

Zimbabwe: Integrated Model to Promote Nutrient Enriched Crops Within Diversification

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Biofortified crops with value chain activities: **Iron Bean, Vitamin A Maize, Vitamin A Orange Sweet Potato**

Biofortified crop varieties currently available and in the pipeline in Zimbabwe

Crop	Variety	Year of release
Vitamin A maize	ZS242A	2015
Vitamin A maize	ZS244A	2016
Vitamin A maize	ZS246A	2016
Vitamin A maize	ZS248A	2016
Vitamin A maize	ZS500A	2019
Vitamin A maize	CZH1713	Pre-release
Vitamin A maize	HP1306	Pre-release
Iron bean	NUA45	2009
Iron bean	Jasmine	2019
Vitamin A orange sweet potato	Alisha	2021
Vitamin A orange sweet potato	Delvia	2021

Note: Iron pearl millet is in the advanced stages of testing in Zimbabwe and is recommended as a crop for commercialization and scale as soon as it is released.

Donors and key projects in Zimbabwe

- UK Foreign Development and Commonwealth Office (FCDO): Zimbabwe Livelihoods and Food Security Program (Sept. 2015–June 2021)
- The Government of Canada: An Integrated Food Systems Approach to Build Nutrition Security Project (Jan. 2021–Sept. 2022)

Delivery model steps and activities

1. Agricultural research

- Crop improvement: Lead by the HarvestPlus R&D team at a global level with the relevant CGIAR centers, i.e. CIMMYT for maize, CIAT for beans, CIP for sweet potatoes, and ICRISAT for pearl millet.
- Crop variety testing and release: HarvestPlus Zimbabwe provides support to the Government of Zimbabwe's Crop Breeding Institute (CBI) to test biofortified varieties coming out of the global breeding pipeline for local adaptation and farmer acceptance.

2. Seed and vine release

- Supported CBI in the release of selected varieties
- Engaged with seed companies to produce and multiply biofortified seeds, then link interested seed companies with CBI for them to be granted marketing rights for the released varieties
- So far, 11 seed companies have been licensed by CBI to produce and multiply vitamin A maize and iron bean seed
- There are an additional nine primary nurseries that multiply and sell vitamin A orange sweet potato vines.

3. Commercial seed production

- Provides licensed seed companies with start-up breeder and foundation seed as well as technical assistance in seed production for biofortified varieties
- Trains 353 smallholder farmers with access to irrigation in certified iron bean seed production and linked the trained farmers with seed companies to produce certified seed for them on contract
- Reduces the cost of seed production for seed companies while providing smallholder farmers with additional income from their farming activities
- Provided marketing support to seed companies for biofortified seeds through mass media, exhibitions, and social media posts, etc. This is to incentivize seed companies to take up biofortified varieties, since they will not bear all of the typically high costs of promoting a new product in the market
- Note: All vitamin A maize and iron bean seed sold in Zimbabwe is certified seed. Companies are responsible for ensuring certification, although the program provided technical support to companies to ensure that the seed they produced met certification standards.

4b. Farming/growing

- Specific program activities to promote the production and consumption of biofortified crops:
 - Nutrition education, cooking demos, and biofortification agronomic training
 - Experiential marketing through seed test packs, demo plots, food tasting fairs, exhibitions, and field days
 - Including the production and consumption of biofortified crops as one of the key nutrition behaviors being promoted to mothers and caregivers of children during the latter's first 1000 days of life
 - Marketing support to biofortified crop growers by linking them to off takers
 - Promoting biofortified crops through mass media advertising, social media campaigns and edutainment shows
- Conducts training-of-trainers workshops on biofortified crops for government extension staff, government nutrition officers, as well as agriculture and nutrition officers from other NGOs, who then extend the training to beneficiary farmers in their own programs
- According to the Ministry of Agriculture's national crop and livestock survey, an estimated 12,136 hectares were planted with VAM and/or HIB in the 2021/22 cropping season. This was mainly in the 12 districts where biofortified crops were first piloted and most extensively promoted under the LFSP, although their production has also spread far beyond these 12 pilot districts.

4a. Fertilizers and agronomic biofortification (including scope or demand)

- Currently there is no work in this area and work plans are advisable.

5. Aggregation

- Through the program's advocacy efforts, the Grain Marketing Board (GMB) (government's grain procurement agency with extensive network of commodity buying centers), is currently buying vitamin A maize from farmers at the same price as non-biofortified maize. Therefore, farmers have a guaranteed market for their vitamin A maize.
- Biofortification sensitization workshops with informal bean traders culminated in high uptake of iron beans by informal traders in the country's main markets, as a way of encouraging them to offtake iron beans from farmers and promote their sales to their customers. As a result, iron beans is one of the most sought-after beans in these markets.

