Reaching Millions

2015 ANNUAL REPORT

HarvestPlus
Better Crops • Better Nutrition

HarvestPlus is developing and promoting biofortified staple crops to improve human health and nutrition, and providing global leadership on biofortification evidence and technology.

Hidden Hunger

More than two billion people in the world—roughly one person in three—do not get enough essential vitamins and minerals, such as vitamin A, zinc, and iron, in their daily diets. Their condition is known as "hidden hunger" because those suffering from this type of undernutrition often appear healthy, but are actually more vulnerable to illness and infections. The impact of vitamin and mineral deficiencies is as follows:

IRON DEFICIENCY

- Impairs mental development and learning capacity
- Increases weakness and fatigue
- May increase risk of women dying in childbirth

VITAMIN A DEFICIENCY

- Impairs growth
- Causes eye damage leading to blindness
- Increases risk of infection such as diarrheal disease

ZINC DEFICIENCY

- Causes stunting
- Lowers immunity
- Increases risk of diarrheal disease and respiratory infection

Biofortification

| bi·o·for·ti·fi·ca·tion | \ˈbī-(ˌ)ō-ˌfȯr-tə-fə-ˈkā-shən\

Biofortification is the process of increasing the density of vitamins and minerals in a crop, through plant breeding or agronomic practices, so that when consumed regularly will generate measurable improvement in vitamin and mineral nutritional status.

Dear Friends,

2015 has been a momentous year for the global biofortification movement. We estimate that 15 million people in eight HarvestPlus target countries are now growing and eating nutrient-rich staple foods. Exciting nutrition data demonstrates that biofortified foods can reverse iron deficiency and reduce the incidence and duration of diarrhea, one of the leading causes of preventable death in children under five.

Cumulatively, more than 100 biofortified varieties across 10 crops have been released in 30 countries, where second and third waves of even higher nutrient lines are being tested for future release. Candidate biofortified varieties across 12 crops are being evaluated for release in an additional 25 countries. Notably, in 2015 we welcomed the release of zinc rice and iron lentil in Bangladesh, vitamin A maize in Brazil, Democratic Republic of Congo, Ghana, Nigeria, Zambia, and Zimbabwe, iron cowpea in India, and iron bean in Colombia. Research studies on long-term adoption and consumer acceptance of biofortified crops have shown encouraging results. We are also developing tools like the Biofortification Priority Index to help target investments in biofortification.

This year, I traveled to several countries where biofortified crops are being grown to observe this progress, and to meet with some of the many partners who are scaling up these nutritious crops. I remain humbled and impressed by the dedication of the policymakers, researchers, farmers, civil society organizations, and other stakeholders who are accelerating access to biofortified foods.

We are grateful to the donors who have made this shared success possible. The United Kingdom renewed its generous support with a four-year grant that runs through 2019, and the U.S. Agency for International Development expanded its funding to include delivery of iron beans in Rwanda. The World Bank made its first ever in-country grant that includes accelerating the scale-up of two biofortified crops in Uganda. The Bill & Melinda Gates Foundation continues to support biofortification, including generous funding of HarvestPlus and other partners. We were honored when Melinda Gates highlighted biofortification in her remarks congratulating the International Food Policy Research Institute (IFPRI) on its 40th anniversary, and we are proud that HarvestPlus was acknowledged as one of IFPRI's key accomplishments.

Much remains to be done as we continue to scale up to reach a billion people by 2030. This goal is ambitious. However, we are confident that it is achievable via private and public partners who integrate biofortification into their policies, programs, and investments. HarvestPlus will focus its efforts on facilitating and supporting existing and new partners in their efforts.

