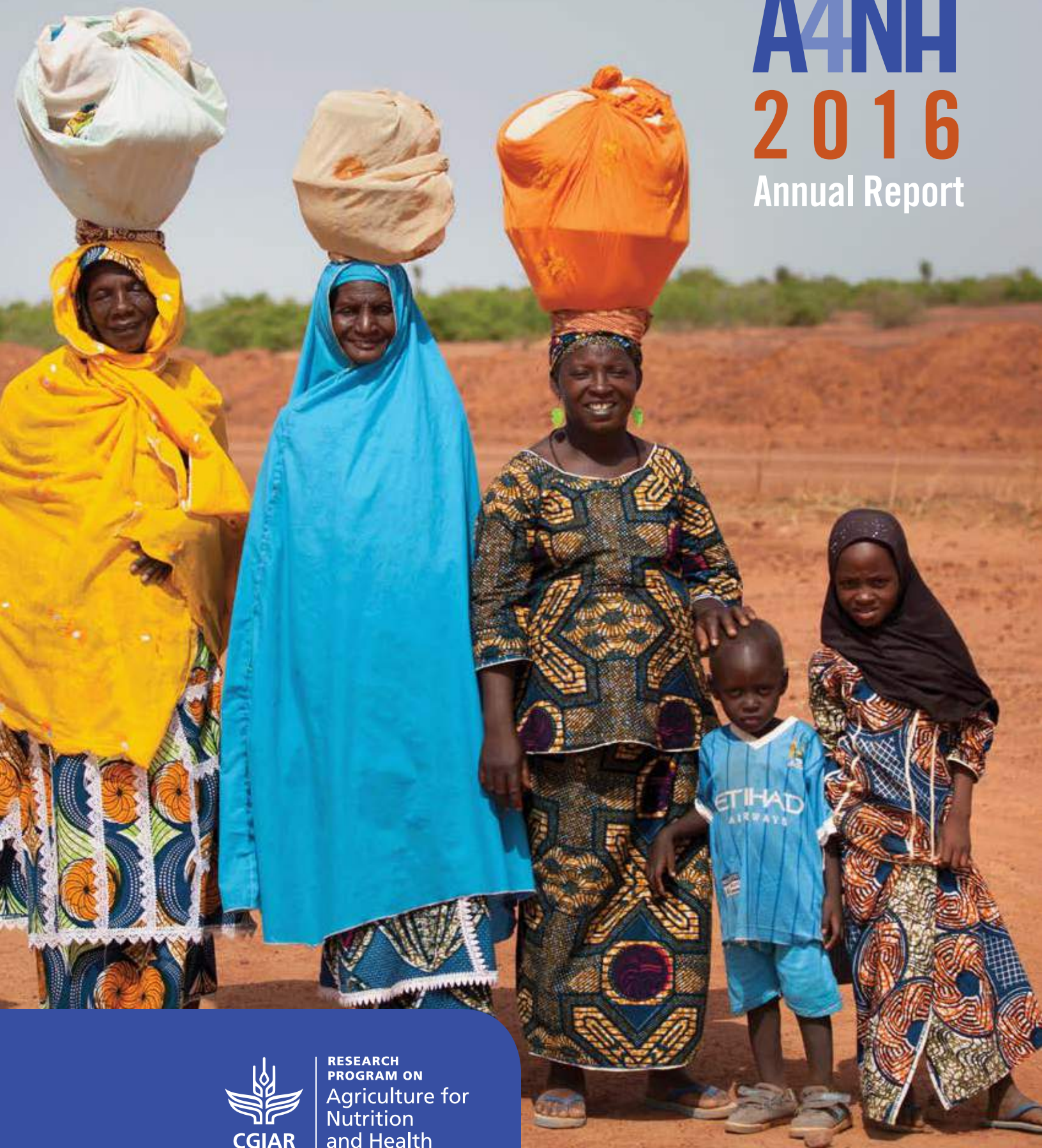


A4NH

2016

Annual Report



RESEARCH
PROGRAM ON
Agriculture for
Nutrition
and Health

Led by IFPRI

CONTENTS

- 1 A Message from A4NH's Director
- 1 A Message from IFPRI's Director General
- 2 A4NH Highlights
- 2 Milestones in Agriculture, Nutrition, and Health, 2016
- 3 Milestones, 2012–2015
- 4 Flagship 1: Value Chains for Enhanced Nutrition
- 6 Flagship 2: Biofortification
- 8 Flagship 3: Agriculture-Associated Diseases
- 10 Flagship 4: Integrated Programs and Policies
- 12 A4NH in Action: Focus on Africa
- 15 Gender
- 16 The Road Ahead: A4NH Plans for Phase II
- 17 The A4NH Portfolio: Moving from Evidence and Understanding to Action and Impact
- 18 Setting the Stage for Phase II
- 18 Spotlight: Enhancing A4NH Partnerships to Maximize Impact
- 19 Spotlight: Emerging Challenges in Focus Countries
- 20 2016 Financial Summary
- 20 Donors + CGIAR Partners
- 21 Governance
- 21 Credits
- 22 About the CGIAR Research Program on Agriculture for Nutrition and Health

