

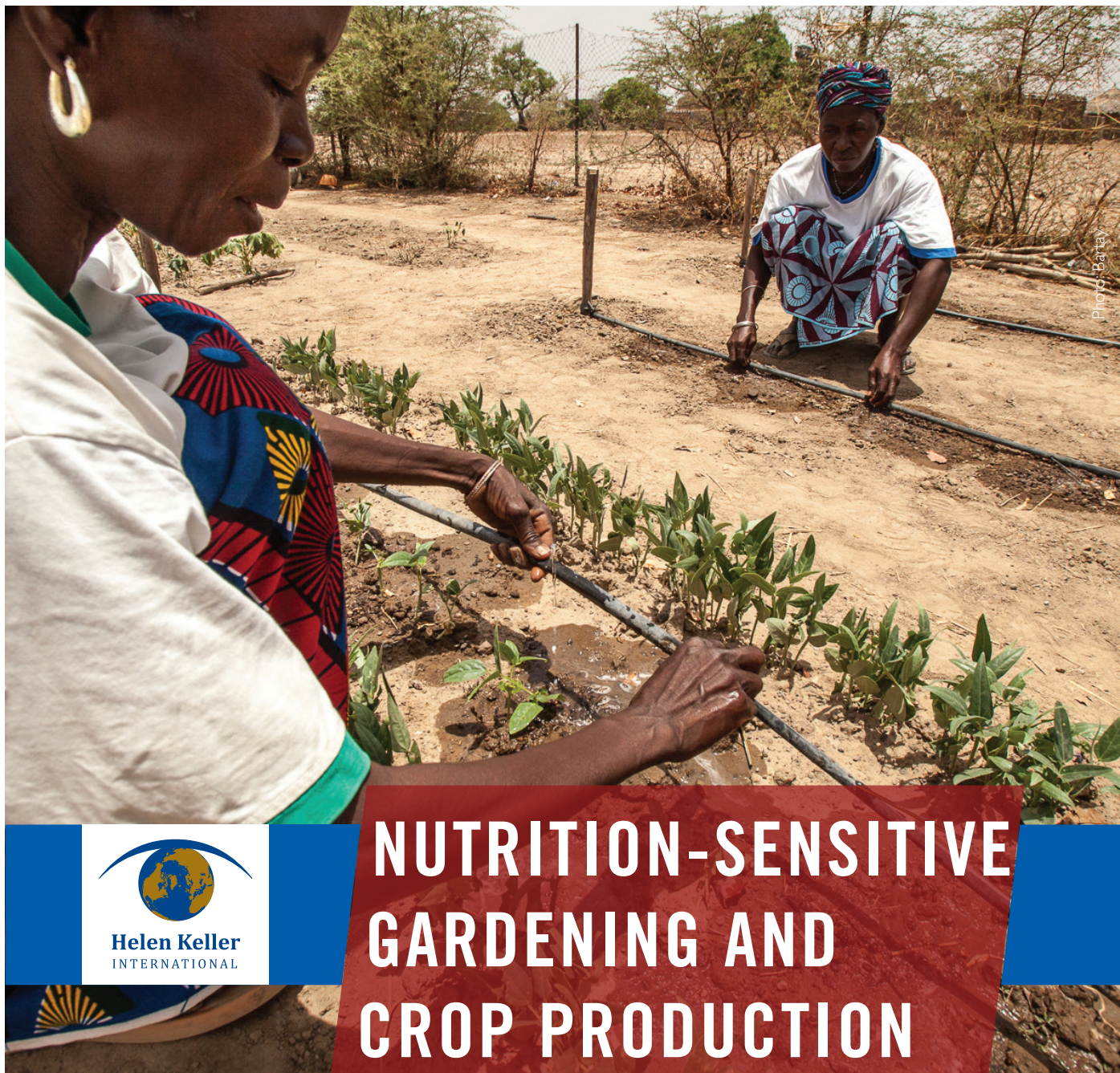


Photo: Baray



NUTRITION-SENSITIVE GARDENING AND CROP PRODUCTION

WHAT MAKES CROP PRODUCTION SENSITIVE TO NUTRITION?