6. Milling

- As with processors and seed companies, the program engages millers to produce, package and sell mostly orange maize meal, samp and grits.

7. Processing

- Engages processors to include NEC ingredients in their processing
- Tailor-made presentations to the processors showcasing the various product innovations they can try with NECs
- So far, nine community-level and three national processors now process vitamin A maize, iron bean and vitamin A orange sweet potato into various products including vitamin A maize snacks, cornflakes, vitamin A maize samp, vitamin A maize meal, sweet potato flour, iron bean dry packs, iron bean flour, tinned iron bean and tinned vitamin A maize samp and iron bean mix.

8a. Retailing

- Retailers are essential for distributing the processed products and also loose beans and flour. Investment is required in point-of-sale marketing, price promotions and collection of sales data.

8b. Public procurement (schools, hospitals, safety net schemes)

HarvestPlus worked directly with 612 primary and secondary schools promoting biofortification through:

- Establishing biofortification demonstration plots;
- Field days by which parents from around the schools were reached; and
- Biofortification days, with the aim of teaching nutrition and biofortification to pupils;
- HarvestPlus also introduced biofortification to 119 institutions (Agric colleges, universities, clinics, hospitals, and prisons) through:
 - Biofortification demonstration plots and field days; and
 - Biofortification seminars.

9a. Consumption on farm

- The activities done to promote on-farm consumption of biofortified crops are the same as those done to promote their production, since production and consumption are promoted simultaneously.
- Additional activities to promote on-farm consumption include cooking demos, food fairs, and the inclusion of biofortified crops in infant and young child feeding guides.

9b. Commercial food consumption (by the entire population)

- As is the case with seed companies, the program also provides marketing support to processors through mass media, social media and exhibitions.

9c. Consumption from institutional settings (schools, hospitals)

- The specific activities the program does to promote the consumption of biofortified crops in boarding schools include the provision of food and seed test packs, and conducting nutrition and biofortification days at which pupils are taught the nutritional benefits of biofortified crops.
- The range of institutions now serving biofortified food in the country includes schools, hospitals, prisons, and orphanages.

Non-commercial value chains, conflict, or fragile environments

The integration of NECs in food security and nutrition programs, including in fragile and conflict-affected settings, are mostly targeted at producer households and/or people served by public institutions.

4	Non-commercial seed/vine dissemination to farmers	<ul style="list-style-type: none"> • HarvestPlus has distributed vitamin A maize seed and grain to institutions serving disadvantaged communities as part of the COVID-19 response under the GAC project. These distributions have also included training on the nutritional benefits of the crops. • The government, under its presidential input support programs, as well as some NGOs under their agricultural recovery programs, have also distributed VAM and HIB seed. • To ensure that the benefits of the crops are communicated to beneficiaries of such programs, HarvestPlus has worked with the seed companies that have been awarded such tenders to ensure that the seed packets they supply include inserts/brochures with information on the benefits and agronomics of biofortified crops.
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Other agricultural activities and points of consideration

The LFSP, as a multi-component program, covered agricultural activities that included promoting good agricultural practices, agrobiodiversity, and sustainable soil and water management practices.

Nutrition and biofortification was mainstreamed into all such activities, such that even when promoting in-field water harvesting for example, the varieties used in such demos would be biofortified. This helped to put biofortification at the center of all the agricultural technologies that the program promoted.

All biofortified seed sold in the country is certified seed.

Policy, advocacy and enabling activities for biofortified crops

Activity	Summary
Government advocacy and engagements	<ul style="list-style-type: none"> • As part of its advocacy efforts, the program held a series of learning events co-hosted with relevant government departments, with the aim of presenting evidence and learnings that would encourage the government to increase its commitment to biofortification. • In addition to the learning events, the program also produced technical and policy briefs on such issues as: <ul style="list-style-type: none"> • The inclusion of biofortified crops in government input support programs; • Integration of vitamin A maize into the strategic grain reserve; • Development of certification standards for sweet potatoes. • In the 2021/22 season, 100MT of iron beans were included in the presidential input scheme.
Policy inclusion (list all relevant policies agriculture and nutrition)	<ul style="list-style-type: none"> • The program has contributed to the inclusion of biofortification in the following policy documents: <ul style="list-style-type: none"> • The national agricultural policy framework; • The national nutrition strategy; • Zimbabwe National Food Fortification Strategy (Industrial Food Fortification, Biofortification and Home Fortification) (2022 - 2026)); • Multi-sectorial food and nutrition security strategy (draft).