FRONT COVER PHOTO: M. MITCHELL, IFPRI
BELOW PHOTO: N. PALMER, CIAT

In its fifth and final year of Phase I, the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) has validated its core areas of research, taking many to scale while also broadening its Phase II portfolio. • By the end of 2016, more than 130 biofortified varieties of 10 crops were released in over 30 countries, all positive steps toward HarvestPlus's goal of reaching 20 million farm households with biofortified crops by 2020 and 1 billion people consuming biofortified foods by 2030. High quality evidence—on topics such as emerging zoonoses, Rift Valley fever, aflatoxin control, and food safety in informal markets—helped inform policy and decision making to prevent and control agriculture-associated diseases in high-risk areas. Following a successful Nigeria pilot stage, the aflasafe™ approach for managing aflatoxins consistently reduced groundnut and maize aflatoxin contamination by at least 80 percent, with plans and investments to expand the approach to 11 other African countries. Rigorous evaluations of integrated agriculture-nutrition interventions demonstrated, for the first time, that well-designed programs can have measurable impacts on child and maternal nutrition, as well as on women's empowerment. • A4NH's work to raise the profile of nutrition globally includes highly cited outputs such as the annual *Global Nutrition Reports*, started in 2014 with input from A4NH researchers, which offer a global roadmap for accountability and action to address undernutrition. The innovative Stories of Change in Nutrition initiative raised the profile of the dynamics of nutrition change processes, and its associated set of resources, produced in 2016, were widely disseminated and applied. Lastly, A4NH researchers contributed significantly to the African Union's *Annual Trends and Outlook Report* that focused, for the first time, on agriculture-nutrition linkages. •

For Phase II, A4NH is eager to build upon success from Phase I while reframing its approach toward food safety, diet quality, and public health research with an expanded portfolio and exciting new partnerships.



A MESSAGE FROM A4NH'S DIRECTOR

2016 was a transition year—bringing together results from Phase I of A4NH (2012–2016) and gaining approval for the proposal of a new six-year phase.

When our program began, a key goal was to provide governments, civil society, private sector organizations, and investors with evidence on what agricultural actions and investments could effectively and efficiently improve nutrition and health. Evidence generated by A4NH informed widely adopted and adapted theories of change and their associated impact pathways for nutrition-sensitive agricultural actions, from policy coherence to biofortification and from integrated agriculture-nutrition programs to food safety. Recognizing gender empowerment's essential role in improving nutrition at the household, community, and national levels, we have also worked to highlight this crucial issue in work across the A4NH portfolio.

Country ownership and leadership are essential to enable and implement agriculture-nutrition-health actions. This year's report highlights an initiative called Stories of Change in Nutrition, which brought together experiences from multiple countries and regions to help countries understand how the enabling environment and both policy and program implementation can drive nutritional improvement.

Food system transformation is emerging as a central issue in national development strategies in Africa and South and Southeast Asia. In response, this year marked a shift for A4NH from a value chains approach to a food systems approach. More of our research now is and will be focused on designing and evaluating interventions for multiple, rather than individual, commodity chains. Our intent is to reorient agricultural thinking from strictly production to placing more emphasis on understanding consumer demand and consumption.

A4NH's Phase I successes are directly tied to the remarkable collaborative efforts of a strong group of partners. From this group, a core of managing partners has emerged to guide our work in Phase II. It is with confidence in our strong foundation and in the dynamic team of partners prepared to lead us that we close Phase I optimistic and ready to take on the challenging work ahead.

John McDermott
JOHN MCDERMOTT



A MESSAGE FROM IFPRI'S DIRECTOR GENERAL

A4NH marked the end of Phase I this past year, and IFPRI could not be prouder to lead such a top-notch, cutting-edge research program. In just five years, A4NH made significant progress in research areas that are critical to fulfilling CGIAR's vision and mission.

A4NH's research was profiled in many outlets. The program's researchers led two of the four papers published in the highly-influential *Lancet* special series on maternal and child nutrition, which revealed malnutrition to be the single greatest obstacle to children's survival and optimal development. More recently, the Stories of Change in Nutrition initiative, a unique collection of experiential evidence on nutrition, has been widely discussed in decision making arenas.

In 2016, HarvestPlus and partners delivered biofortified planting material to over 3 million households across three regions: Africa, Asia, and Latin America and the Caribbean. This brings the total number of households who were growing and consuming biofortified crops in 2016 to over 5.3 million. Published studies found that consuming biofortified high-iron and vitamin A-rich crops improved micronutrient status and also improved important functional health outcomes, such as physical work capacity and eyesight, respectively. The program is now moving into its delivery phase and aims to reach 100 million people by 2020. A4NH also made inroads in food safety, working with partners to develop and disseminate the application of aflasafe™ in Africa, a technology that controls aflatoxin levels in maize and groundnut production.

This range of achievements makes clear the important contribution of agriculture to nutrition and health. As the focus turns to implementing A4NH's second phase of programming, IFPRI, alongside its partners, is excited by what new research will reveal about how to best redesign our agricultural and nutrition policies, programs, investments, and food systems to improve nutrition and health around the world.

Shenggen Fan

SHENGGEN FAN



A4NH HIGHLIGHTS

MILESTONES IN AGRICULTURE, NUTRITION, AND HEALTH, 2016

JANUARY

A team of researchers from Kenya, the Netherlands, and the United States developed a Rift Valley fever risk map for Kenya to aid prevention and control of the disease.



PHOTO: S. MANN, ILRI

First ANH Academy Week Conference held in Addis Ababa, Ethiopia.

JULY

Study published in the *Journal of Nutrition* found that daily consumption of meals with beans conventionally bred to be richer in iron helps prevent and reverse iron deficiency in young Rwandan women in just four and a half months.

Regional Strategic Analysis and Knowledge Support System (ReSAKSS)

launched *2015 Annual Trends and Outlook Report*, co-edited by an A4NH affiliated researcher and featuring several chapters authored by A4NH researchers.

ReSAKSS
Regional Strategic Analysis and Knowledge Support System
Facilitated by IFPRI

APRIL

Global Panel on Agriculture and Food Systems for Nutrition (GloPan)

publishes brief on Policy Options for a Healthier Food Supply, citing A4NH evidence on the burden of foodborne disease.