2015 ends on a bittersweet note for me. It has been the professional and personal honor of a lifetime to lead HarvestPlus from its inception to the thriving, multi-faceted global organization that it is today. The time has come for me to transition to an emeritus role, making way for new leadership. A search is underway for a new CEO, and I am confident that my successor will have the vision, expertise, and commitment needed to continue the momentum. I will remain at IFPRI, where I began my career more than thirty years ago, to focus on research and writing. Above all, I will remain a lifelong champion of biofortification. I will take great pleasure in watching all of you and the other supporters of this movement carry on this important work.

Thank you, and best wishes for the year ahead.

Howarth E. Bouis

Director of HarvestPlus

2015 **MILESTONES**

15 MILLION
PEOPLE

Are now growing and eating biofortified crops in HarvestPlus target countries

100+ VARIETIES
OF **10** BIOFORTIFIED
CROPS
have been released in
30 COUNTRIES

VIT A MAIZE
RELEASED IN ZIMBABWE

ZINC WHEAT
RELEASED IN PAKISTAN

PROGRAMS

RESEARCH

Through peer reviewed studies published in leading scientific journals, we demonstrated the impact of biofortified crops on consumers. An efficacy trial with rural teenage school children in the Indian state of Maharashtra found that iron pearl millet can reverse iron deficiency in children, and reduce the likelihood of being iron deficient by 65 percent after six months.

Our research on zinc maize and wheat demonstrated that despite the phytates in grains and cereals that inhibit nutrient absorption, these biofortified varieties contributed an important proportion of the daily zinc requirements for children and women of child-bearing age. Research on the health benefits of biofortified OSP in Mozambique showed that consumption of the crop reduced the prevalence and duration of diarrhea in children under five.

Consumer acceptance studies on our iron and vitamin A crops showed that target populations liked foods made with these crops as much as, if not more than, their conventional counterparts. And farmers, impressed by the nutritional and agronomic qualities of biofortified crops, are adopting them in growing numbers. Our impact assessment study in Rwanda provided evidence that since iron beans were first made available to farmers in 2011, nearly one-third of all rural bean producers—some half a million households—in the country have grown at least one iron bean variety.

IRON PEARL MILLET CAN REVERSE IRON DEFICIENCY IN CHILDREN, AND REDUCE THE LIKELIHOOD OF BEING IRON DEFICIENT BY 65 PERCENT AFTER SIX MONTHS.

ENGAGEMENT

Facilitating broader delivery and mainstreaming biofortification globally drove HarvestPlus' advocacy efforts and strategic partnership building. From sharing our work at high-level events, such as the Clinton Global Initiative, to briefing regional inter-governmental institutions, such as the African Union, we raised the profile of biofortification among influencers and policymakers.

The World Health Organization and the Food and Agriculture Organization (FAO) of the United Nations solicited review papers on various aspects of biofortified staple crops ahead of a special consultation on biofortification scheduled for New York in 2016. In London, the Global Panel on Agriculture and Food Systems for Nutrition released a policy brief recommending biofortification as an important intervention among a suite of complementary strategies. And in Rome, Bioversity International jointly issued a policy brief with HarvestPlus on the mutually reinforcing relationship between dietary diversity and biofortification at the annual meeting of the Committee on World Food Security.

Strategic partnerships allowed us to expand the reach of biofortified crops in and beyond our pioneer target countries. As a Technical Advisory partner in an FAO-led project funded by the UK Department for International Development, we facilitated the introduction of vitamin A maize and iron beans in Zimbabwe. Uganda received a major grant from the World Bank's Global Agriculture and Food Security Program, which includes national scaling of two biofortified crops. A collaboration with four CGIAR centers—CIP, IITA, CIAT, and CIMMYT—in a Bill & Melinda Gates Foundation-funded initiative set the stage for accelerating national adoption and scaling up of four biofortified crops in Nigeria and Tanzania in the next few years. An integrated maternal and child health program led by World Vision Canada and involving the Micronutrient Initiative was successfully proposed to Global Affairs Canada and will result in expansion of biofortified crops in two countries each in Africa and Asia.

