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

What Is Biofortification?
The process of increasing the density of vitamins and minerals in a crop through conventional plant breeding or agronomic practices. Rigorous research has shown that regular consumption of biofortified crops generates measurable improvements in nutritional status.

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

HarvestPlus Crops
We support countries and partners globally to test, release, and market biofortified nutritious crops so that farmers and consumers can benefit from them.

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

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

Zinc Maize
**Nutritional Benefits:** provides up to 70% of daily zinc needs. **Farmer Benefits:** High yielding, virus resistant.

Iron Pearl Millet
**Nutritional Benefits:** Provides up to 80% of daily iron needs. **Farmer Benefits:** High yielding, mildew resistant, drought tolerant.

Zinc Wheat
**Nutritional Benefits:** Provides up to 50% of daily zinc needs. **Farmer Benefits:** High yielding, disease resistant.

Vitamin A Cassava
**Nutritional Benefits:** Provides up to 100% of daily vitamin A needs. **Farmer Benefits:** High yielding, virus resistant.

Vitamin A Sweet Potato
**Nutritional Benefits:** Provides up to 100% of daily vitamin A needs. **Farmer Benefits:** High yielding, virus resistant.

Zinc Rice
**Nutritional Benefits:** Provides up to 40% of daily zinc needs. **Farmer Benefits:** High yielding, disease and pest resistant.

**Vitamin A deficiency:**
- Impairs growth
- Causes eye damage leading to blindness
- Increases risk of infections such as diarrheal disease

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

**Zinc deficiency:**
- Lowers immunity
- Contributes to stunting and loss of appetite
- Increases risk of diarrheal disease and respiratory infections
Dear Friends,
I look back on 2018 as a year when the efforts of HarvestPlus and our partners to advance the biofortification movement translated into strong commitments from more key actors in the global nutrition field.

On the supply side: Great strides were made in the drive to “mainstream” biofortification within the crop development programs of the CGIAR—the international network of agricultural research centers that develop new seed varieties for developing countries. The centers reached consensus on a new biofortification strategy to integrate the development of micronutrient-rich traits in their core seed breeding work. HarvestPlus will provide technical support as part of our close collaboration with the centers. (see pp. 5–6 of this report).

On the demand side: HarvestPlus formed a landmark partnership with the Global Alliance for Improved Nutrition to spur private-sector engagement and reach hundreds of millions more consumers with biofortified foods through market channels. Rising demand will also incentivize farmers to grow more biofortified crops. (see p. 11).

In policy and advocacy: The African Development Bank (AfDB) showed firm support for biofortification. AfDB President Akinwumi Adesina named me a champion within the African Leaders for Nutrition, a high-level advocacy movement the Bank jointly sponsors with the African Union. Far more significant, though, was that the AfDB made biofortification a priority in its nutrition investment strategy (see p. 13).

The scientific evidence for biofortification also gained strength in 2018. We participated in a groundbreaking study that looked at economic and climate projections through 2050 and concluded that—under any scenario—low micronutrient intakes will remain a significant global challenge as dietary quality remains outside the reach of resource-poor people. Biofortification can significantly add to the supply of minerals and vitamins in foods at zero cost to consumers. Meanwhile, nutrition efficacy trials on biofortified foods continue to show improved functional outcomes: In one study, young children who ate foods prepared with high-zinc wheat spent far less time ill with pneumonia and vomiting. In another, adolescents who consumed foods made with high-iron pearl millet showed markedly improved nutritional and cognitive performance (see p. 8).

HarvestPlus will continue to be a catalyzer, capacity strengthener, advocate, and knowledge hub for biofortified food systems as the movement gains more adherents. We are deeply grateful for the ongoing support of our funders and the talent and energy of hundreds of partners around the world.

Finally, I’ll mention two important milestones in the governance and management of HarvestPlus. I want to extend my personal gratitude to Peter McPherson, who served as chair of the Program Advisory Committee from inception in 2003 through the end of 2018 (see p. 15).

I also heartily welcome Arun Baral as my successor in 2019. Arun’s considerable management and seed industry experience make him uniquely qualified as CEO to uphold our commitment to reaching the world’s malnourished populations with biofortified crops.

