kenya	Malawi	Mozambique	Rwanda	Bangladesh	Total
HH with children <5 receiving OFSP planting material	Program participants	44,448	95,585	53,737	113,882	7,527	315,179
	HH reached through diffusion and related projects	253,352	544,832	306,302	649,127	42,906	1,796,518
OFSP multipliers operational	Program participants	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)
Caregivers reached through training	Program participants	35,362	50,600	38,691	115,779	10,080	250,513
	HH reached through diffusion and related projects	201,562	288,420	220,541	659,943	57,456	1,427,921
Sales volume of each product	Program participants	Puree: >$100,000 Bread: >$330,000	Crisps: >$15,000	Bread: >$11,000	Bakery products: >$212,000	n/a	n/a

The program has partnered with Michigan State University to conduct a comprehensive 4-year Randomized Control Trial in Rwanda. Additional qualitative evaluations and case studies have been carried out and results have been published and presented at international conferences.

During its final year, the program has intensified its operational research activities and specifically analysed in more detailed the underlying constraints and possible incentives for behaviour change towards greater utilization of OFSP and other nutritious foods. This research has been presented in regional technical roundtable meetings convened around three questions:

- What factors determine the early interest and adoption/ uptake of OFSP processing by commercial partners in the urban food sector, and how can incentives be created for private sector (co)investments at different stages of program implementation?
- How does the commercialization of sweetpotato value chains affect (positively or negatively) the well-being of smallholder farmers and their families, particularly women's opportunities as producers, traders, artisanal processors, and consumers?
- What nutrition-related behavior change has the SUSTAIN program achieved in different household and market contexts, including smallholder households producing OFSP and households in rural and urban areas purchasing OFSP through the market?

Fig. 3 Making OFSP puree at Organi Ltd in Kenya (Credit J. Low)

Fig. 4 Women cultivating orange-fleshed sweetpotato in Rwanda (Credit H. Rutherford)

What have we learnt so far?

a) Diffusion and retention of OFSP in farmers' fields and diets.
The program's operational research and case studies substantiated the initial assumptions that OFSP will be retained and further diffused by farmers in their production system if they consider OFSP varieties to be competitive in yield and/or price as compared to other sweetpotato varieties (Fig. 4). Nutrition knowledge is an important additional motivator for increasing and maintaining regular consumption of OFSP but is in itself, insufficient to drive either production or consumption.

b) Partnering with commercial food processors.
Conclusions on best practice of partnering with commercial food processors are limited by the small number of partnerships undertaken to date. Initial observations from these partnerships, however, indicate that research and commercial partners need to co-develop a collaboration model that focuses the role of the research organization in providing knowledge and technology support and initial linkages with service providers.

c) Understanding rural-urban linkages in food systems.
The development outcome of increased commercialization of OFSP through pathways such as commercial processing for urban markets is still uncertain and requires more rigorous research in both urban and rural areas. Urgent research questions include how OFSP-based products can be better customized to low-income urban consumers and how benefits for smallholder farmers selling OFSP roots into these value chains can be further increased.

What's next?

This impactful CIP-led program will continue to deliver outputs and outcomes in the participating countries (Kenya, Malawi, Mozambique, Rwanda, Bangladesh) through March 2019. During this time, we will also conclude the evaluation of different delivery mechanisms and assess their scalability. Findings from this analysis and related operational research will inform the design of follow-on programs in the participating countries as well as at global level.

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