STRATEGIC PARTNERSHIPS ALLOWED US TO **EXPAND THE REACH OF BIOFORTIFIED CROPS** IN AND BEYOND OUR PIONEER TARGET COUNTRIES.

STANDARDS AND REGULATIONS

The consideration of biofortification within the WHO/FAO-administered Codex Alimentarius continued to progress. The electronic working group (EWG) of the Codex Committee on Nutrition and Foods of Special Dietary Use (CCNFSDU) succeeded in narrowing a formalized definition for biofortification from eighteen proposals to two. These two proposals will be considered by CCNFSDU at their session in 2016.

OPERATIONS

LATIN AMERICA AND THE CARIBBEAN

IRON BEANS

VITAMIN A MAIZE
PROTEIN MAIZE
ZINC MAIZE

VITAMIN A
SWEET POTATO

ZINC RICE

ZINC WHEAT

In 2015, HarvestPlus added two new partnership countries to our program in Latin America and the Caribbean. El Salvador and Honduras join seven other countries in the region that have embraced biofortification. We continued to work with governments to establish biofortification programs, and strengthened our support to platforms promoting biofortified crops, such as AgroNutre and BioFORT. The AgroNutre program in Panama delivered biofortified crops, including zinc rice and maize, iron beans, and vitamin A sweet potato to some 8,000 farmers in the country's poorest and most vulnerable regions. In Guatemala, nearly 13,000 farmers received iron beans or Quality Protein Maize through the BioFORT Platform. In Brazil, the BioFORT Network reached more than 11,000 farmers in Maranhão and Piaui—the states scoring lowest on the human development index—with biofortified crops, such as iron cowpeas, and vitamin A cassava, maize, and sweet potato. More than 5,400 farmers from central-western, southeastern, and southern regions also received biofortified crops.

50,000
people reached

NIGERIA

VITAMIN A CASSAVA

An additional half a million Nigerian farmers adopted vitamin A cassava in 2015, joining more than 2 million Nigerians who have access to the crop. Through commercial and public sector partners, we produced more than one million bundles of vitamin A cassava stems, sufficient to plant over 17,000 hectares of new fields. We strengthened the crop's value chain by training more than 5,000 Nigerians on enterprise development, one-third of whom went on to invest in processing vitamin A cassava into popular local foods, such as *gari* and *fufu*. And, we engaged print and broadcast media, including Nigeria's film industry (Nollywood), to reach tens of millions of Nigerians with messages on vitamin A cassava and proper nutrition.

3.8 MILLION
people reached

DEMOCRATIC REPUBLIC OF CONGO

IRON BEANS

VITAMIN A CASSAVA

In 2015 alone, HarvestPlus delivered stems of vitamin A cassava to about 100,000 farming households in the Democratic Republic of Congo. More than 300,000 households in the west of the country are now growing the crop. We also identified, evaluated, and submitted for the government to release four new varieties suited to the northeast and south central agro-ecological zones. In North and South Kivu, Katanga, and Bas Congo provinces, we delivered 165 metric tons of iron bean seed to more than 175,000 households, raising the total number of Congolese who have tried iron bean to nearly 2 million. Additionally, with the country's first vitamin A maize varieties poised for official release, we supported seed multipliers to plant 40 hectares with the open pollinated candidate variety and 10 hectares with two hybrid candidate varieties. That should ensure at least 75 metric tons of seed and 100 metric tons of grain available to farmers and consumers in the first half of 2016.

