



Scaling Iron Beans (NUA45) in Zimbabwe

– from Zero to 41 Percent in Ten Years



HarvestPlus



SOLUTIONS

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Background

The common bean (*Phaseolus vulgaris* L.) is a vital and affordable source of plant-based protein, iron, zinc, and dietary fibre for over 100 million households across Africa. It is grown on more than 7.6 million hectares, where it also improves soil fertility through natural nitrogen fixation (Mukankusi et al., 2019). Its importance for food and nutrition security has grown in recent years with the introduction of biofortified bean varieties, which contain up to 90 percent more iron than the conventional 50 ppm baseline. These biofortified beans can provide up to 80 percent of the daily iron requirements for women of reproductive age and children aged 6–59 months, making them more effective in combating iron deficiency. Globally, iron deficiency is the most widespread micronutrient deficiency and a leading cause of anaemia, impaired cognitive development in children under five, and adverse pregnancy outcomes in women. In Zimbabwe, approximately 72 percent of children aged 6–59 months and 61 percent of women of reproductive age (15–49 years) are iron-deficient. In response, the Government of Zimbabwe has adopted biofortification as one of four key strategies to address iron and other micronutrient deficiencies, alongside supplementation, industrial fortification, and promoting dietary diversity.

NUA45, a biofortified common bean variety, was the first biofortified crop variety released in Zimbabwe in 2010. However, widespread promotion and dissemination only commenced in 2015 under the Zimbabwe Livelihood and Food Security Program (LFSP). By the end of 2025, four years after the close of the LFSP, NUA45 had become the most widely grown common bean variety in the country, accounting for an estimated 41 percent of the total area planted to common beans.

This study analyses the key success factors that contributed to the rapid adoption of NUA45, from its release to achieving an estimated 41 percent of the country's total bean production area within a decade.

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NUA45: The Journey from Zero to 41 Percent Within Ten Years



Variety Description

NUA45 is an iron-biofortified common bean (*Phaseolus vulgaris* L.) variety developed through a partnership between HarvestPlus, the International Center for Tropical Agriculture (CIAT), and the Crop Breeding Institute (CBI) under the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development. This large-seeded, Calima-type bean is easily distinguished by its red-mottled appearance, characterized by deep maroon seed coats with light pinkish-white streaks.

Release and Initial Resistance

When NUA45 was first released in 2010, it became the first-ever Calima-type bean variety introduced in Zimbabwe, entering a market dominated by cream-colored sugar-type beans. As a result, the variety initially faced resistance from both farmers and consumers due to its unfamiliar appearance. Farmer acceptance for this new technology was accelerated through coordinated social marketing, anchored on a strong value proposition, highlighting its high iron content, competitive yields, early maturity, and fast cooking qualities. Over time, the distinct seed colour—initially a barrier to adoption—evolved into one of the variety's most recognisable and sought-after characteristics. Today, both farmers and consumers use this unique appearance to identify NUA45, a variety they now recognise, trust, and value.

Growth and Market Dominance

The NUA45 gained significant traction from 2015 onwards. Initially through the Livelihoods and Food Security Programme (LFSP), HarvestPlus led extensive marketing and promotion efforts targeting seed companies, farmers, processors, development partners, and government departments. HarvestPlus also played a central role in developing the ecosystem and coordinating the NUA45 value chain.

Central to the success was HarvestPlus' market-led delivery model, which brought together strategic actors across the NUA45 value chain. Each stakeholder contributed at different levels, collectively driving the rapid adoption and widespread expansion of NUA45's market share.

Adoption surveys conducted by HarvestPlus, Michigan State University, and by CIAT and DR&SS, estimated that 29 percent of bean growers were cultivating NUA45 by 2022 (Mudyahoto et al., 2024). Meanwhile, Maereka et al. estimated that 47 percent of the bean growers in Zimbabwe's bean production corridor were growing NUA45 by 2023. By 2025, an estimated 41 percent of the country's total common bean area was under NUA45 cultivation, signalling the rapid growth and expansion of the value chain.