AUGUST

Special aflatoxin issue of the *African Journal of Food, Agriculture, Nutrition and Development (AJFAND)*, led by the International Livestock Research Institute (ILRI), was published.

DECEMBER

Manufacturing plant for Aflasafe KE01™ in Kenya completed, following signing of the Technology Transfer Agreement by the International Institute for Tropical Agriculture (IITA) and the Kenya Agriculture and Livestock Research Organization (KALRO) and product launch in October.



JUNE

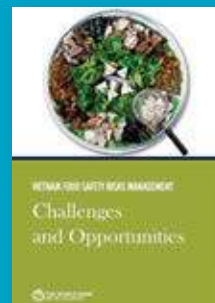
Global Nutrition Report (GNR) 2016 launched in Washington, DC.

The government of Uganda released first five high iron bean varieties that will provide more iron in the diets of millions of Ugandans who eat beans almost daily.

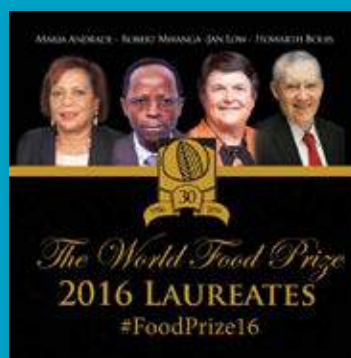
OCTOBER

The 2016 World Food Prize awarded to Howarth Bouis, founding director of HarvestPlus, along with three colleagues from the International Potato Center—Maria Andrade, Jan Low, and Robert Mwangi—demonstrating biofortification's acceptance as an impactful and scalable approach to tackling micronutrient deficiency.

ILRI researchers co-author World Bank report on *Vietnam Food Safety Risks Management: Challenges and Opportunities*.



Nourishing Millions book and associated products launched in Washington, DC.



“Dr. Bouis pioneered the implementation of a multi-institutional approach to biofortification as a global plant breeding strategy. Through the combined efforts of our four Laureates, over 10 million persons are now positively impacted by biofortified crops.”

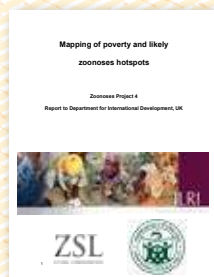
—Ambassador Kenneth M. Quinn, President of the World Food Prize Foundation

MILESTONES, 2012–2015

2012

HarvestPlus launched biofortified crops around the world: in Nigeria, vitamin A cassava and two hybrids of vitamin A maize; in Rwanda, five varieties of iron beans; in Zambia, three varieties of vitamin A maize; and in India, high iron pearl millet.

ILRI released DFID-funded report mapping poverty and likely zoonoses hotspots.



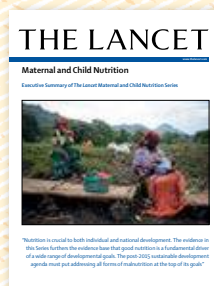
Bioversity International co-authored book on sustainable diets and biodiversity with the Food and Agriculture Organization of the United Nations (FAO).



Official launch of A4NH in September.

2013

Two of the four papers in *The Lancet's* agenda-setting maternal and child health series were led by A4NH-affiliated researchers.



Successful piloting of the aflasafe™ biocontrol approach to control aflatoxins in Nigeria spurred interest to expand the technology in other countries across Africa.

A4NH and IFPRI collaborated with a wide range of researchers to launch a series of practical and accessible 2020 Vision Briefs on the management and control of aflatoxins, co-edited by two A4NH flagship leaders.



IFPRI and the United States Agency for International Development (USAID) jointly hosted a workshop in Dhaka to present findings on the impact of food security programs, like Feed the Future, in Bangladesh.

In response to demand from within CGIAR for support for achieving better nutrition impact through a gender lens, A4NH hosted the first gender-nutrition methods workshop for researchers and practitioners, in Kenya.

2014

A4NH convened a workshop to develop a monitoring and evaluation framework for research on value chains for nutrition. Over the next two years, the framework picked up global momentum, being tested and applied by partners including the World Food Programme (WFP), the International Fund for Agricultural Development (IFAD), and others.

HarvestPlus organized 2nd Global Conference on Biofortification in Kigali, Rwanda, to mobilize governments, policy makers, investors, and partners to join in scaling up biofortification.



Food Safety and Informal Markets, a book synthesizing 10 years of food safety research in Africa, was published by ILRI as part of the Safe Food, Fair Food project.

Two A4NH projects, Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) and Transform Nutrition, successfully co-hosted the Together for Nutrition conference in New Delhi.



Launch of the first *Global Nutrition Report* (GNR), which provides a comprehensive analysis and action plan to address undernutrition. A4NH-affiliated researchers contributed content, and one co-chaired the Independent Expert Group (IEG) that produced the report.

2015

HarvestPlus launched the Biofortification Priority Index, an online tool to guide global investment in biofortified crops.

A4NH convened a series of regional public health consultations in East Africa, West Africa, and South Asia to explore expanded research on agriculture and health linkages.



The Agriculture, Nutrition, and Health Academy (ANH Academy) was officially launched, jointly convened by A4NH and the

Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH), along with the Innovative Methods and Metrics for Agriculture and Nutrition Actions (IMMANA) initiative.

Six of eight studies in special issue of the *Journal of Development Studies* on farm-level pathways to improved nutrition were co-authored by A4NH-affiliated researchers.

Bangladesh's Ministry of Agriculture launched the Agriculture, Nutrition, and Gender Linkages (ANGeL) project.