3.7 MILLION
people reached

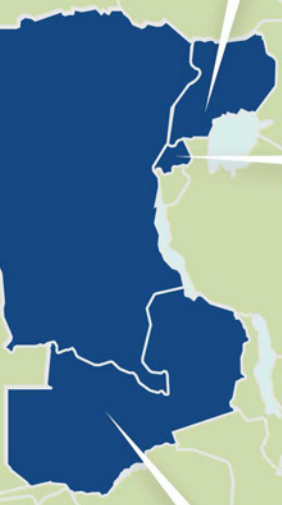
UGANDA

IRON BEANS

VITAMIN A SWEET POTATO

More than 85,000 farming households across 25 districts in Uganda received vitamin A orange sweet potato (OSP) vines and iron bean seed in 2015. At least 1.5 million farming households have now adopted one or both of these biofortified crops. We are working closely with the government to develop quality systems for OSP vines. To meet growing demand for vines, we provided major multipliers with water pumps and shared their costs of constructing mini-screen houses, facilities that are crucial for sustained production of clean vines. We supported testing of new iron bean varieties across six agro-ecological zones, and the government selected five for release in 2016 to complement the sole variety currently available to farmers.

1.8 MILLION
people reached



4.3 MILLION
people reached

RWANDA

IRON BEANS

Since 2011 when we first introduced iron beans to Rwandan farmers, more than half a million farming households have grown the crop. In 2015, we delivered over 1,200 metric tons of iron bean seed to 280,000 households across 23 districts, with farmer-to-farmer distribution reaching additional households. We trained 170 seed multipliers on best agronomic and post-harvest handling practices, empowering them to produce over 1,300 metric tons of certified seed. Our partner, World Vision, delivered some of the certified seed to 17,000 farming households across the border in Burundi. We continued to promote iron bean adoption within Rwanda through media and major events such as the national agricultural show, where we won the 2015 best exhibitor award.

1 MILLION
people reached

ZAMBIA

VITAMIN A MAIZE

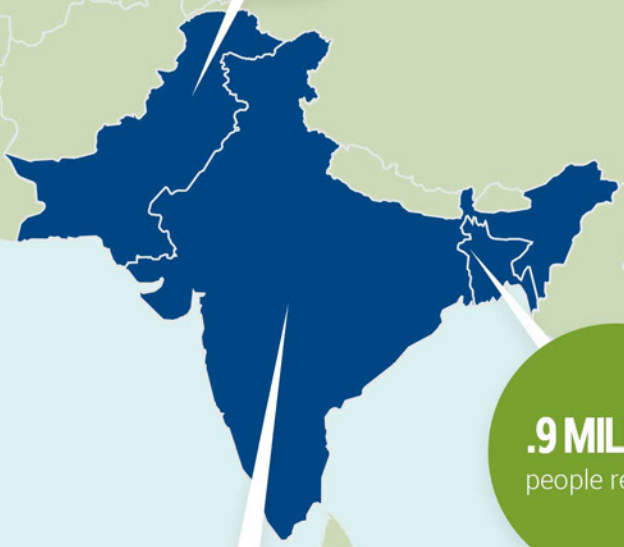
Vitamin A "orange" maize entered the mainstream maize value chain in Zambia for the first time in 2015. The Government officially launched commercial sales of orange maize seed, and bought at least 80 metric tons to distribute under the subsidized Farmer Input Support Programme. Our partner private seed companies produced 460 metric tons of seed for sale to farmers. Through our partnership with the AgResults Maize Biofortification Pilot Project, we bought 800 metric tons of grain for the market, strengthening linkages between smallholder farmers and processors. Working with international partners and our key local partner, the Zambia Agriculture Research Institute (ZARI), we developed three new varieties with even higher vitamin A levels, which the Government subsequently released to farmers.

PAKISTAN

ZINC WHEAT

We disseminated nearly 70 metric tons of seed of a new zinc wheat variety among federal and provincial research and development institutions, farmers, seed multipliers, promotional partners and NGOs across Pakistan during 2015. These partners will be able to produce 2,000 metric tons of seed for the 2016/2017 crop season following the variety's commercial release in 2016. Partnering with the CIMMYT-Agricultural Innovation Program, we distributed 8 tons of seed of the country's first zinc wheat variety to smallholder farmers under a joint program with the national agricultural research system to popularize and mainstream zinc wheat nationally. Through our advocacy efforts, we convened and engaged the Government, national and international organizations, farmers, stakeholders and the media in a national roundtable discussion on zinc wheat.

