HarvestPlus develops and promotes biofortified staple food crops to improve human health and nutrition, and provides global leadership on biofortification evidence and technology.

A Hidden Problem

More than two billion people in the world do not get enough essential vitamins and minerals, such as vitamin A, iron and zinc, in their daily diets. Those living with this type of hidden hunger may appear healthy, but are vulnerable to illness, infection and even death.

VITAMIN A DEFICIENCY
- Impairs growth
- Causes eye damage leading to blindness
- Increases risk of infections such as diarrheal disease

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

ZINC DEFICIENCY
- Contributes to stunting and loss of appetite
- Lowers immunity
- Increases risk of diarrheal disease and respiratory infections

HarvestPlus Crops

We support countries globally to test and release biofortified nutritious crops so that farmers and consumers can enjoy the benefits of them.

BEANS
Nutritional Benefits: Provides up to 80% of daily iron needs
Farmer Benefits: High yielding, virus resistant, heat and drought tolerant

MAIZE
Nutritional Benefits: Provides up to 50% of daily vitamin A needs
Farmer Benefits: High yielding, disease and virus resistant, drought tolerant

PEARL MILLET
Nutritional Benefits: Provides up to 80% of daily iron needs
Farmer Benefits: High yielding, mildew resistant, drought tolerant

WHEAT
Nutritional Benefits: Provides up to 50% of daily zinc needs
Farmer Benefits: High yielding, disease resistant

CASSAVA
Nutritional Benefits: Provides up to 100% of daily vitamin A needs
Farmer Benefits: High yielding, virus resistant

SWEET POTATO
Nutritional Benefits: Provides up to 100% of daily vitamin A needs
Farmer Benefits: High yielding, virus resistant, drought tolerant

RICE
Nutritional Benefits: Provides up to 40% of daily zinc needs
Farmer Benefits: High yielding, disease and pest resistant
Dear Friends,

A world without two billion people suffering from micronutrient deficiencies is within humanity’s grasp. As part of this vision, imagine a future where most of the staple foods grown and consumed in developing countries are biofortified.

Crop development research by CGIAR Centers and national agricultural research systems has been central to the success of biofortification. To date, more than 290 biofortified varieties of 12 staple food crops have been released or are in testing in more than 60 countries around the world. In selected countries, seed and marketing specialists are working across value chains to introduce and speed up the adoption of biofortified crops. Thanks to the dedicated efforts of hundreds of partners, 50 million people in farm households are growing and eating biofortified foods. Yet the work has only just begun.

The evidence continues to build that biofortification improves lives. Lessons learned from almost five years of delivery were published in a special issue of the *African Journal of Food, Agriculture, Nutrition and Development*. New nutrition research findings indicate iron-biofortified beans not only reduce iron deficiency, but also improve cognitive and physical performance. These promising results follow earlier data about significant reductions in disease and iron deficiency and improved night vision.

Bringing agriculture to the forefront of efforts to reduce malnutrition may have once seemed implausible and impractical, but ideas and seeds can be powerful things. Last year, we were named a Food Innovator by LAUNCH, and USAID inducted us into their coveted Million Lives Club in recognition of our impact. We were honored to be one of only four finalists out of 1,904 applicants in the MacArthur Foundation’s prestigious 100&Change competition, which raised the profile of biofortification globally and connected us to new partners and friends.

Because the impacts of agricultural interventions develop inexorably but relatively slowly over time, this success could only have happened due to the long-term and sustained support of the UK Department for International Development, the Bill & Melinda Gates Foundation, and numerous other donors. Now also with new funding from the MacArthur Foundation and a new strategic plan guiding our work over the next five years, we will continue to persevere to multiply the health impacts of biofortified crops.

Our shared quest to nourish the most vulnerable may have once seemed revolutionary. Today it is transforming our ability to address and prevent malnutrition. Our diverse partners around the world — researchers in agriculture, human nutrition, food science, economics, and genetics; seed and food companies; those involved in farm extension; national and multinational policymakers from multiple sectors—all make scaling this innovation possible.