Policy recommendations on aflatoxin control, provided by A4NH-affiliated researchers in series of 11 technical papers, all adopted by East Africa Community Multisectoral Ministerial Council on aflatoxins.

FLAGSHIP 1:

Value Chains For Enhanced Nutrition

Identifying opportunities to improve nutrition and diet quality along value chains to increase poor people's access to and consumption of nutritious foods

An emphasis on nutritious consumption

This flagship centers on identifying ways for people to access and consume more diverse and nutritious foods. Research here explores opportunities for improving diet quality and diversity via dietary assessments and analyses of both informal and formal value chains. It also looks more broadly at the connections between agriculture, environment, and diets in specific regions.

To improve value chains for nutrition, researchers generate evidence and validate methods that help value chain actors, including policy makers, farmers, and nongovernmental organizations (NGOs), to better design, assess, and implement programs that deliver more nutritious food to the farms and tables of the most undernourished populations.

Strengthening the nutrition sensitivity of value chains

A practical framework for nutrition-sensitive value chain interventions, developed by A4NH, was applied in new contexts in 2016. IFPRI, with other CGIAR partners and the World Food Programme (WFP), adapted the framework for multi-chain systems in Malawi. The International Center for Tropical Agriculture (CIAT) applied the framework to a study on market-based solutions to increase the consumption of beans and amaranth by poor urban and peri-urban consumers in Kenya and Uganda. With technical support from A4NH, the International Fund for Agricultural Development (IFAD) developed guidance on designing nutrition-sensitive value chains, modifying the A4NH framework to focus on smallholder producers, and tested it in Indonesia and Nigeria. Results from these applications help expand the evidence base on what works.

Two new Bill & Melinda Gates Foundation (BMGF)-funded value chain projects focus on improving nutrition and health through poultry and livestock value chains. [SE LEVER](#), an integrated agriculture-nutrition package of interventions aimed at increasing poultry production and improving the diets and

health of women and children, is implemented by Agribusiness Systems International in Burkina Faso. IFPRI is leading the evaluation of the project. [MoreMilk](#), led by the International Livestock Research Institute (ILRI) in collaboration with IFPRI, assesses whether enhancing training, certification, and marketing in Nairobi's informal dairy markets can improve child health and nutrition.

Diverse landscapes, diverse diets

Bioversity International's research focused on linking value chains and markets to the agro-ecosystems that support local food production and supply. They produced a summary [book](#) on the scientific foundations for the concept of an Agrobiodiversity Index, building upon the foundational work of sustainable diets, nutrition-sensitive landscapes, and multifunctional landscapes and seascapes. Tools, methods, and results from Phase I experiences were summarized in [Integrated Systems Research for Sustainable Intensification in Smallholder Agriculture](#). Lessons learned from projects in the Central Mekong Action Area were summarized in a [book chapter](#). Studies on seasonal differences in diets in Zambia and on costs of nutritious, seasonal food baskets in Kenya progressed, with new projects set to begin in Malawi and Zambia.

"At IFPRI, we are working on the changing prices of pulses. When there's a fall in pulse production, prices shoot up. How do you stabilize prices for the commodities? We are working... to address this."

—P.K. Joshi, IFPRI Director for South Asia, on key issues highlighted during the Year of Pulses



PHOTO: M. MITCHELL, IFPRI

FLAGSHIP 1 HAS THREE MAIN OBJECTIVES:

- ① Improve diet quality for women, infants and young children, and vulnerable groups,
- ② Empower women and vulnerable groups, and
- ③ Contribute to an enabling environment for nutrition and health.



PHOTO: N. PALMER, CIAT

LINKING FARMERS, MARKETS, AND THE PRIVATE SECTOR TO IMPROVE NUTRITION FOR LOW-INCOME CONSUMERS

This year, CIAT researchers provided critical information to small and medium enterprises (SMEs) in Kenya and Uganda to help them develop a multi-ingredient bean-based porridge flour that is nutritious and affordable for poor people.

CIAT conducted a rapid market assessment study to better understand why these nutrient-dense foods are not consumed by poor consumers, in order to help the SMEs improve product development and marketing. Their survey results showed that proximity is a key consideration for poor consumers in urban and peri-urban areas of Nairobi and Kampala when they decide where to purchase porridge flour. Their analysis also

showed that the current porridge flours in the markets have a relatively low nutritious value because they are mostly made from cereals, without additional ingredients like legumes or vegetables. In Kenya, 80 percent of surveyed households reported that the porridge their young children consumed was only made with porridge flour, which contained a single ingredient like maize, rice, or millet. Since porridge is an important part of the diets of young children between two and five years old, additional nutritious ingredients in the flour could help add diversity to their diets. Their survey showed that 44 percent of Kenyan consumers preferred porridge flour with

more than two ingredients because it was perceived to be a more nutritious product. And therein lies a marketing opportunity.

Since the study results were shared with the two SMEs—Nutreal in Uganda and Azuri in Kenya—the companies have completed more of their own analysis to get the right balance of a nutritious and affordable product. The market study is only one aspect of the larger German Federal Ministry for Economic Cooperation and Development (BMZ)/Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)–funded project called Making Value Chains Work for Food and Nutrition Security in East Africa, which includes testing existing business models of linking farmers—in this case bean and amaranth farmers—to private processors. The project also introduces a new technology that reduces on-farm contamination, improves the quality of raw beans, and reduces labor. The overall goal is to develop more nutrient-dense products that are both attractive and affordable to poor consumers. Nutreal and Azuri plan to launch the improved porridge-flour product in 2017.

“By testing and validating A4NH’s conceptual framework on value chains for nutrition in a real-life project context in Kenya and Uganda, CIAT and partners are generating evidence to demonstrate how a market-based approach can achieve both nutrition and income-generation outcomes.”