Yours Sincerely,

Howarth Bouis
Founder and Interim Chief Executive Officer; Institute Fellow, IFPRI

Arun Baral
Chief Financial Officer

Anna-Marie Ball
Director, External Affairs; Chief of Staff

Ekin Birol
Director, Impact & Strategy

Wolfgang Pfeiffer
Director, Research & Development; Regional Director, Asia

Donald Mavindidze
Regional Director, Africa

Marilia Nuti
Regional Director, Latin America & Caribbean

Erick Boy
Head, Nutrition
More than 150 HarvestPlus staff members based on four continents work with partners in the public, nonprofit, philanthropic, and private sectors to develop and deliver biofortified crops. We also conduct nutrition research and help build and support sustainable biofortified food systems that improve human nutrition and health.
Catalyzing biofortification requires holistic strategies based on partnerships. This example from Nigeria shows how we optimize local ownership and long-term sustainability of biofortified food systems so foods reach those most vulnerable to micronutrient deficiencies.

**Objectives**

**Build Supply**
- Work with CGIAR breeding centers and national agricultural research systems to develop and release biofortified staple crops.
- Provide start-up seed and build capacity of seed and food producers.

**Stimulate Demand**
- Disseminate nutrition and market information through various channels to spur interest for consumption and investment.
- Integrate biofortification into policies, programs, and budgets for sustainability.

**Develop Enabling Environment**

**The role of HarvestPlus**

- Breeders: Develop varieties with higher nutrient levels.
- Farmers: Multiply seeds and supply them to other farmers for planting and provide raw materials to processors.
- Processors: Transform tubers/grains into consumable products.
- Aggregators: Bridge supply and demand gaps by aggregating and transporting crops where there is demand. With agricultural extension agents, build capacities of farmers and introduce new technologies to increase yield.
- Marketers: Sell biofortified seeds and foods in retail or wholesale markets.
- Media: Media coverage of trainings, events, and new developments raises awareness of biofortification.
- Access points: Support points of sale, model farms, processing centers, and more where consumers can purchase biofortified products, receive training, or assess activities for investment.
- Champions: Encourage leaders to speak publicly in support of biofortification.

**Partners**

- Government agencies: Advocate for policies and regulations.
- Development agencies: Encourage inclusion of biofortification in nutrition programs.
- Traditional, religious, and academic institutions: Establish credibility of biofortification.

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"My job helps me deliver nutrition to hard-to-reach places. Satisfaction comes from knowing that I am helping to proliferate a solution (biofortification) that is positively impacting on the health and nutrition of children and women."

—Crop aggregator Samuel Ajewole

"I want to inspire young students to go into agriculture."

—Nollywood actor Segun Arinze, star of the biofortification-focused film “Yellow Cassava” and host of NutriQuiz, an agriculture, nutrition, and science competition for secondary school students.
Since 2004, HarvestPlus has facilitated the release of 211 biofortified crop varieties in 30 countries. These crops are developed through conventional breeding techniques by contracted CGIAR centers* and are tested and released by national agricultural research systems, with support and technical assistance from HarvestPlus.

**Crop Varieties Released, by Region**
(cumulative totals since 2004)

![Crop Varieties Released, by Region](image)

**Crop Varieties Released, by Crop**
(cumulative totals since 2004)

![Crop Varieties Released, by Crop](image)

**Households Growing Biofortified Crops**
(cumulative by year)

An estimated 7.6 million farming households in HarvestPlus focus countries are growing biofortified crops delivered by HarvestPlus and its partners, benefiting some 38 million farm family members who consume these crops. The figure of 38 million beneficiaries does not account for people who consume biofortified crops purchased in markets or who consume processed foods made from biofortified crops.
Biofortified Crop Varieties Released in 2018

**Zinc Maize in Colombia, Guatemala, and Nicaragua**
These high-zinc varieties will help address widespread stunting by improving childhood growth and immune system development. In Guatemala, nearly half of children under five are stunted and 30 percent of the population is estimated to consume inadequate amounts of zinc.

**Iron Pearl Millet in Niger**
Well-suited for dryland cultivation, pearl millet is the major dietary energy source for millions of people in Africa’s Sahel region. This variety of the cereal helps combat iron-deficiency anemia and supports healthy cognitive and physical development in children. There is potential to expand the release of iron pearl millet to other West African countries.