30,000
people reached



BANGLADESH

ZINC RICE

In 2015, our partnerships produced and delivered over 200 metric tons of zinc rice seed directly to more than 40,000 farming households in Bangladesh. Farmer-to-farmer distributions reached an additional 120,000 farming families. Households across 58 districts received seed of the two pioneer zinc rice varieties, and a newly released wet season variety BRRI dhan72. We supported the release and multiplication of another variety, suited to the dry season and which will be ready for demonstration in 2016. Our outreach services benefitted more than 4,000 farmers with training on proper techniques in zinc rice cultivation, seed production, and preservation.

.9 MILLION
people reached

1.3 MILLION
people reached

INDIA

IRON PEARL MILLET

ZINC WHEAT

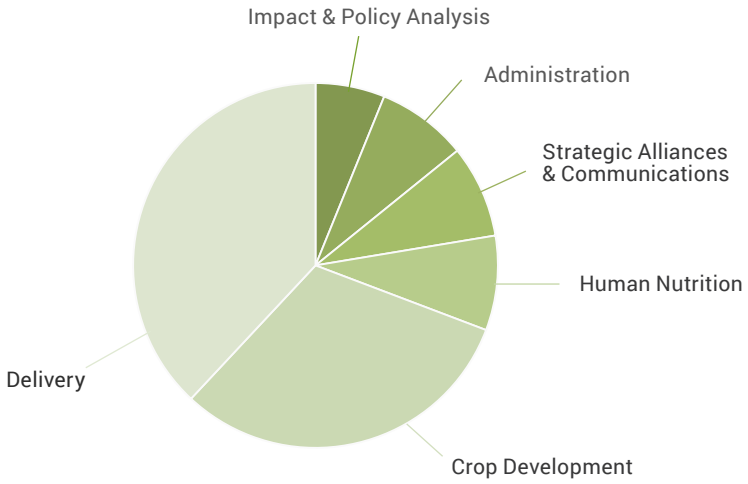
Through our partners Nirmal Seeds and Shakti Vardhak, we reached some 140,000 farming households with iron pearl millet seed in 2015. That included over 340 metric tons of open pollinated variety *Dhanashakti*, and 13 metric tons of hybrid variety Shakti-1201. Cumulatively, more than 1 million people across four states—Maharashtra, Rajasthan, Uttar Pradesh, and Haryana—have accessed iron pearl millet in the three years since the first variety (*Dhanashakti*) was released. For wheat-producing states, we delivered four zinc-rich varieties to 35,000 farming households, thanks to our partnership with various seed companies. Farmers in the states of Uttar Pradesh and Bihar received and planted 350 metric tons of zinc wheat seed produced through Astha Beej Co., Sood Foods, Said Seeds, or Shakti Vardhak.