—Matthias Jager, project lead researcher, CIAT



Supporting the global campaign for pulse value chains

Throughout 2016, A4NH researchers supported the Global Pulse Confederation’s efforts to link nutrition to pulse production trends and value chains through the United Nations’ International Year of Pulses—a campaign which sought global commitment to support pulses as an important means for feeding the world. A4NH’s pulse research complemented the campaign’s discussions, with an emphasis on increasing pulse production and consumption and on stabilizing their rising prices, especially in India—the world’s largest pulse producing and consuming nation. A4NH supported the “[Pulses for Sustainable Agriculture and Human Health](#)” conference held in India in May and co-organized by IFPRI, and an IFPRI Working Paper on how the global supply of pulses cannot match India’s needs and what impacts this has on world prices and India’s domestic production. In 2016, A4NH provided input to the campaign’s food and nutrition security and markets committees, and also offered technical guidance for the May conference—all in an effort to promote pulses as an important contributor to sustainable and healthy food systems.

Partnerships to enhance value chains locally and globally

A4NH’s ongoing partnership with IFAD brings research and knowledge generation that is complementary to IFAD’s

role as a user of that knowledge. The partnership began in 2013 to support and catalyze IFAD’s efforts to mainstream nutrition. In 2016, A4NH provided technical assistance for 6 Country Strategy Plans, 12 IFAD portfolio projects, and the IFAD Nutrition Action plan, which will be published in 2017. The partnership also provides more opportunities for A4NH to interact with other United Nations organizations, such as WFP and FAO, and their initiatives. For example, the A4NH framework was presented to the United Nations System Standing Committee on Nutrition and the Committee on World Food Security.

Many promising new partnerships arose in 2016. CIAT joined Azuri Health Foods Ltd. as part of its ongoing work on beans and amaranth in Kenya and Uganda. Bioversity International partnered with Fresh Studios, an agro-food research and consulting firm, as part of a new grant in Viet Nam, and with McGill University, Self Help Africa (Zambia), and the Small Producers Development and Transporters Association (SPRODETA, Malawi) as part of a newly funded IFAD grant. CIAT and Action Contre la Faim collaborated on a training workshop for 40 technical staff on a value chains for nutrition approach, the LINK methodology, and a review of opportunities for joint work in 2017–2018. ●

FLAGSHIP 2:

Biofortification

Improving the availability, access, and intake of biofortified nutritious staple foods

Building the evidence base for biofortification

This flagship aims to build an evidence base on the effectiveness and impact of biofortification, while working to build partnerships with national governments, UN Agencies, international financial institutions, and the public sector to scale up this proven innovation. HarvestPlus leads this flagship and, with its partners, develops, tests, and disseminates planting materials of nutrient-rich, biofortified staple food crops to rural populations in Africa, Asia, and Latin America and the Caribbean. By increasing production and consumption of biofortified staple foods among rural populations dependent on staple crops to meet the majority of their food needs, this flagship aims to reduce iron, zinc, and vitamin A deficiencies, taking into account technical, social (including gender), and institutional constraints and opportunities associated with biofortified crops.

Progress toward availability, efficacy, and delivery

Interdisciplinary research conducted in the last 15 years demonstrates that: biofortified varieties can be bred without compromising key agroeconomic traits like high yields; micronutrient deficiency status, as well as certain adverse health outcomes, can improve with regular consumption of foods made with biofortified crops; farming households are willing to adopt and consume biofortified varieties of staple foods; and biofortification is cost-effective and sustainable. Specific 2016 achievements include the following:

1. **Additional high-yielding, micronutrient-enhanced varieties are available:** In 2016, HarvestPlus and its partners released 30 new varieties (of pearl millet, wheat, rice, beans, and maize) in 12 countries (Bangladesh, Colombia, DR Congo, Honduras, India, Malawi, Mali, Nigeria, Pakistan, Tanzania, Uganda, and Zimbabwe).

“Biofortification must be rigorously supported within the broader context of promoting a diversified and healthy food base for improved nutrition.”

—Dr. Akinwumi Adesina, President of the African Development Bank and Former Minister of Agriculture & Rural Development of Nigeria



2. **Demonstrated nutritional efficacy:** Studies published in 2016 examined the nutrition and health benefits of vitamin A cassava (Kenya), maize (Zambia), and iron beans (Rwanda).
3. **Delivery is scaled up to promote adoption and consumption of biofortified crops:** In 2016, almost 15 million people were reached with planting material, ranging from 360,000 people reached with iron pearl millet in India to 5.1 million people reached with vitamin A cassava in Nigeria and DR Congo.

The first nationally representative impact assessment to measure adoption and diffusion rates of biofortified crops was conducted in Rwanda in 2015 and finalized in 2016: 29 percent of rural bean-producing households—equivalent to almost half a million households—had grown at least one high iron bean variety in at least one cropping season since dissemination of these varieties started in 2012. A smaller-scale impact study from Zambia signaled great potential for long-term adoption of vitamin A maize: 97 percent of first-time growers wanted to grow the variety again in the subsequent season, demanding four times more seed; and each farmer recommended the variety to an average of 10 other farmers.