**Zinc Rice in Indonesia**
Despite Indonesia’s status as a middle-income country, an estimated 30 percent of the population suffers from stunting and there is strong official interest in addressing the problem. As part of a project funded by the Australian government to raise interest in biofortification in Asian countries, HarvestPlus organized a stakeholders’ meeting in December 2018 to explore how Indonesia can catalyze scaling and uptake of this high-zinc rice variety.

*HarvestPlus collaborates with the following CGIAR centers on the development of biofortified crops: Iron Beans: International Center for Tropical Agriculture (CIAT); Iron Pearl Millet: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); Vitamin A Cassava: International Institute of Tropical Agriculture (IITA) and CIAT; Vitamin A Maize: International Maize and Wheat Improvement Center (CIMMYT) and IITA; Vitamin A Orange Sweet Potato: International Potato Center (CIP); Zinc Maize: CIMMYT and IITA; Iron-Zinc Sorghum: ICRISAT; Zinc Rice: International Rice Research Institute (IRRI) and CIAT; Zinc Wheat: CIMMYT.
**Supporting Strategic Choices**

*HarvestPlus* introduced the Biofortification Priority Index (BPI) in 2013 to help us and others assess which biofortification investments will have the greatest impact on micronutrient deficiency. The BPI covers 128 countries and provides priority rankings for eight biofortified staple crops. *HarvestPlus* developed a new BPI microsite in 2018 that launched publicly in early 2019 with updated data and analyses and several new features including:

- Maps for subindices that compose the BPI
- Maps with data weighted for land area or population
- Country pages

The BPI microsite is a user-friendly tool to inform strategic decisions by biofortification stakeholders.

**Biofortification Priority Index**

*HarvestPlus* developed the Biofortification Priority Index (BPI) to help stakeholders assess which country-crop combinations will have the greatest impact in reducing micronutrient deficiencies. The BPI ranks 128 countries according to their impact potential for investment in each of the eight biofortified staple food crops.

**Select a biofortified crop to begin:**

- Iron Beans
- Iron PeaMillet
- Vitamin A Cassava
- Vitamin A Maize
- Vitamin A Sweet Potato
- Zinc Maize
- Zinc Rice
- Zinc Wheat

**About HarvestPlus**

*HarvestPlus* is part of the CGIAR Research Program on Agriculture for Nutrition and Health (AANH). CGIAR is a global agricultural research partnership for a food secure future. Its science is carried out by 13 research centers in collaboration with hundreds of partner organizations. *HarvestPlus* is based at the International Food Policy Research Institute (IFPRI) and collaborates with multiple CGIAR centers and partner organizations.

The BPI microsite is also supported by the John D. and Catherine T. MacArthur Foundation.

**BPI.harvestplus.org**
Research and Evidence:

**Key Findings In 2018**

Through a robust research agenda, the nutritional content and impact of biofortified crops are assessed under various conditions. Our research staff also take part in projects looking at the role of biofortification within broader nutritional issues.

### Iron Pearl Millet Improves Cognitive Performance

A study published in the *Journal of Nutrition* in July 2018 showed that biofortified high-iron pearl millet can stem the negative ripple effects of iron deficiency by significantly improving nutrition and cognitive performance. When Indian adolescents consumed biofortified pearl millet twice daily as *bhakri* (a local flatbread) or *shev* (a savory snack) for six months, researchers found the students had significantly improved learning and mental abilities related to perception, attention, and memory. This is the second landmark study to demonstrate that iron biofortification results in functional cognitive improvements that could profoundly impact women and teens' daily lives, including their ability to succeed at school and work. The previous study, released in 2017, involved Rwandan college-age women.

“If we can improve adolescents’ performance in school by improving their iron status we may also have longer term impacts in terms of their ability to secure a good job, or be admitted to a college program,” said Samuel Scott, research fellow at the International Food Policy Research Institute and lead author of the latest study.

### Zinc Wheat Reduces Childhood Illness

When vulnerable young children in India eat foods prepared with agronomically zinc-enriched wheat, they spend significantly fewer days sick with pneumonia and vomiting, according to a study published in *Nutrition Journal* in September 2018. Diets in India commonly lack enough zinc and may consequently contribute to the nearly 40 percent of children under age five who are physically stunted and markedly vulnerable to common infections. If stunting is not corrected before the second year of life, it may become irreversible and gravely impair individual and societal development. “This is the first large trial evaluating biofortified zinc wheat to increase zinc in diets and improve nutritional status and related health outcomes in young children and their mothers,” said lead researcher Dr. Sunil Sazawal, director of the Center for Public Health Kinetics in New Delhi and senior associate of Global Disease Epidemiology and Control at Johns Hopkins University.