Drivers for Success

The success of NUA45 cannot be attributed to a single factor, but rather to a combination of interrelated elements that complemented and reinforced each other. The key success factors are summarized below:



Nelson Munyaka, Managing Director, Zimbabwe Super Seed

“We pioneered the production of NUA45 with CBI and had the first seven metric tonnes (MT) of certified seed produced for marketing in 2014. The first batch of NUA45 seed was marketed in mines and schools in Masvingo. Initially, resistance was faced due to the bean’s coloration but once they cooked and tasted the product they all discarded other bean types. The support we got from HarvestPlus in sourcing markets and technical promotion helped Zimbabwe Super seeds production to rise from seven MT to more than 100 MT in three years.

During the early phases of promotion, institutional buyers, particularly those supporting agricultural recovery and input assistance programmes played a critical role in stimulating demand. The bulk purchases increased the number of farmers being exposed to the bean variety. They got excited and it became their bean. Their bulk purchases provided assured markets for seed companies, reduced investment risk, and incentivised continued production and promotion of NUA45, helping to build confidence across the seed value chain and laying the foundation for sustained nationwide adoption.

When we began producing bean seed in 2013, NUA45 represented just 10 percent of our total bean portfolio. Today, it is our flagship variety, accounting for nearly 80 percent of the bean seed we produce and sell. This growth is due to its strong and sustained demand at both national and regional levels. It is now our best-selling bean variety, with overall sales increasing by an average of 20 percent annually, despite the growing number of seed companies also producing and marketing it.”

A Competitive Variety and Development of a Strong Value Proposition

The variety’s competitive yield, early maturity (approximately 90 days), drought tolerance, and resistance to common bean diseases are key agronomic traits valued by farmers and important drivers of NUA45 adoption. However, the advantages of NUA45 extend beyond the field performance.

According to Dr. Kutwayo, Chief Director of the Department of Research and Specialist Services, in the Ministry of Agriculture, *“NUA45 illustrates how successful a variety can be when it is bred to meet the combined preferences of both farmers and consumers. Its strengths extend beyond yield to include cooking time, taste, grain size, and nutritional value, which together explain its widespread acceptance and success.”*

These combined attributes formed the foundation of the promotional messaging developed by HarvestPlus and its partners. By highlighting both the agronomic and consumer benefits of NUA45,

the campaign generated strong demand among institutional buyers and women consumers, contributing to increased farmer uptake and the variety’s strong market competitiveness.

Crowding In a Critical Mass of Seed Companies and Strengthening Production Capacity for a Robust NUA45 Seed System

Building on the strong value proposition for NUA45, HarvestPlus facilitated variety licensing and strengthened seed production capacity for participating seed companies. As a result, the number of seed companies producing and marketing certified NUA45 seed increased from just one in 2015 to ten by the end of 2025. Over the same period, NUA45’s market share increased from less than two percent to an estimated 41 percent of all certified common bean seed on the market by 2025.



Charles Dhewa, CEO - Knowledge Transfer Africa (KTA)

NUA45 constitutes an estimated 70 percent of the 1,300 metric tons of the total beans sold each month in Mbare Market, Zimbabwe's largest fresh produce market. The variety has gained a footing into most urban formal and informal markets including eMalaleni in Bulawayo, Kudzanayi in Gweru, Sakubva in Mutare and many smaller towns including growth points like Gokwe, Lupane and Guruve. Soup yield, relatively long shelf life, resistance to attack by weevils, and taste have made this bean more attractive to many consumers and traders compared to the other bean varieties,

including the once popular “Ngoda” variety which has remained the closest competitor and substitute for NUA45. Although NUA45 has not acquired a nickname like Ngoda, it has maintained its distinctiveness in the market with many traders acquiring unique marketing skills including serving it with rice for lunch in the informal market's food catering enterprises.