Reaching more audiences with scientific evidence for biofortification

A series of evidence syntheses on biofortification was published in 2016 and presented at various forums. The World Health Organization (WHO) and FAO convened a consultation with external experts that will be published in a special 2017 issue of ANYAS, offering an all-encompassing review of biofortification. A set of 17 peer-reviewed articles showcasing evidence on biofortification finalized in 2016 is earmarked for 2017 publication in a special issue of the *African Journal of Food, Agriculture, Nutrition and Development*. Additionally, a

FLAGSHIP 2 HAS THREE MAIN OBJECTIVES:

- ① Make high-yielding, micronutrient-enhanced varieties available to NARES and implementing partners in target countries,
- ② Support nutrition and health communities promoting biofortified crops of demonstrated nutritional efficacy, and
- ③ Implement delivery programs to ensure adoption and consumption of biofortified varieties in target countries.

chapter was dedicated to biofortification in the *2015 Annual Trends and Outlook Report* of the Regional Strategic Analysis and Knowledge Support System (ReSAKSS).

Evidence on biofortification was showcased at three major international conferences in 2016: the 5th African Association of Agricultural Economists Conference in Ethiopia; the Micronutrient Forum in Mexico; and the annual ReSAKSS conference in Ghana. Lastly, a definition for biofortified products was presented in the 2016 session of the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) for which the criteria are now being agreed upon.

The road ahead for biofortification

HarvestPlus's goal is to reach 20 million farm households with biofortified crops by 2020 and to have 1 billion people consuming biofortified foods by 2030. Five major steps are needed to achieve this goal:

1. **Effectively mainstream biofortified crop varieties into multidimensional breeding programs.** Build capacity within CGIAR research centers and National Agricultural Research and Extension Programs (NARES).
2. **Provide evidence for targeting biofortification interventions.** In 2017, update the Biofortification Priority Index (BPI)—a targeting tool for identifying high impact biofortification interventions—with the most recent national data and new crop-micronutrient combinations.
3. **Develop robust monitoring and evaluation and knowledge management systems** to track indicators of progress toward key outcomes; this will ensure that lessons learned feed back into planning and program management for scaling up.
4. **Promote sustainable value chains.** Ensure effective market demand and supply of biofortified crops across all actors—seed multipliers, seed companies, processors, food manufacturers, retailers, and consumers.
5. **Create an enabling policy environment.** Effectively advocate to ensure that biofortification is integrated within national, regional, and global investment plans and initiatives. Agreement on criteria to inform the definition of biofortification is anticipated at the 2017 Session of CCNFSDU.

A detailed strategic plan for scaling up biofortification to reach HarvestPlus's goal will be finalized by the end of 2017. The robust evidence base, and monitoring and evaluation and knowledge management systems being developed with funding from A4NH, will support HarvestPlus's aim to alleviate hidden hunger with biofortification. ●

PHOTO: N. PALMER, CIAT

BIOFORTIFICATION IN NUMBERS

As of the end of 2016, more than **140 biofortified varieties** of **10 crops** were released in **over 30 countries**. Globally, **over 50 countries** have released biofortified crops, are conducting related multi-locational trials, or both. Globally, almost **3 million farming households** were reached with biofortified planting material in 2016 and an estimated **26 million people** in Africa, Asia, and Latin America were growing and eating biofortified staple foods.



BIOFORTIFICATION IN THE SPOTLIGHT

Dr. Howarth (Howdy) Bouis, the founder of HarvestPlus, and Drs. Maria Andrade, Robert Mwangi, and Jan Low of the International Potato Centre (CIP) were awarded the prestigious World Food Prize in 2016 for their pioneering work on biofortification. Orange sweet potato, the spotlight biofortified crop for the award, was also listed by *TIME* magazine as one of the top 25 innovations in 2016.

“Howdy [Bouis] joins the ranks of the very few and rare persons who have created opportunities for the world’s nutritionally vulnerable populations to have better diets.”

—Anna Lartey, President,
International Union of
Nutrition Sciences



PHOTO: © R. CENCIARELLI, FAO



FLAGSHIP 3: Agriculture-Associated Diseases

Addressing food safety issues, including zoonotic disease control and better management of agricultural systems, to reduce the risk of human diseases

Integrating perspectives, improving risk exposure

Foodborne diseases pose a severe threat to development: the health burden is comparable to malaria, HIV/AIDS, or tuberculosis. Throughout Phase I, A4NH researchers have focused on mitigating this threat in several specific areas: food safety of perishable products and aflatoxin contamination of food and feed. Other work has focused on diseases emerging from agricultural systems.

As these risks occur at the crossroads between agriculture and public health, addressing them requires strategic and innovative efforts beyond normal responses for either area alone. A4NH brought together a broad spectrum of actors and perspectives to better understand agriculture-associated disease. Our researchers gathered national, regional, and global views, socioeconomic, gender, and ecological perspectives, and public and private interests to inform a wide range of decision makers.

Challenges, understanding, and progress

Most foodborne disease results from eating fresh foods sold in the wet markets of developing countries, but this area has been largely overlooked. A4NH researchers are working to turn that around, having published the first book on informal markets, provided extensive training to practitioners and policy makers, and introduced informal markets to university curricula in three countries. ILRI researchers also published systematic reviews for five important pathogens, including three foodborne, as well as a methods paper on the application of systematic literature reviews in Africa. These reviews, considered the gold standard for generating evidence, are less used in agriculture and health in developing countries.

A4NH researchers also made progress on longstanding problems. For example, approximately half of East Africa (including 52 million people and 90 million hectares) now benefits from risk-targeted surveillance, the result of research at ILRI into developing maps of high-risk areas. ILRI scientists

were also involved in a series of papers on climate change and disease that highlighted the effects of climate change on distribution of livestock diseases, priorities for modeling livestock health and pathogens, and tracking progress on health and climate change. Climate change can exacerbate diseases in livestock and many of these are foodborne and/or zoonotic diseases. In 2015, ILRI helped produce the first-ever global mapping of antimicrobial use in livestock, showing huge and increasing amounts driven by large developing countries such as Brazil, China, India, and Russia. This trend was covered in reviews and opinion pieces on antimicrobial use in agriculture in high-level human and animal journals, including *The Lancet*. Another publication reported for the first time the presence of *Trichinella*, one of the most globally important pig zoonoses, in Uganda. The paper provided evidence that the parasite is shifting from a wildlife- to a livestock-based life cycle, exploiting the niche created by the rapidly growing pig sector. The ILRI team also published results from studies on informed consent processes in One Health research. The findings were based on ILRI research identifying diseases of animal and human importance, and to our knowledge, it is the first of its kind to be written by CGIAR researchers.