In much of Africa, policy and extension services have traditionally focused on staple crops, such as maize, and cash crops, such as coffee and cashew. While these play key roles in household livelihoods, national economies, and food security, they leave gaps in terms of nutrition. Staples tend to be rich in calories—but not micronutrients and minerals, like Vitamin A and iron. Diets based solely on staples can thus lead to nutrient deficiencies, particularly among young children, who are in a critical developmental phase.

Crop diversification is one way to address this. Fruits and vegetables are rich in nutrients essential for immune system function and physical and cognitive development. For example, orange fruits and vegetables (like mangos and carrots) are rich in vitamin A (beta carotene); dark green leafy vegetables like spinach contain smaller amounts of vitamin A and iron. Pulses, like lentils, also provide iron. Growing nutrient-rich crops can improve nutrition while supporting income generation and livelihood diversification by allowing farmers to expand into marketing or secondary products. Finally, growing diverse crops can make farmers resilient to environmental stresses, such as pests, droughts, and changes in climate.



HKI'S APPROACH TO NUTRITIOUS CROP PRODUCTION IN AFRICA

HKI's agricultural programming places nutrition front and center. We promote nutrient-rich crops that are well suited to local environments and preferences, aiming to complement what exists to fill nutrient gaps. For example, by pairing vitamin A-rich crops like pumpkin with local greens containing iron and vitamin A like moringa and pulses like cowpea, a balanced diet can be obtained. Combining these crops with animal-source foods goes even farther toward meeting nutrient needs. Complementing food production with behavior change communication (BCC) on nutrition and hygiene and support for women's empowerment fosters the conditions for the whole household to benefit from newly available crops.

HKI's nutrition-sensitive agriculture (NSA) programs typically use a community-based approach to provide training and support for crop production. This may include start-up inputs, such as improved seeds, as well as technical support. We collaborate with local NGOs, building capacity to integrate NSA into their on-going activities. Local NGO staff then train "lead farmers", mostly women, to create Village Model Farms (VMFs): shared plots used for demonstrations, collective cultivation, and producing seeds. With the support of HKI and local NGOs, the lead farmers train groups of other women, who learn together at the VMF. This community-based model helps support sustainability, since resources remain available locally, and social inclusion, since women without land can grow at the VMF. Hands-on trainings focus on crop choice and environmentally-friendly, health-sensitive techniques. These include minimal and smart use of pesticides and fertilizers, replacing these with compost and plant-based bio-pesticides where feasible, water conservation, and crop-livestock integration. Additional training on post-harvest storage and transformation can help extend crops' seasonal availability or create new income-generating activities—such as blending enriched flours using orange-fleshed sweet potato (OFSP) and cowpea.

HKI has achieved numerous successes with such approaches in Africa. Under a 2009-2012 Irish Aid-funded project in Tanzania, the percentage of households with gardens multiplied over fourfold, as did the number of vegetables grown. Among households with a garden, about 95% were growing five or more vegetables, compared to 22% at baseline. Sales of vegetables increased, as did income. A USAID-funded project in Burkina Faso (2009-2012) similarly succeeded in increasing production across numerous crops: women's annual production increased by 161 kg relative to a control group, with a 34 kg increase in vitamin A-rich crops.

A GOLDEN OPPORTUNITY: ORANGE-FLESHED SWEET POTATO

The WHO estimated that 48% of children aged 6 to 59 months in Sub-Saharan Africa were Vitamin A deficient in 2013, with potentially negative consequences for their vision, cognitive development, and growth. Vitamin A deficiency also afflicts pregnant women and new mothers. There are no magic bullets for ending Vitamin A deficiency, but one tuber can play a key role: OFSP is rich in beta carotene. Increasing consumption can thus sustainably reduce vitamin A deficiency. In some parts of sub-Saharan Africa, sweet potatoes are a staple crop – but typically white or yellow ones, which are not rich in beta carotene. Thus, HKI has long worked to promote OFSP production and consumption, working across eight African countries.

Through the AGRANDIS (2014-2018) project in Burkina Faso and Mozambique, we provided OFSP vines to over 25,000 people, most cultivating for the first time. We built networks of vine producers and supported them to make OFSP a new livelihood—netting as much as \$1,000 in additional annual income, well above GDP per capita. We also supported OFSP production in schools and increased broader demand for OFSP. In Sierra Leone and Cote d'Ivoire, we have worked with researchers to identify promising varieties of OFSP. In Mali, we've integrated OFSP into a large livelihoods, nutrition, health, and governance project. In Senegal, through the SPRING project, we've helped communities produce videos showcasing OFSPs' advantages, including delicious OFSP-based local dishes.