The past few years have seen “NUA45” look-alikes from Malawi, Tanzania and Zambia finding its way into Mbare market. However, consumers prefer local NUA45 which they say has a superior taste and cooks much faster than that from other countries. These distinctions have been expressed through different prices with the local one being retailed at USD 1/cup while that from outside is sold USD 1/two cups. At the time of writing this article, 80 tons of beans had arrived from Malawi into Zimbabwe, looking for buyers, but market continues to favour the local NUA45, which has been selling at USD 22 – USD 35 per 20L bucket since November 2025.

This growth was driven largely by HarvestPlus' support to seed companies through improved access to early generation seed, targeted seed production training for out growers, and seed marketing support. Working closely with government extension services, HarvestPlus also built the capacity of hundreds of smallholder farmers, particularly those in irrigation schemes, to produce certified NUA45 seed through training and improved access to quality foundation seed.

This enabled out-growers to meet the quality and quantity requirements stipulated in their contracts with seed companies, while also generating surplus seed that could be sold or exchanged locally, thereby accelerating farmer-level adoption.

The combined engagement of private seed companies and community-based seed producers established a sustainable dual seed delivery system. Commercial seed companies provided a strong market-based foundation and ensured distribution beyond donor-supported areas, while farmer-led

seed enterprises and farmer-to-farmer seed exchange extended access to remote and hard-to-reach communities that were not commercially viable for seed companies.

This approach promoted equity and inclusivity, ensuring the sustained availability and affordability of quality NUA45 seed for smallholder farmers.

In the early phases of promotion, institutional buyers, particularly those supporting agricultural recovery and input assistance programmes played a critical role in stimulating demand. Their bulk purchases provided assured markets for seed companies, reduced investment risk, and incentivised continued production and promotion of NUA45, helping to build confidence across the seed supply chain. This laid the foundation for sustained nationwide adoption.



Developing and Rolling Out a Robust Multi-Pronged Demand Creation Strategy at Various Levels

At policy level, HarvestPlus led the development of a robust, evidence-led advocacy strategy anchored in a compelling value proposition aligned with national priorities to address iron deficiency. The rollout of this evidence-led advocacy strategy included mainstreaming NUA45 into agricultural extension and community health messaging, as well as integrating the variety into training materials used across sectors. Policy-level engagement ensured integration and mainstreaming of NUA45 in institutional procurement systems, particularly among programmes involved in agricultural recovery and input support.

The strong messaging and clear value proposition positioned the promotion of NUA45 a collective, multi-stakeholder initiative involving a wide range of nutrition and agricultural partners. These included the National Nutrition Unit under the Ministry of Health and Child Care (MoHCC), the Food and Nutrition Council (FNC) through its multi-sectoral Food and Nutrition Security Committees, the Scaling Up Nutrition (SUN) networks, FAO, UNICEF, IFAD, and several food and nutrition-focused NGOs.

HarvestPlus and its partners also created strong consumer demand pull by training grain aggregators, schools, fresh produce marketers, and processors on the value proposition of NUA45. Awareness among these groups was a key driver of both demand and adoption of the variety. A marketer at a fresh produce market in the city of Masvingo, explained: *“Boarding schools now look for NUA45 beans only because of its fast cooking, energy saving and its ability swell to nearly twice their size when cooked, allowing schools to serve more learners from small quantities of dry grain. So, if you stock other varieties, you will only sell them if no one has NUA45”*.

The Promotion of NUA45 also employed a combination of social and traditional media approaches, incorporating both above-the-line and below-the-line advertising. These efforts included radio jingles, edutainment programs involving popular comic champions, like “Vhara zipi”, cooking demonstrations, field days, and promotional activities at agricultural trade exhibitions. Surveys continue to show that fellow farmers and extension staff remain the primary source of information on NUA45 beans.



