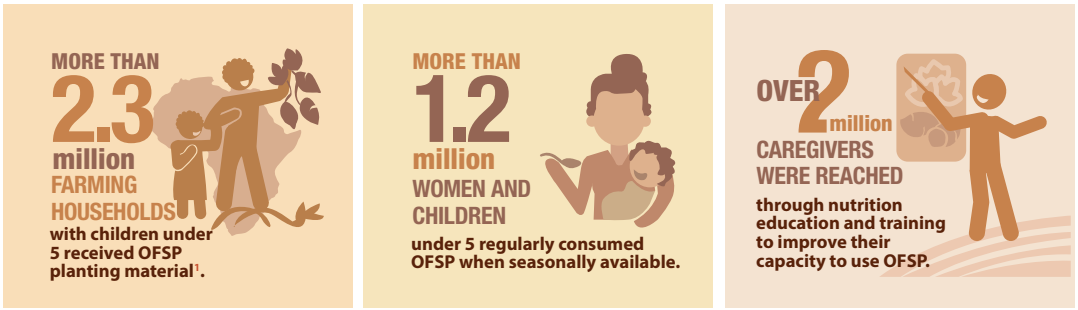
Scaling Up Sweetpotato through Agriculture and Nutrition

Between 2013 and 2019, the Scaling Up Sweetpotato through Agriculture and Nutrition (SUSTAIN) project, led by the International Potato Center (CIP) and involving more than 20 partner organizations, set out to improve the diets of at least 2.3 million households with children under 5 years of age in Africa and South Asia.

Focusing on Kenya, Malawi, Mozambique, and Rwanda, with additional activities in Bangladesh and Tanzania, SUSTAIN used integrated agriculture and nutrition interventions to scale up the production and consumption of biofortified (vitamin A-rich) orange-fleshed sweetpotato (OFSP).

Key achievements



SUSTAIN's basic assumption, that agriculture and nutrition interventions can reinforce each other to effect behavior change towards healthier diets in smallholder households, has been validated at a large scale.

1 Sweetpotato is propagated vegetatively, that is it is grown from cuttings taken from other sweetpotato plants and not true seed from which crops such as cereals, pulses and most vegetables are grown.

What is special about orange-fleshed sweetpotato?

Vitamin A deficiency (VAD), one of the most pernicious forms of undernourishment, can limit growth, weaken immunity, lead to blindness, and increase mortality in children. Globally, 165 million children under 5 suffer from VAD, mostly in Africa and Asia.

Over the past decade, CIP and partners have developed and disseminated dozens of biofortified OFSP varieties in Africa and Asia. These varieties contain high levels of beta-carotene, which the body converts into vitamin A. Just 125 g of fresh OFSP root (a medium-sized sweetpotato) meets the daily vitamin A needs of a preschool child, and also provides high levels of vitamins B6 and C, manganese and potassium, among other nutrients.

CIP-led work in promoting production and consumption of OFSP has made it a cost-effective and sustainable source of vitamin A for vulnerable populations, especially women and young children. OFSP also provides the raw material to support rapidly growing commercial production of nutritious foods, creating jobs and income opportunities, including for women and young people.

Approach

Some key features of the SUSTAIN approach were:

- Integrated agricultural, nutritional and marketing interventions that simultaneously targeted smallholder households with children under 5 years of age.
- Investing in the selection and training of partners—drawn from national agriculture research institutions, health services, civil society organizations and the private sector—enabled CIP to scale back direct involvement in the delivery of OFSP planting material and nutrition education at field level, and instead focus on provision of technical support to partners.
- Promoting the production and consumption of fresh roots by smallholder households and mainstreaming of commercial products based on OFSP puree for other rural and urban consumers.
- Rigorous monitoring and evaluation, including the use of a 4-year-long randomized control trial (RCT) undertaken by Michigan State University. RCTs—the gold standard for assessing cause and effect relationships between interventions and outcomes—provided robust and independent evidence of achievements and impact.

Achievements

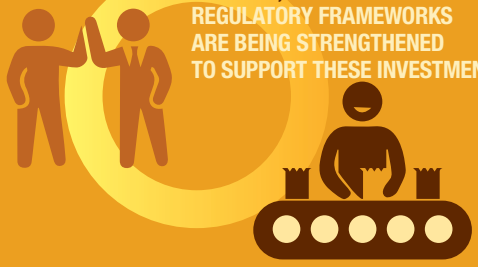
SUSTAIN focused on three outputs: creating access to OFSP planting material by smallholder households with children under 5; access to improved nutritional knowledge and diversified use of OFSP by both male and female caregivers; and commercially marketed processed products utilizing OFSP.

Access to planting material: SUSTAIN helped enhance access to OFSP planting material—directly and indirectly—for more than 2.3 million households with

Demonstration of feasibility and viability of commercial processing of OFSP, grown by smallholders, into nutritious puree as an ingredient in the local bakery sector.