FINANCIAL SUMMARY

2015 HARVESTPLUS DISBURSEMENTS BY CATEGORY

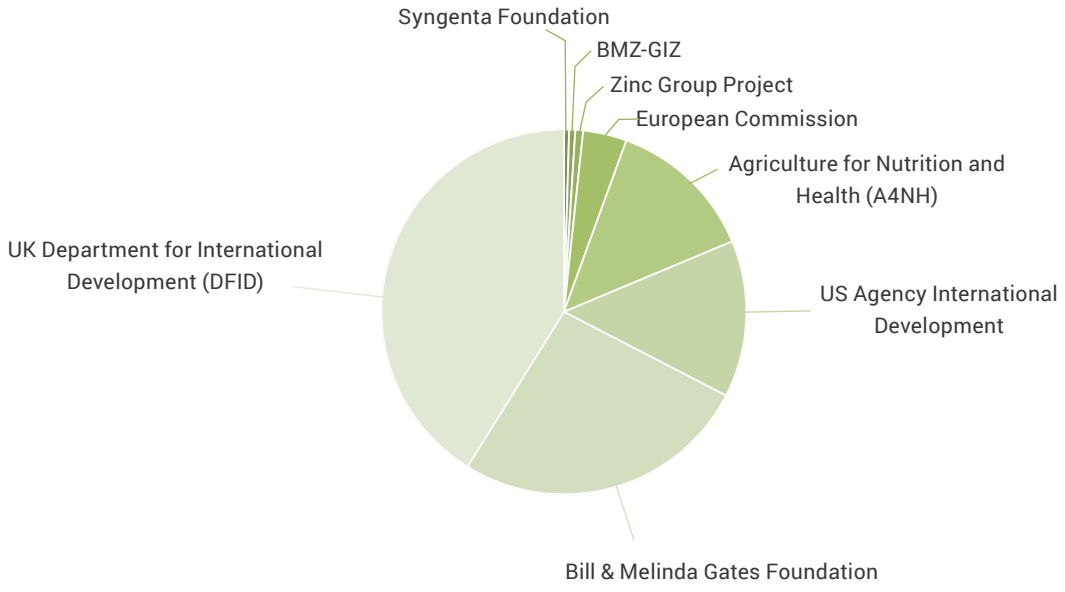
(IN THOUSAND US DOLLARS)

Administration	3,703
Communications & Strategic Alliances	3,783
Crop Development	14,387
Delivery	17,548
Human Nutrition	3,869
Impact & Policy Analysis	2,836
Total Disbursements	**46,126**



2015 DONORS

Our largest investor, UKaid through the UK Department for International Development, renewed its vital support for research and delivery, providing £35 million for an additional five years, through 2019. The USAID's Feed the Future initiative allocated $3 million in new funding to scale up iron beans to reach an additional 400,000 smallholder farming households in Rwanda by July 2018.



GOVERNANCE

HarvestPlus is a joint venture between the International Center for Tropical Agriculture (CIAT) and International Food Policy Research Institute (IFPRI). The Boards of Trustees of CIAT and IFPRI have delegated the responsibility for oversight of HarvestPlus to a Program Advisory Committee (PAC), which acts in effect as a Board of Trustees for HarvestPlus:

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Page 1: HarvestPlus-India

Page 2: A. Atero*

**HarvestPlus staff*

NEWS & PUBLICATIONS

VISIT HARVESTPLUS.ORG FOR A FULL LIST OF 2015 NEWS AND PUBLICATIONS

Selected HarvestPlus Publications

Nutrition Research

- Evaluation of Zinc Bioavailability in Humans from Foliar Zinc Biofortified Wheat and from Intrinsic vs. Extrinsic Zn Labels in Biofortified Wheat
- Zinc Absorption from Biofortified Maize Meets the Requirements of Young Rural Zambian Children

Impact Research

- Rwanda Impact Assessment Study
- Consumer Acceptance of Biofortified Iron Beans in Rural Rwanda: Experimental Evidence

Highlights from HarvestPlus.org

- **Mapping for Investments in Biofortification**, January 20, 2015
- **Zinc-Rich Maize Can Provide Adequate Zinc for Children, Study Finds,** March 9, 2015
- **New Climate-Smart Beans Set to Beat the Heat—and Improve Nutrition,** March 24, 2015
- **Iron Pearl Millet Reverses Iron Deficiency in Children**, May 18, 2015
- **New Study Finds that Orange Sweet Potato Reduces Diarrhea in Children**, June 15, 2015
- **Zambia Launches Widespread Sales of Vitamin A Maize**, August 12, 2015
- **Updated Map Shows Biofortification's Growing Global Reach**, September 21, 2015
- **Dietary Diversity and Biofortification: Closer Than You Think**, October 15, 2015