### Study Sees Persistent Micronutrient Gaps Through Midcentury

A landmark study, published in *Nature Sustainability* in December 2018, projects that billions of people are likely to remain vulnerable to the serious health effects of micronutrient deficiencies for decades to come—even under optimistic scenarios for global economic and income growth. Keith Lividini, head of strategy and policy research at HarvestPlus, was one of the authors of the study that looked at the dietary availability of several important nutrients and micronutrients through 2050 under several scenarios of future economic, income, and climate change trends worldwide.

The projections are particularly worrisome for low-income countries, where widespread malnutrition and its negative health consequences take big tolls on human well-being. The World Health Organization estimates that more than two billion people worldwide currently suffer from micronutrient deficiencies that can lead to stunted growth, weakened immune systems, and impaired intellectual development.

The authors note that the best way to address this challenge is by improving dietary diversity, but they also underline the need to step up support for research on other interventions—including biofortification. “The ideal is to increase availability and access to animal source foods, fruits and vegetables. But the poorest people miss out because they can't afford or can't access these types of foods,” said Lividini. “Biofortification puts the micronutrients in affordable staple foods that low-income families already consume,” he added.
Engaging and Supporting Farmers

Segmenting Seed Delivery

In Guatemala, which has the highest rates of stunting and anemia in Latin America, HarvestPlus has worked with partners since 2012 to expand access to zinc-biofortified maize and iron-biofortified beans. The maize varieties are also quality protein maize (QPM) with enriched levels of beneficial amino acids.

Different delivery mechanisms are needed to reach different types of farmers. Salomon Perez, HarvestPlus country coordinator in Guatemala, explained that subsistence and vulnerable farmers have access to QPM-zinc maize (and soon to ICTA Chorti iron-biofortified beans) through Semillas Para Todos, a public distribution program run by the Ministry of Agriculture. “This system ensures that the neediest farmers have access to more nutritious seeds,” said Perez.

HarvestPlus also partners with Semilla Nueva, a nonprofit organization, to sell commercial farmers HB18 hybrid maize seed under the brand name Fortaleza F3; the hybrid was developed by Guatemala’s national agricultural research center (ICTA) and the International Maize and Wheat Improvement Center (CIMMYT). Curt Bowen, co-founder and executive director of Semilla Nueva, said his team is focused on scaling its activities and showing that the maize seed it distributes has a positive nutritional impact on consumers of it. He said technical advice from HarvestPlus has been critical in this regard.

Leveraging Nutrition and Health NGO Networks

Partnering with nutrition and health NGOs helps HarvestPlus reach smallholder farmers; it also helps farming families better connect the dots between healthy living practices, nutrition principles, and the benefits of biofortified crops. In 2018, HarvestPlus Rwanda collaborated with six organizations in water, sanitation, and hygiene (WASH) and community nutrition: CARITAS Rwanda, Catholic Relief Services, Food for the Hungry, FXB Rwanda, Gardens for Health International, and Global Communities. Collectively, they had broad geographical spread and established community networks. Farming households reached by HarvestPlus Rwanda through these six partnerships accounted for 56 percent of the 160,000 farming households directly reached with improved high-iron beans and nutritional messages during the year.

“It’s great to have input from the leaders in evaluating biofortified crop nutrition.”

—Curt Bowen, co-founder and executive director of Semilla Nueva
Talking Zinc Rice

The first zinc rice variety—BRRI dhan62 developed by the Bangladesh Rice Research Institute with support from HarvestPlus—was released in 2013. Since then, biofortified seed has been distributed to over 630,000 farming households in Bangladesh. In November 2018, HarvestPlus staff attended a “farmers field day” in a district near the town of Cox’s Bazar, where demo plots had been established. Such meetings with farmers are critical to promoting adoption of unfamiliar biofortified varieties—a weighty decision for farming families who depend on their crops for sustenance and income. To make the “sale,” HarvestPlus, partnering NGOs, and extension agents explain the role of zinc in health and how it can make a positive difference in the lives of farming families. But the farmers also want proof that zinc rice won’t add costs or lower yields in comparison to rice varieties they know.