Across the target countries, annual sales of OFSP puree-based products are estimated at more than USD 890,000 as a result of the program:

- **THIS HAS RESULTED IN INDEPENDENT PRIVATE SECTOR INVESTMENTS IN OFSP PROCESSING IN KENYA, RWANDA, AND MALAWI**
- **IN KENYA, REGULATORY FRAMEWORKS ARE BEING STRENGTHENED TO SUPPORT THESE INVESTMENTS**



children under 5 years of age, enabling them to start producing and consuming OFSP. Beneficiaries within these households included more than 2.8 million children, 1.1 million adolescent girls and 2.9 million women of reproductive age.

Almost one-quarter (23%) of smallholder households in the target communities, located in areas with high potential for growing sweetpotato, established OFSP production as part of their farming activities. Of these, about 70% still cultivated and consumed OFSP at least one year after receiving planting material.

For every household directly reached with planting material through project activities and interventions, on average an additional 4.2 households were reached through farmer-to-farmer diffusion or partner activities using OFSP technologies and behavior change modules developed by SUSTAIN.

Providing households with planting material twice rather than once increased the OFSP adoption rate and enhanced production. But providing planting material alone for multiple seasons is no more effective than providing planting material for one season together with nutrition education and marketing training.

A variety of approaches were used to deliver OFSP planting material, in the form of bundles of 100-200 cuttings, to smallholders. These included local project-trained multipliers, commercial multipliers, public extension services and participatory varietal selection trials. Adjustments were made in year two of the project to increase participation by women; by the end of the project, overall, 65% of the 549 multipliers of planting material who supplied the cuttings to other smallholders were women and only in Mozambique and Tanzania was the proportion of women less than half.

Improved nutritional knowledge and diversified use of OFSP: Many approaches were employed to increase nutritional knowledge and diversified use of OFSP among caregivers in households with children under 5. The households supplied with OFSP planting material were also targeted with basic nutritional messages. Methods used to further increase knowledge included counselling, training and nutritional education at rural health centers, field day events, food demonstrations and mother-to-mother clubs, as well as media campaigns on the benefits of OFSP as part of a healthy and diverse diet.

Directly and indirectly, SUSTAIN succeeded in reaching more than 2 million caregivers—men and women, parents and other family and community members—with nutrition messages. Research demonstrated that nutrition knowledge increased and both children and adults regularly consumed OFSP when seasonally available. On average, for every caregiver reached directly through project activities, an additional 5.2 caregivers were reached through household-to-household diffusion or complementary partner activities.

The combination of creating access to planting material and improving knowledge resulted in at least 1.2 million children and women in smallholder households regularly consuming vitamin A-rich OFSP. Implementing nutrition education and counselling or marketing interventions increased the likelihood of OFSP adoption, and enhanced production and consumption.

In Rwanda, women and children in around one-quarter of targeted smallholder households consumed OFSP five days a week, in months when the crop was available. Rwanda has one of the highest rates of sweetpotato consumption globally. In target communities, OFSP consumption accounts for 15-20% of all sweetpotato consumed.

Field trip to an orange-fleshed sweetpotato project site in Rwanda.

Commercially marketed processed products utilizing OFSP: A major innovation achieved by SUSTAIN was to facilitate the commercial manufacture and utilization of OFSP puree made from sweetpotatoes grown by smallholders. The puree was used by small- and medium-sized companies in the baking sector of the project countries to produce OFSP-puree-based bread and other products.

The project demonstrated the technical feasibility and commercial viability of these products. This built on previous CIP research that had demonstrated proof-of-concept for using OFSP puree in bakery products. They were nutritionally superior, with higher vitamin A content, less fat and sugar, a lower glycemic index and cheaper to make due to substitution of imported wheat and other ingredients with puree.

Earlier CIP-led research demonstrated that transformation of OFSP storage roots into puree is an excellent strategy for retaining beta-carotene in a stable and safe product. Even after baking, puree-based products retain more than 90% of the beta-carotene present in the root. Just two slices of OFSP bread can provide about one-third of the daily vitamin A requirement of a 5-year-old.

CIP ensured a strong focus on healthier and nutritious bakery products by focusing on reducing fat and sugar levels and discontinuing support for less healthy foods, such as chips or crisps.

As a result of SUSTAIN, commercial partners introduced 10 new OFSP-puree-based bakery products, together generating additional annual sales of close to USD 900,000. Sales were especially strong in Kenya (which accounted for 61% of total sales) and Rwanda (29%). Commercial uptake of the puree in Mozambique was slower, reflecting smaller markets and fewer food processing companies.

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For more information about see: cipotato.org and sweetpotatoknowledge.org.

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