Selected Media Coverage

- **HarvestPlus Supports Farmers with Improved Cassava Stems**
  The Guardian Nigeria, April 11, 2015
- **Vitamin A aus Mais Kommt im Körper an**
  Deutschlandfunk, May 27, 2015
- **West Farmers Discover "Gold" in Orange Maize**
  The Daily Mail, June 4, 2015
- **HarvestPlus Yeretse Abahinzi uko Bakemura Ikibazo cya Ushingiriro N'imirire Mibi**
  Kigali Today, June 9, 2015
- **'Magic Millet' Gets an Enrichment Boost to Cure Anemia**
  The Economic Times, June 14, 2015
- **Scientists Fight Disease with Sweet Potatoes**
  Voice of America, June 15, 2015
- **Studie: Oranje Zoete Aardappel Succesvol Tegen Kindersterfte**
  De Volkskrant, June 16, 2015
- **Studi: Konsumsi Ubi Jalar Bisa Kurangi Risiko Anak Terserang Diare**
  Jakarta Detik Health, June 18, 2015
- **Orange Sweet Potato Can Curb Diarrhoea in Children**
  The East African, June 27, 2015
- **This Orange Food is Fighting Malnutrition**
  ONE Blog, August 17, 2015
- **El Científico que Busca Frenar la Desnutrición del Mundo Desde Cali**
  El Tiempo, December 25, 2015

LOOKING AHEAD

Some defining events and milestones to look forward to over the next twelve months:

- Award of the **2016 World Food Prize** to our departing director, Howarth "Howdy" Bouis.
- A complete overhaul of our digital presence, culminating in the launch of a new, visually compelling, more interactive and user-friendly website, **www.HarvestPlus.org**.
- Official announcement of the **Third Global Conference on Biofortification**.

VITAMIN A SWEET POTATO
(LAC, Uganda)

Provides up to **100%** of daily vitamin A needs.
High yielding, virus resistant, drought tolerant.

ZINC WHEAT
(India, LAC, Pakistan)

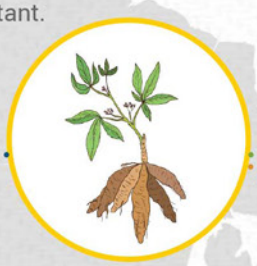
Provides up to **50%** of daily zinc needs.
High yielding, disease resistant.

ZINC RICE
(Bangladesh, India, LAC)

Provides up to **60%** of daily zinc needs.
High yielding, disease and pest resistant.

VITAMIN A MAIZE
(LAC, Nigeria, Zambia)

Provides up to **40%** of daily vitamin A needs.
High yielding, disease and virus resistant, drought tolerant.



VITAMIN A CASSAVA
(DRC, Nigeria)

Provides up to **40%** of daily vitamin A needs.
High yielding, virus resistant.

IRON PEARL MILLET
(India)

Provides up to **80%** of daily iron needs.
High yielding, mildew resistant, drought tolerant.

IRON BEAN
(DRC, LAC, Rwanda, Uganda)

Provides up to **50%** of daily iron needs.
High yielding, virus resistant, heat and drought tolerant.

HarvestPlus improves nutrition and public health by developing and promoting biofortified food crops that are rich in vitamins and minerals, and providing global leadership on biofortification evidence and technology. HarvestPlus is part of the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH). CGIAR is a global agriculture research partnership for a food secure future. Its science is carried out by its 15 research centers in collaboration with hundreds of partner organizations. The HarvestPlus program is coordinated by two of these centers, the International Center for Tropical Agriculture (CIAT) and the International Food Policy Research Institute (IFPRI).

CGIAR | RESEARCH PROGRAM ON Agriculture for Nutrition and Health
LED BY IFPRI

HarvestPlus' principal donors are the UK Government; the Bill & Melinda Gates Foundation; the US Government's Feed the Future initiative; the European Commission; and donors to the CGIAR Research Program on Agriculture for Nutrition and Health.

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