At the meeting, HarvestPlus Country Manager Khairel Bashar told the farmers that growing zinc rice won’t mean lower yields and consuming it “can help make your children healthier and smarter.” This seemed to resonate: Bashar first asked how many farmers had cultivated the zinc rice seeds and several hands went up; he then asked how many other farmers were interested in trying the seeds, and many more hands were raised.

Reaping the Benefits of Vitamin A Orange Sweet Potato

Walter Odongo is a 31-year-old farmer from Dokolo district in Northern Uganda who is married with two children ages nine months and two years. Walter decided to start growing vitamin A orange sweet potato (OSP) after receiving agronomy and nutrition training from World Vision, a HarvestPlus implementing partner in Uganda and other countries. Walter learned that the vitamin A OSP, a crop developed by the International Potato Center (CIP), is fast maturing, drought tolerant, and higher in vitamin A than the traditional white and cream sweet potato varieties (more than a quarter of preschool-aged children in Uganda suffer from vitamin A deficiency). Walter has also been selling his OSP roots and vines on a nearby roadside, with the goal of using the proceeds to create a better life for his family. “I now earn more than twice the amount of money I used to earn from my acre of land,” recounted Walter. He used some of the proceeds to buy land to expand his vitamin A OSP garden. He also bought some goats that he plans to breed and sell, and then buy oxen for plowing.

Deepening Efforts in India

HarvestPlus received a grant in early 2018 from the Bill & Melinda Gates Foundation to expand our operations in India to the states of Bihar and Odisha, with a combined population of more than 160 million. These are two of India’s most nutritionally vulnerable states, with stunting levels at 48 percent and 38 percent respectively. HarvestPlus has operated in India since 2004, developing and promoting iron pearl millet, zinc rice, and zinc wheat varieties.
Informing Consumers, Building Markets

New Partnership Targets Commercial Channels
HarvestPlus and the Global Alliance for Improved Nutrition (GAIN) have made a bold joint commitment to accelerate progress in the fight against micronutrient deficiency. The new partnership combines the deep experience of HarvestPlus in all facets of biofortification with GAIN’s acumen in working with private companies to create sustainable consumer markets for nutritious foods. The objective: scale up market-led production, delivery, and consumption of biofortified crops and foods more rapidly, especially in countries where the need for nutritional advances is greatest.

With funding from Germany’s Federal Ministry of Economic Cooperation and Development (BMZ) and the Ministry of Foreign Affairs of the Netherlands, and others, the partnership will operate in Asian and African countries where micronutrient malnutrition is pervasive.

The partners will focus on better integrating biofortified crops into food systems through private sector partnerships, value chain development, and the integration of biofortification in national food and nutrition strategies. The partnership grew out of close ties between HarvestPlus CEO Howdy Bouis and GAIN Executive Director Lawrence Haddad, both recipients of the prestigious World Food Prize. The two previously worked together at IFPRI on research that led to the concept of biofortification.

“Together, we will leverage our linkages with the private sector to accelerate market uptake of [biofortified crops and foods]. Giving better access to hundreds of millions of consumers will make a big contribution to reducing life-damaging deficiencies of micronutrients.”

—Lawrence Haddad, GAIN Executive Director
Innovating in the Food Sector

Entrepreneurs are finding innovative ways to deliver biofortified foods to consumers. Tinashe Mbiriri, a former HarvestPlus Zimbabwe intern with a degree in agricultural economics, partnered with a former classmate to launch Sky Brands in 2017 to process and sell products containing vitamin A-enriched orange maize, including orange maize meal, samp, and porridges in several flavors. “As a company whose quest is to contribute significantly to the fight against hidden hunger and malnutrition, we have embraced [biofortification] and committed ourselves to the nutrition revolution,” Tinashe said. They launched a website (skybrands.co.zw) in 2018 to sell their products online. HarvestPlus has assisted Sky Brands with logistical support, notably in managing aggregation of product delivered by hundreds of smallholder farmers growing vitamin A orange maize.