Figure 1: NUA45 at Mbare Musika: red ticks are NUA45 and blue ticks are other bean varieties

In addition, the establishment of agronomic demonstration plots on the fields of opinion leaders and lead farmers enabled farmers and extension staff to directly observe the agronomic performance of NUA45. This hands-on exposure encouraged farmers to switch from non-biofortified varieties to NUA45. Strategically positioned as learning and promotional sites, the demonstration plots were deliberately managed as marketing tools rather than input support systems, ensuring effective introduction of the variety while simultaneously stimulating seed sales by seed companies and agro dealers.

Strengthening the Capacity of Value Chain Actors and Coordinating Value Chain Activities

To ensure consistent and accurate messaging, HarvestPlus conducted training-of-trainers workshops for partner staff to strengthen their capacity to effectively communicate the NUA45 value proposition. As a result, many partners integrated NUA45 and other biofortified varieties into their programmes. These coordinated efforts

mainstreamed NUA45 within both national and community-based initiatives, expanding awareness, strengthening consumer acceptance, and contributing to its emergence as a widely adopted variety.

Integrated Value Chain Approach

The scale-up of NUA45 in Zimbabwe was guided by an integrated value chain approach designed to stimulate multiple nodes of the bean value chain simultaneously and ensure that all critical functions worked in harmony. The strategy involved engaging seed companies to produce and distribute certified seed at scale, mobilizing farmers through training, demonstrations, and contract production schemes, and partnering with processors, and aggregators to guarantee reliable markets. By strengthening both the supply and demand-side components concurrently, the initiative minimised adoption bottlenecks and fostered a self-reinforcing ecosystem that strengthened confidence among actors across the value chain.

Recognizing the central role of informal markets in the bean value chain, the strategy also included educating informal traders on the attributes of NUA45, effectively recruiting them as nutrition advocates and promoters of the variety. According to Charles Dhewa, an agricultural market systems specialist and knowledge broker as well as Founder and Chief Executive Officer of Knowledge Transfer Africa (KTA), NUA45 accounts for an estimated 70 percent of the 1300 metric tons of the total beans sold in Mbare market every month.

Supportive Government Policy Environment

Zimbabwe's policy environment provides strong and explicit support for biofortification as a nutrition-sensitive, food-based intervention. Biofortified crops are recognized in the Food and Nutrition Security Policy, the National Agriculture Policy Framework (2018–2030), the National Nutrition Strategy (2019–2025), and the Zimbabwe National Food Fortification Strategy (2022–2026). Biofortification is also aligned with national development priorities outlined in the National Development Strategy 1 (2021–2025), National Development Strategy 2 (2026–2030), and the Agriculture, Food Systems and Rural Transformation Strategy (2026–2030).

This policy coherence has enabled the systematic integration and scaling of NUA45 and other biofortified crops within public programmes, including Presidential Input Support Programmes, private sector seed systems, and community-based initiatives.

In addition, the Ministry of Lands, Agriculture, Fisheries, Water, and Rural Development implements a self-funded nutrition-oriented breeding programme covering iron beans, vitamin A maize, iron cowpea, orange-fleshed sweet potato, zinc wheat, and iron pearl millet. International development financing, including loans from institutions such as IFAD, have further supported the promotion of NUA45 and other biofortified crops under their nutrition-sensitive agriculture investment pillars.

The Future Outlook

The success of NUA45 has established a blueprint for scaling biofortified crops and other agricultural technologies in Zimbabwe. It demonstrates how coordinated action across science, policy, community development, and markets—combined with a strong product value proposition—can transform a research innovation into a nationally owned solution for solving problems of national interest, such as hidden hunger, livelihoods, and food security.

Looking ahead, continued investment in the development of more genetically diverse and competitive biofortified bean varieties will be critical to complement NUA45 and Jasmine, a navy-type biofortified bean currently used for canning.

Further efforts are still needed to strengthen the integration of iron beans and other biofortified varieties into public procurement systems, social protection programs, and school feeding initiatives.

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