With gratitude to our many partners,

Harwath E. Bauzá

Founder and CEO, HarvestPlus
Where We Work

HarvestPlus works with diverse partners from government, business and civil society to develop, test and release biofortified crops; educate farmers and consumers on the benefits of these crops; and build markets to ensure these nutritious foods reach as many people as possible.

LATIN AMERICA & THE CARIBBEAN
Because no single staple food crop is dominant in this region, families consume a variety of biofortified foods, including iron beans, zinc rice, vitamin A cassava, vitamin A maize, zinc maize, and vitamin A orange sweet potato.

Approximately 33 million people are growing and eating these healthier crops in countries where HarvestPlus works, and adoption continues to accelerate.

NIGERIA
The annual Nutritious Food Fair was attended by over 7,000 value chain actors and multi-sectoral partners, strengthening partnerships and awareness of biofortification.

DEMOCRATIC REPUBLIC OF CONGO
In 2017 alone, HarvestPlus enabled 530,000 children under the age of five and more than 560,000 women of child-bearing age to access and consume iron rich beans and vitamin A rich cassava and maize. This achievement was made possible through strategic partnerships with agriculture technical schools, health facilities and smallholder farmers from across the country.

ZAMBIA
Families in 55 of the 110 districts in Zambia can now plant and consume nutritious vitamin A maize.
Only two years after introduction, thousands of farmers have been trained and more than half a million people are consuming zinc wheat.

Public, private, and non-governmental partners are mainstreaming zinc rice into their research and agricultural extension programs and product portfolios. Zinc wheat and iron-zinc lentils are also increasingly available.

Ugandan President Yoweri Museveni launched the release of high iron beans as an agricultural strategy addressing malnutrition.

14 private seed companies, 7 public institutions, and 3 NGOs are developing high-iron pearl millet varieties, testing them, and evaluating new products. Setting of minimum standards of iron and zinc levels is now a core requirement for inclusion in the national pearl millet testing trials.

One million people are already consuming vitamin A maize and iron beans only 2.5 years after their release in partnership with the Livelihoods and Food Security Programme funded by the UK Department for International Development.

In partnership with community based private grain traders and the local agricultural extension system Twigire Muhinzi, 22 grain aggregation centers were established to link iron bean producers to markets and improve access to the product by consumers. More than a third of the total iron bean seed dissemination occurred through this extension service.
Successes: Research and Programs

Our impact is underpinned by a rigorous evidence-based approach.

290
VARIETIES OF 12 STAPLE FOOD crops have been released or are in testing in 60 countries.

29
NEW VARIETIES of several biofortified crops were released in 2017 across Latin America and the Caribbean, Asia and Africa, including the first release of zinc maize, in Honduras.

8M
MORE PEOPLE GREW AND ATE BIOFORTIFIED CROPS IN 2017

In recent years, peer-reviewed clinical trials have demonstrated that biofortified foods have a positive impact in health and nutritional status, including:

- reduction in the prevalence of diarrhea among children under three
- reversal of iron deficiency in children and women
- improved cognitive and physical performance in women and children
- improved night vision in children

440
PARTNERS We have collaborated with more than 440 partners globally to develop, deliver and promote biofortified crops

102
PUBLICATIONS In 2017, 102 publications published and seven citations in policy reports

20
COUNTRIES 20 governments have now incorporated biofortification into their national health and agriculture strategies and plans
The 100&Change competition began in 2016 with 1,904 applicants on a quest for US$100 million to solve a critical problem. After a rigorous evaluation process, HarvestPlus made it to the final four. We were thrilled when our proposal for scaling up biofortified crops to help alleviate hidden hunger in Africa was awarded US$15 million. This generous support will allow us to reach more families with biofortification, giving generations of children the opportunity to live, learn and grow to their full potential.
Around the world, hundreds of organizations, from research institutes to public and private sector partners to local and global nongovernmental organizations, help us develop and disseminate nutrient-rich crops. Ensuring biofortified crops meet nutritional needs and are attractive to farmers and consumers necessitates collaboration with plant breeders, nutritionists, economists and behavior change experts. Here are just a few of the over 400 partners who make this groundbreaking work possible.