Naturally More Nutritious

Biofortified crops were first released in Colombia in 2016 with varieties of iron beans and, later, zinc maize. But the regional HarvestPlus team saw that work was needed on the demand side to generate better understanding among Colombian farmers and consumers of biofortification and its benefits. The team worked with an ad agency to devise a compelling, easily understood logo and message: Naturalmente Más Nutritivo (Naturally More Nutritious). Luz Adriana Jimenez, HarvestPlus country coordinator for Colombia, said the phrase captures the fact that biofortified crops are developed through conventional breeding methods that make them more nutritious than other varieties. “We want biofortification to be sustainable, and to do so we need to stimulate demand from consumers. This message will help small farmer associations sell their biofortified beans and maize,” said Jimenez.

Inspiring and Involving Youth

The HarvestPlus team in the Democratic Republic of Congo (DRC) saw a need to better engage young people and ensure that they are able to sustain interest in biofortification in the country. Given serious resource challenges faced by many students, the team started an “Ambassadors of Biofortification” scholarship program for exceptional secondary school graduates—those with top scores on nationally-administered exams—to motivate them to study plant breeding and agriculture at university. HarvestPlus DRC has also been collaborating since 2016 with three public universities to incorporate biofortification in plant breeding curriculums, help purchase lab equipment, and organize dedicated lectures. “The scholarship cost per student per year is less than US $1000 but the long-term benefit for biofortification is much larger,” said Antoine Lubobo, country manager for HarvestPlus in DRC.

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—Lawrence Haddad, GAIN Executive Director

Howarth Bouis (left) and Lawrence Haddad (right)
HarvestPlus India Sets Minimum Iron and Zinc Levels In Releases of Pearl Millet Varieties

Establishing minimum standard levels of micronutrients for release of varieties is an impactful way to mainstream biofortification in crop development. In 2018, the All India Coordinated Research Project on Pearl Millets, coordinated by the Indian Council of Agricultural Research, officially set minimum standard levels of iron and zinc for the release of pearl millet cultivars. Diets deficient in iron and zinc can be a major cause of anemia and stunting, respectively, and in India, 59 percent of children under five and 54 percent of women are anemic, while 38 percent of children under five are stunted.

Because of its ability to grow well in dry soil, pearl millet is a staple crop for over 90 million people across the world. Biofortified versions of this staple crop present a cost-effective, sustainable strategy to improve nutrition for resource-poor families and communities who rely on pearl millet for the bulk of their diets.

Equally significant, the Indian government declared in 2018 that millets are “nutri-cereals” important for improving food and nutrition security, and recommended their inclusion in the country’s extensive public food distribution system, or PDS. When this is implemented, millets with minimum micronutrient traits will be available to millions more low-income Indians.

Global Definition Drive Enters New Stage

Work on a global definition for biofortification is progressing within the Codex Alimentarius, the international food standards-setting body comprising 188 member governments and 250 observer NGOs. A draft definition for biofortification advanced to step 4 of the 8-step Codex standard-setting procedure. Many member governments await a Codex-approved definition before they proceed with national regulations or policies on biofortification.

African Development Bank Prioritizes Biofortification

In its Multi-Sectoral Nutrition Action Plan for 2018–2025, the African Development Bank pledged to invest in “grey matter infrastructure” to ensure Africans reach their full cognitive potential and their countries’ economies can realize demographic dividends. The Bank estimates member states’ gross domestic products are reduced by between 2 and 17 percent annually by the impacts of hunger, particularly stunting.

The plan, released in December 2018, includes biofortification among a few priority investments deemed to have “the greatest impact on nutrition.” The Bank’s Technologies for African Agricultural Transformation projects will also seek to increase agricultural production through activities that include scaling up biofortified nutritious crops. The Bank is targeting a 40 percent reduction in the number of African children whose cognitive and physical development are impaired by poor nutrition by 2025. More than a third of the world’s stunted children under age five reside in Africa.

Separately, the African Leaders of Nutrition (ALN), an initiative of the Bank and the African Union, has played a key role in encouraging member states to elevate nutrition as a key driver of economic growth and development. Howarth Bouis, the founder of HarvestPlus, was welcomed into the ALN early in 2018 to help focus attention on the pervasive challenge of micronutrient micronutrition and the role of biofortification in addressing it.