PHOTO: S. MACMILLAN, ILRI

FLAGSHIP 3 HAS THREE MAIN OBJECTIVES:

- ① Reduce exposure to health risks,
- ② Empower women and vulnerable groups, and
- ③ Contribute to enabling policies and investments.

Working to solve a silent threat

Aflatoxins are an invisible problem that have evaded solution for some time. Over the last several years, A4NH research carried out by IITA, ILRI, and IFPRI has sought to control and mitigate aflatoxins. One solution is a biocontrol product, generically referred to as aflasafe™. IITA, with the US Department of Agriculture's Agricultural Research Service (USDA-ARS) and local national institutions, successfully adapted this technology, reducing groundnut and maize aflatoxin contamination consistently by at least 80 percent.

Expanded outreach on and availability of aflasafe™ has been a positive development for policy makers and farmers alike throughout a region plagued by this threat to animal and human health. Supported by the Partnership for Aflatoxin Control in Africa (PACA), as well as A4NH, other donors, and national governments, IITA is pursuing an ambitious plan

to expand aflasafe™ to 11 countries in Africa. By the end of 2016, Nigeria had completed all steps of the process to expand aflasafe™'s reach across the country; Kenya had made significant progress towards being able to produce aflasafe™ in-country for use nationwide; and IITA had worked with other partners to develop a communication strategy and support the government in applying Aflasafe KE01™ in priority counties. Meanwhile, Aflasafe SN01™ was registered in Senegal and Gambia in 2016, signaling progress toward expansion elsewhere.

In 2016, a special edition of the *African Journal of Food, Agriculture, Nutrition and Development* was published on aflatoxins in East Africa, with 12 articles from A4NH researchers. This was featured by PACA with a message of gratitude from AU Commissioner Tumusiime Rhoda Peace. Notably, [a paper by IITA and USDA-ARS scientists](#) was selected as Best Paper of the Year 2016 by the *World Mycotoxin Journal*. ●



PHOTO: CGIAR

“At this time when we are talking about agriculture transformation, we cannot keep quiet about the silent killer to the citizens of Africa. Thanks to ILRI team.”

—Her Excellency Tumusiime Rhoda Peace, African Union Commissioner for Rural Economy and Agriculture

MAPPING RISK TO PREVENT DISEASE

Rift Valley fever (RVF) is an acute, fever-causing viral disease most commonly occurring in domesticated animals, such as livestock, that can also infect and cause illness in humans. East Africa is one region that has experienced large RVF outbreaks. A team of researchers from ILRI has been conducting research and designing evidence-based tools to improve RVF response and control. For example, the team developed risk maps to identify areas particularly vulnerable to RVF, allowing scarce surveillance resources to be directed to where they are most effective. In Kenya, county-based risk maps helped direct funding delegated to county-level surveillance and response, while other maps show how distribution may change under different climate change scenarios. These have been layered with other information on poverty to indicate vulnerability to assist in longer-term planning.

RVF is not easy to prevent by vaccination, since outbreaks happen at intervals of several years. The mapping work done by ILRI researchers under A4NH complements ILRI's ongoing work on vaccination strategies that help indicate what will be effective and, importantly, what won't. In 2016, ILRI researchers co-authored a paper in *Nature Scientific Reports* announcing promising developments of a [One Health vaccine](#), to protect both humans and animals from RVF. More research published in 2016 found that [RVF vaccination](#) can be enhanced by increasing coverage, targeting cattle, and using both periodic and reactive vaccination strategies. Due to strong partnerships with government ministries, findings like these are being incorporated in national contingency plans.



PHOTO: S. ODEYO, ICRAF

FLAGSHIP 4:

Integrated Programs and Policies

Addressing the need for integration among the agriculture, nutrition, and health sectors, at both the program and policy levels

Better evidence to improve nutrition-sensitive agriculture programs

Work on integrated nutrition-sensitive agricultural programs under this flagship, led by the Poverty, Health, and Nutrition Division at IFPRI, helps to strengthen program design and operations, achieve greater impacts and cost-effectiveness, and stimulate investments in replicating, adapting, and scaling up programs that engage agriculture to improve nutrition.

Filling research gaps to boost the impact of agriculture on nutrition and health

New results from several multi-year studies of nutrition-sensitive agriculture programs were finalized in 2016, filling important gaps in our understanding of how agricultural programs can lead to nutritional impacts. A 2016 paper from IFPRI's rigorous evaluation of Helen Keller International's (HKI) Enhanced Homestead Food Production programs in Burkina Faso, for example, demonstrated positive impacts of this well-designed agriculture, gender, and nutrition program on the nutrition and health of both mothers and children, and on measures of empowerment among mothers. Published results from the BMGF-funded Alive & Thrive project in Bangladesh, Ethiopia, and Viet Nam demonstrated the impact of large-scale behavior change communication on improved nutrition knowledge and practices.

Research on the application of household consumption and expenditure survey data for understanding food consumption was recently described in an issue of *Sight and Life* magazine. A4NH has investigated this topic for several years, contributing

to INDDEX, a collaborative effort implemented by Tufts University with FAO and IFPRI.