Asia

Private partnerships: Sustaining our impact

Over the past five years, HarvestPlus Bangladesh has made significant progress in reaching low-income rural families with zinc rice. By the end of 2017 the total number of zinc rice growing and consuming households had reached 1.26 million.

“In a country where 99% of people eat rice every day and nearly 40% of children are stunted due to a lack of zinc in their diets, this biofortified food is a major breakthrough,” says Bangladesh Country Manager Dr. Khairul Bashar.

These results garnered the attention of PRAN, the largest food distribution company in Bangladesh, which agreed to purchase zinc rice directly from farmers in northern Bangladesh. The pilot was such a success that PRAN entered into a formal partnership with HarvestPlus to expand the project to 120,000 farmers and to sell zinc rice through their distribution network.

“Everything we do focuses on our main goal: improving the health of vulnerable children and women,” says Dr. Bashar. “Farmers are eager to participate because the opportunity to sell their zinc rice surplus to the largest food distributor in the country gives them a predictable source of income over the long term.”

Consumers living in rural areas and purchasing food from shops where PRAN sells can also benefit from the added nutrients. The company’s sales to other countries around the world could allow even more families to benefit from biofortification.
Africa

Community partnerships: Expanding our impact

In Zambia, the learning and earning potential of 40% of children under five has been stunted by malnutrition. HarvestPlus saw a way to help feed schoolchildren in a nutritious and educational way: a competition to show children the benefits of adding the color orange—from vitamin A maize—to their health.

Adding biofortified foods to school meals not only helps scale the impact of biofortification, it’s also a viable solution for many institutions. “A lot of schools have available arable land,” says Khululwe Dlamini, HarvestPlus’ regional marketing specialist in Africa. “Enabling schools to grow vitamin A orange maize gets nutrition sustainably to children, building healthier future generations.”

Students at four primary schools grew a hectare (2.5 acres) of vitamin A orange maize. While the children cared for their vitamin A orange maize plants, the teachers helped the students learn about the nutritional benefits of this crop. Once the maize was harvested, a cooking demonstration allowed students and their parents to taste their hard work.

“We want to influence diet choices starting at a young age, so that children not only make good choices for themselves, but also take that knowledge home to their parents and influence decisions in the household,” explains Emely Mwale, HarvestPlus’ demand creation expert.

While all the students came away with new school supplies and a new awareness of the important role of vitamin A in helping them grow up healthy, one school received a special reward for their success of their harvest. For their 48,880 maize cobs, the Chipapa Primary School earned a hammer mill to grind maize for income and student consumption. More edifying and edible competitions are expected in neighboring countries in the near future.

Latin America

Public partnerships: Embedding our impact

After 50 years of civil war, Colombia is implementing a national program to reintegrate former combatants into their communities and encourage farmers to transition from illegal crops like coca and poppy to growing staple food crops. Biofortification is part of that solution.

“Beyond their nutritional value, biofortified crops in this area are widely known to meet farmers’ demands for yield, quality and climate tolerance,” says Julio Ramírez, Head of the Seed Department at the Colombian Agricultural Research Corporation. “We hope that our joint work with HarvestPlus will encourage more farmers to choose to participate in this program.”

“Already, 10,000 households throughout Colombia are reaping the benefits of biofortified crops—both nutritionally and economically,” says Dr. Carolina González, Deputy Director of HarvestPlus Latin America and the Caribbean. “By partnering with this national program, we will be able to reach even more families with biofortified crops that provide critical nutrients.” These include staple crops important to food security like maize, beans and rice, and commercial crops like cocoa or sugar cane. In this way we are not only scaling innovation—but scaling hope.
HarvestPlus is a joint venture between the International Center for Tropical Agriculture (CIAT) and the 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, which acts in effect as a Board of Trustees for HarvestPlus.