We've also aimed to foster higher-level uptake. The Reaching Agents of Change (RAC) Project (2011-2014), implemented in five African countries in partnership with the International Potato Center (CIP), focused on advocacy for increased investment in OFSP, generating investments that supported 52 projects or activities. It also developed educational materials, built local capacity to implement cost-effective and gender-sensitive OFSP projects, and led to numerous national and regional policies affirming a role for OFSP in African growth. Previously, we collaborated with CIP and the International Food Policy Research Institute (IFPRI) to test diverse strategies for promoting OFSP production and consumption.



CHANGE: INNOVATIVE NUTRIENT-RICH CROP PRODUCTION ACROSS CONTEXTS

The Global Affairs Canada-funded CHANGE (2013-2016) project, implemented in Senegal, Burkina Faso, Cote d'Ivoire, and Tanzania, gave HKI its biggest opportunity yet to expand work in nutrient-rich crop production in Africa by testing potentially impactful innovations. In Burkina Faso, we worked with the World Vegetable Center to promote nutrient-rich traditional African vegetables (TAVs). Jute mallow, for example, has almost twice as much beta-carotene per gram as spinach. While common in some in parts of Africa, these vegetables were new to many farmers in Burkina Faso. Growing TAVs can improve nutrition and resilience, while helping ensure that these unique crops (which often have environmental benefits) are conserved and adapt to new environments. Farmers may hesitate to adopt unfamiliar crops like TAVs: in marginal environments, there is little scope for replanting if a crop fails, so many farmers are averse to risks. The use of VMFs allowed for testing TAVs while reducing the cost of failure. Through CHANGE, 12 TAV varieties were introduced, and trainings reached 2,500 people. During the three years, over 165 tons of TAVs were produced. To encourage sustainability, farmers were also trained in seed production, producing a total of 15.6 kg of TAV seeds.

In Cote d'Ivoire, the focus was on marketing and sustainability. Women's groups were supported to sell surplus production from the VMFs; the resulting revenue was used to expand their collective nutrient-rich crop

production. In the first year, over 14,000 kg of tomato and 2,000 kg of carrot were produced, with average revenues of up to \$490. In Tanzania, CHANGE worked in a densely-populated area with limited land availability. HKI thus adapted the approach: instead of communal land, trainings were held on the land of 'resource farmers', who volunteered to share. The project supported these farmers to become trusted sources of gardening advice, creating a lasting source of information for the other project participants. CHANGE Senegal was implemented in a very different context: a dense urban neighborhood of Dakar. The goal was to pilot-test an urban NSA model using locally produced 'micro-garden' tables in which plants could be grown hydroponically (in nutrient-enriched water). Participants, once provided with seeds and training, widely succeeded in using the tables to grow nutrient-rich plants for use in household meals.

CHANGE thus allowed HKI to innovate with approaches to agriculture, achieving impacts across all four countries. The project directly reached over 8,000 households, a cadre of 800 resource people were trained in NSA techniques, and over 250 villages and neighborhoods gained sustainable supplies of OFSP vines. Households in all countries saw increases in nutrient-rich crop production: from 54 kg to 403 kg per household in Burkina Faso and from 15 kg to 85 kg in Cote d'Ivoire, for example.

ONGOING WORK AND FUTURE DIRECTIONS

HKI continues to expand its impact in NSA. The multi-country USAID-funded SPRING project (2013-2017) allowed us to experiment with different ways to produce nutritious crops at scale. In Senegal, we worked with local agricultural cooperatives, and in Sierra Leone we focused on further developing value chains for Vitamin A-rich pumpkin. In the future, we aim for greater development of nutrition-sensitive value chains and other market-based approaches. We will explore novel ways to improve water access and test production techniques that enhance resilience to climate change. We will work to extend seasonal availability and reduce post-harvest losses through processing and storage. Indeed, we see the avenues for improving nutrition and livelihoods in Africa through enhanced nutrient-rich crop production as being as diverse as the crops themselves!



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