Standards and regulations	<ul style="list-style-type: none"> The Publicly Available Specifications for zinc, iron and vitamin A biofortified grains are promoted in Zimbabwe. In 2022, a guideline for manufacturers will be published to advise businesses on how to label and market biofortified and fortified foods.
Market research	<ul style="list-style-type: none"> Market research is required to understand the flow of trade in staple crops. This should involve precise mapping of the use of maize, beans, sweet potato and millets, and which market segments the commodities go into. This allows for a more-targeted business-to-business campaign in the future.
Technology advancements	<ul style="list-style-type: none"> The HarvestPlus Biofortification Priority Index is used to make decisions on crops and target beneficiaries. Concepts have been developed for predictive models that could identify impacts of enhanced nutrition on multiple outcomes, including migration, conflict, livelihoods, and education. 2022 will see the launch of a pilot to digitize production through SaaS-based platforms. Concepts are developed to use farmer data to digitize data collection, and monitoring and evaluation.
Data collection	<ul style="list-style-type: none"> HarvestPlus and FAO facilitated and provided technical and financial support to the Ministry of Agriculture to ensure that biofortification metrics and indicators are integrated into existing national surveys. This is a key sustainability pillar that will enable government to account for the contribution of biofortified crops to the reduction of micronutrient deficiencies. Biofortification metrics are now regularly included in: <ul style="list-style-type: none"> The Zimbabwe national nutrition survey; The AGRITEX National crop and livestock Assessment survey; and The Zimbabwe Vulnerability Assessment committee (ZImVAC) survey 2022
Gender and inclusivity	<ul style="list-style-type: none"> The program placed considerable emphasis on gender equity; 56 percent of program beneficiaries were women. Moreover, 50 percent of the community-based mobilizers were women, and they will continue to reach fellow women farmers with nutrition and biofortification training beyond the program.

Monitoring and evaluation, reach in 2022

The program has a robust monitoring, learning and evaluation system and also conducts regular surveys to monitor key output and outcome indicators for the adoption of biofortified crops in the country.

Reach in 2022

Seed Volumes	Grain Volumes	Food products commercial
<p>Market share % According to the 2022 crop and livestock report, VAM was planted on 0.6% of the total area under maize production, while HIB was planted on 13% of the total area planted to HIB. Data on OFSP area is not yet available.</p>	<p>Market share % Data not available.</p>	<p>Data not available.</p>

Consumer reach - Targets for the 2022/23 season

Area planted to biofortified crops:	14,500ha
Quantity of biofortified grain harvested:	11,800 MT
Quantity of biofortified food processed:	1,400 MT

	Current / 2021 figures	Potential reach by 2030
Households Growing	303,002 farming households	
Off-farm / food market consumption	Data are not available – only estimates based on the proportion of crops which are known to be consumed at home.	As part of the Happel funded project it is estimated that the HP program in Zimbabwe will reach a further 5,000 farmers and 520,000 consumers by June 2026.
Institutional reach (social safety nets, schools, hospitals)	Data are not available	

*Potential reach is only an aspiration. Current funding and donors not yet in place to reach this many consumers

SWOT analysis summary

Strength	Weaknesses
<ul style="list-style-type: none"> Strong support for biofortification by NGOs in Zimbabwe, UN agencies (WFP, FAO, IFAD, and UNICEF), CGIAR, African Union, the Ministry of Agriculture and Ministry of Health, as well as the Zimbabwe's nutrition community. Inclusion of biofortification in a number of key government policy documents. 	<ul style="list-style-type: none"> Limited funding available to support the development of new and improved biofortified varieties to add to the current portfolio of biofortified varieties. Limited geographic scope of previous and current funding, limiting the nationwide upscaling of BF crops. Limited investment by large multinational seed companies in biofortified varieties.
Opportunities	Threats
<ul style="list-style-type: none"> High acceptance and demand for biofortified crops. High potential for the inclusion of biofortified foods in school feeding. High potential for the inclusion of biofortified seed in government input support schemes. Availability of promising biofortified pearl millet varieties which could be released to tackle increase climate resilience while also tackling hidden hunger. 	<ul style="list-style-type: none"> Demand for biofortified seed currently exceeds supply resulting in biofortified seed shortages, especially for VAM.

About the author: Sakile Kudita is the Country Manager for HarvestPlus Zimbabwe and a multidisciplinary trained rural development practitioner with experience working in the nexus between crop production, market linkages, seed systems, food security, and nutrition programming.

These case studies were developed in collaboration with the FAO as part of a Letter of Agreement to create "Guidance and tools to promote nutrient enriched crops as part of healthy diets to address micronutrient deficiencies in vulnerable rural communities"