Our team

Representing more than 20 countries, HarvestPlus staff bring many years of experience from across different disciplines and from public, private, academic and nongovernmental sectors to address the problem of micronutrient malnutrition. HarvestPlus staff are based at the International Center for Tropical Agriculture (CIAT) in Cali, Colombia, or the International Food Policy Research Institute (IFPRI) in Washington, D.C. Many are posted in countries where biofortified staple crops are being delivered. There are HarvestPlus offices or team members in Bangladesh, Brazil, Colombia, the Democratic Republic of Congo, Guatemala, India, Nicaragua, Nigeria, Pakistan, Rwanda, Uganda, Zambia and Zimbabwe.
In 2017, the UK Department for International Development granted an additional £4 million to help increase private sector involvement in the delivery of biofortified crops in Africa and South Asia. The Bill & Melinda Gates Foundation awarded an additional US$6 million in funding, allowing us to expand our work in biofortification to two new Indian states (Bihar and Odisha) over the next five years. As a finalist in the MacArthur Foundation’s 100&Change competition, we were awarded $15 million to scale up our work in Africa in the next three years.
We are proud to work with hundreds of partners around the world to achieve our shared goal of improving nutrition, health and livelihoods.

CG CENTERS
Bioversity International
International Center for Tropical Agriculture (CIAT)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
International Food Policy Research Institute (IFPRI)
International Maize and Wheat Improvement Center (CIMMYT)
International Potato Center (CIP)
International Center for Agricultural Research in the Dry Areas (ICARDA)
International Center for Tropical Agriculture (CIAT)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

IN-COUNTRY PARTNERS
Bangladesh
Agricultural Advisory Society (AAS)
Ali Seed Farm
Amira Kaj Kori (AKK)
AVA Development Society
Bangladesh Agricultural University (BAU)
Bangladesh Rice Research Institute (BRRRI)
Bhai Bhai Traders
Christian Commission for Development in Bangladesh (CCDB)
Department of Agricultural Extension, Ministry of Agriculture
Friends in Village Development Bangladesh (FIVDB)
Green the Environment
Integrated Social Welfare Association (ISWA)
Lal Teer Seed Ltd
Mother Seed & Agro Industries Ltd
Naton Zibon Rochi (NZRIP)
Prokash Gano Unnayan Kendra
RDRS Bangladesh
Society Development Committee (SDC)
Shariatapur Development Society (SDS)
Small & Medium Seed Producing Association (SMSPA)
Shawdesh Unnay Kendra (SUK)
Socio Economic Health Education Organization (SEHEO)
South West Seed Producer Association of Bangladesh (SWSPAB)
Thengamara Mohila Sabuj Sangha (TMS)
Unnayan Dhara (UD)
Voluntary Rural Development Society (VRDS)