African Union Body Backs Biofortification

HarvestPlus works with several partners in Africa to build high-level political support for biofortification as a response to the continent’s nutritional challenges. In an important milestone, the African Union (AU) Executive Council endorsed biofortification in January 2018, increasing the odds that AU Heads of State will declare official support when they gather at a summit in February 2020. An official declaration by the Heads of State would catalyze action on biofortification by more AU member states; currently, 12 of 54 have adopted policy measures related to biofortification.

Engaging High-Level Champions

The HarvestPlus booth at the 2018 Agricultural and Commercial Show in Zambia, received an extended visit from President Edgar Lungu (pictured below, right), a strong supporter of biofortification. He said he regularly eats products made with vitamin A orange maize, most recently the day before he visited the booth. Support from high-level champions like President Lungu are essential to generating interest in biofortified foods among the general public, government agencies, and businesses.
India Sets Minimum Iron and Zinc Levels In Releases of Pearl Millet Varieties

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The HarvestPlus program is based at the International Food Policy Research Institute (IFPRI) and collaborates with multiple CGIAR centers and partner organizations. The Board of Trustees of 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.

Andrew Natsios (Chair)*
Director, Scowcroft Institute of International Affairs, and Executive Professor, Bush School of Government and Public Service, Texas A&M University

Esi Foriwa Amoafu
Director of Nutrition, Ghana Health Service

Jeroen A. Bordewijk
Senior Vice President (Retired), Unilever Corporation, Supply Chain Excellence Programme

Ken Noah Davies
Director (Retired), Purchase for Progress, World Food Programme

Ruben G. Echeverría
Director General, International Center for Tropical Agriculture (CIAT)

Ismahane Elouafi
Director General, International Center for Biosaline Agriculture

Shenggen Fan
Director General, International Food Policy Research Institute

Richard Flavell
Chair, Science and Impact Executive Board, International Wheat Yield Partnership, Texas A&M University

John Hamer
Managing Partner, Data Collective

Patrick J. Murphy
Vice President (Retired), Bank of America

Andrew M. Prentice
Head, MRC International Nutrition Group, London School of Hygiene and Tropical Medicine

Margret Thalwitz
Board Chair, International Center for Agricultural Research in the Dry Areas

Barbara Wells
Director General, International Potato Center

Peter McPherson (Chair Emeritus)
President, Association of Public and Land-grant Universities

*Andrew Natsios became chair of the PAC on Jan. 1, 2019, succeeding Peter McPherson.

HarvestPlus Thanks
Peter McPherson for His Service

Peter McPherson stepped down as chair of the PAC on Dec. 31, 2018, after serving in this capacity since the inception of HarvestPlus in 2003. McPherson, president of the Association of Public and Land-grant Universities and a former administrator of the United States Agency for International Development, has been instrumental in the development and successes of HarvestPlus. He worked tirelessly to advance a culture of delivering impact through focused research investments and multi-disciplinary collaboration. He has also been a consistent champion of our global leadership in biofortification. Throughout, HarvestPlus benefited immensely from his wise counsel, unwavering support, and thoughtful contributions to our strategic and operational activities.

HarvestPlus Governance and Financial Summary

2018 Receipts and Disbursements (in million US$)

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount (million US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receipts</td>
<td>38.990</td>
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<tr>
<td>Grants and Contracts</td>
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<tr>
<td>Interest Income</td>
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<tr>
<td><strong>Total Receipts</strong></td>
<td><strong>39.161</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Disbursements</th>
<th>Amount (million US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>2.982</td>
</tr>
<tr>
<td>Crop Development</td>
<td>8.813</td>
</tr>
<tr>
<td>External Affairs</td>
<td>2.851</td>
</tr>
<tr>
<td>Delivery</td>
<td>14.155</td>
</tr>
<tr>
<td>Impact &amp; Strategy</td>
<td>2.324</td>
</tr>
<tr>
<td>Human Nutrition</td>
<td>3.899</td>
</tr>
<tr>
<td><strong>Total Disbursements</strong></td>
<td><strong>35.023</strong></td>
</tr>
</tbody>
</table>

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CGIAR Research Program on Agriculture for Nutrition and Health (A4NH)

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HarvestPlus produced an animated video in 2018 about our work in biofortification. Watch it at: harvestplus.org/BetterCrops

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) and is based at the International Food Policy Research Institute (IFPRI).

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