Brazil
Agency for Agricultural Research and Rural Extension of Maranhão State (Agerp)
Agricultural Development and Fisheries Secretary of Para State (Sedap)
Agricultural Research Company of Rio de Janeiro State (Pesagro-RJ)
Capim Branco City Government, MG
Cascavel City Government, PR
Caxias-MA Secretary of Agriculture
Corumbá City Government, MS
Development Company of the São Francisco and Paranhos Valleys (Codecasfl)
Education and Culture Secretary of Piauí State
Embrapa - Brazilian Agricultural Research Corporation
Extraordinary Secretary for Racial Equality of Maranhão State
Family Agriculture Secretariat of Maranhão State (SEAF)
Federal University of Maranhão (UFMA)
Federal University of Rio de Janeiro (UFRJ)
Federal University of Uberlândia (UFU)
Federal University of Viçosa (UFV)
Food and Nutrition Security Council of Maranhão State (Consea-MA)
Food and Nutrition Security Secretariat of Maranhão State
Foundation for Scientific and Technological Development (Fundetec)
Guaraniacu City Government, PR
Inter-sectoral Chamber of Food and Nutrition Security of Maranhão State
Itaguai City Government, RJ
Magé City Government, RJ
Maranhão State Government
Mato Grosso Company of Research, Assistance and Rural Extension (Emater-MG)
Minas Gerais State Company of Technical Assistance and Rural Extension (Emater-MG)
Monte Carmelo City Government, MG
Municipal Secretariat of Agriculture
Livestock and Fisheries Supply of Alto Alegre-MA
National Supply Company of Maranhão (Comab)
Packaging Technology Center of the Institute of Food Technology (CTET/UNICAMP)
Patrocínio City Government, MG
Piauí Company of Technical Assistance and Rural Extension of Piauí (Emater-PI)
Piauí Regional Association of Agricultural Family Schools (ARFAPI)
Regeneration City Government, PI
Rio Grande do Sul Company of Technical Assistance and Rural Extension Company (Emater-RS)
Rio Negro City Government, PR
Rural Producers Association of Barra do Saco, Codó-MA
Rural Producers Association of the 13th April Settlement, Canto do Buriti-PI
Rural Producers Association of the Anglo Branco Settlement, Eliseu Martins-PI
Rural Producers Association of the Settlement Center of Cabeceira, Caxias-MA
Rural Producers Association of the Malhada Settlement, Canto do Buriti-PI
Rural Workers Union of Coroatá-MA
Rural Workers Union of Eliseu Martins,
Rural Workers Union of Queimada Nova-PI
Rural Workers Union of Tanque-PI
Santa Angela Foundation, Pedro II-PI
São Gabriel do Oeste City Government, MS
São João do Soter City Government, MA
São Mateus Municipal Council of Maranhão-MA
School of Agriculture “Luiz de Queiroz” at State University of São Paulo (ESALQ/USP)
Sote Lagoas City Government, MG
State University of Campinas (Unicamp)
State University of Maranhão (UEMA)
State University of São Paulo (USP)
Tanque City Government, PI
Technical Services Cooperative of Coroatá-MA (Coosert)
Timbiras-MA Secretary of Agriculture
University Center of Sete Lagoas (Unifermin)

Colombia
Association of Agronomists of the Atlantic
Colombian Agricultural Research Corporation (CORPOICA)
Del Valle University
Foundation for Research and Agricultural Development (FIDAR)
Guerrero Seeds
Latin American and Caribbean Consortium to Support Research and Development of Cassava (CLAYCASA)
Masisemillas
Ministry of Health
National Federation of Cereal and Leguminous Plants Growers - FENACSE
Seed Companies
SENA – Agribusiness Buga
UMATA Versalles
Valle del Cauca Government
World Food Programme (WFP)

UNIVERSITIES & OTHER RESEARCH ORGANIZATIONS
Children’s Hospital Oakland Research Institute-CHORI
Cornell University
Flanders University
Greenwich University
Iowa State University
Johns Hopkins Bloomberg School of Public Health
Purdue University
Sabanci University
Swiss Federal Institute of Technology (ETH-Zürich)
United States Department of Agriculture, Agricultural Research Service (USDA-ARS)
University of Adelaide
University of California, Davis
University of Freiburg
University of Hohenheim
University of Melbourne
Wageningen University

WorldFish

Argentina
Agricultural Development and Rural Extension Company (Emater-BA)
Corrientes City Government, CO
Federal University of Maringá (UFU)
Federal University of São Paulo (USP)
Federal University of São Paulo (USP) 
Federal University of Viçosa (UFV)
Federal University of Uberlândia (UFU)
Federal University of Víncula (UFV)
Food and Nutrition Security Council of Maranhão State (Consea-MA)
Food and Nutrition Security Secretariat of Maranhão State
Foundation for Scientific and Technological Development (Fundetec)
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International Potato Center (CIP)
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SENA – Agribusiness Buga
UMATA Versalles
Valle del Cauca Government
World Food Programme (WFP)
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).

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