Results from the first randomized trial evaluating an innovative nutrition-sensitive dairy value chain project in Senegal, showing impacts on milk supply as well as on children's anemia, were submitted for publication in 2016. Two other nutrition-sensitive value chain projects involving homegrown preschool and school feeding programs in Malawi and Ghana, respectively, were completed in 2016 and analysis is underway.

In its second year, the BMGF-funded Advancing Research on Nutrition and Agriculture (ARENA) project studied the effects of cereals on child nutrition in Bangladesh and Malawi; assessed the effects of climate shocks on nutrition in Bangladesh; analyzed health and undernutrition risks associated with livestock ownership in Ethiopia, Bangladesh, and Viet Nam; and lastly, conducted a multi-country study on the drivers of dietary change.

Supporting countries and implementers in bringing about nutrition change

Another important component of A4NH's work is integrating nutrition into policy and implementation processes and raising awareness on lessons learned. In 2016, IFPRI researchers summarized guidance in a chapter of the *ReSAKSS Annual Trends and Outlook Report* on how to design and implement a comprehensive evaluation framework to assess the impact and costs of nutrition-sensitive programs.

Growing out of demand from policy makers for real life examples of how countries have successfully tackled undernutrition, the Stories of Change in Nutrition initiative launched a book in 2016 called *Nourishing Millions*, which draws on data from multi-layered case studies from five countries and one Indian state, as well as from a full analysis paper.

The Transform Nutrition (TN) consortium focused on synthesizing key findings from across its six years of research studies and engaging with stakeholders, particularly the Scaling Up Nutrition (SUN) Movement, in addition to state-level government, civil society, and journalists, around the findings of the TN-supported *India Health Report*, published in late 2015.

The 2016 *Global Nutrition Report (GNR)* cemented its position as the go-to reference for decision makers, implementers, and researchers for nutrition data globally—a resource that not only highlights global commitments to ending malnutrition, but also examines ways to turn these commitments into actions. The 2016 GNR prompted more than 74,000 unique downloads by year-end, putting it in the top 5 percent of all

FLAGSHIP 4 HAS THREE MAIN OBJECTIVES:

- ① Evaluate and strengthen nutrition-sensitive agriculture interventions, particularly those targeted at pregnant women and young children,
- ② Evaluate and strengthen multisectoral nutrition-sensitive development programs and policies and scaled up nutrition-specific programs, and
- ③ Develop tools, methods, and approaches for understanding, influencing, and evaluating cross-sectoral policy processes related to nutrition-sensitive development.



POSHAN AND THE EVOLVING NUTRITION AGENDA IN INDIA

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition (POSHAN), in India, is recognized as an example of a successful country-focused research program to support nutrition policy and program decisions. It aims to reduce the nutrition evidence gap in India by synthesizing, generating, and mobilizing nutrition evidence for policy makers, implementers, researchers, and other stakeholders.

Following a successful implementation phase, BMGF is funding a second four-year phase of POSHAN in India, starting in 2017. In addition, funding has been expanded for a similar initiative in West Africa.

In 2016 alone, POSHAN generated a host of new evidence and outputs, including a review of the Integrated Child Development Services' Supplementary Nutrition Program as well as District Nutrition Profiles for Odisha, Uttar Pradesh, and Bihar—all of which supported policy engagement at state or national levels in India. POSHAN's contributions in Odisha, a state of 42 million people, are recognized in a newly launched state nutrition strategy. In November 2016, POSHAN co-organized the conference, Delivering for Nutrition in India: Learnings from Implementation Research, the first-ever nutrition implementation research conference in India, with BMGF, the All India Institute of Medical Sciences (AIIMS), and the Children's Investment Fund Foundation (CIFF).

The new phase, called POSHAN-2, will include planning for multiple subnational Stories of Change in Nutrition in India, as well as the release of a first state-level nutrition report.

“POSHAN is generating knowledge and bringing stakeholders together at the national level while keeping an independent role, directing the attention back to the evidence. POSHAN has created momentum at the national level.... They bring credibility to the discourse.”

—2016 External evaluation of POSHAN

PHOTOS: BIOVERSITY INTERNATIONAL

research outputs ever tracked according to Altmetric, with coverage spanning 56 countries and 16 languages, including 21 top-tier publications such as *The New York Times*, *The Wall Street Journal*, and *Voice of America*.

A growing nutrition portfolio in South Asia

In 2016, researchers from the Leveraging Agriculture for Nutrition in South Asia (LANSA) consortium examined the relationship between farming systems and dietary diversification in South Asia, as well as agriculture-child undernutrition linkages in relation to growth and care practices in India.

Two projects on agriculture-nutrition linkages in Bangladesh continued collecting data in 2016: the Agriculture Nutrition and Gender Linkages (ANGeL) project, jointly funded by the government of Bangladesh and USAID under IFPRI's Policy Research and Strategy Support Program (PRSSP) and implemented by the Bangladesh Ministry of Agriculture in collaboration with HKI; and Targeting and Realigning Agriculture for Improved Nutrition (TRAIN), a multi-year project funded by BMGF and DFID, implemented in partnership with BRAC. Both projects aim to address evidence gaps on the effects of agricultural interventions on maternal and child nutrition and the mediating role of women's empowerment.

In India, work continued on two projects that examine the role of women's self-help groups in improving maternal and child nutrition—JEEViKA-Multisectoral Convergence

(JEEViKA-MC) and Women Improving Nutrition through Group-based Strategies (WINGS). Several reports and publications based on the baseline data were drafted for the WINGS project in 2016.

Continued impact and expanded research to deliver results

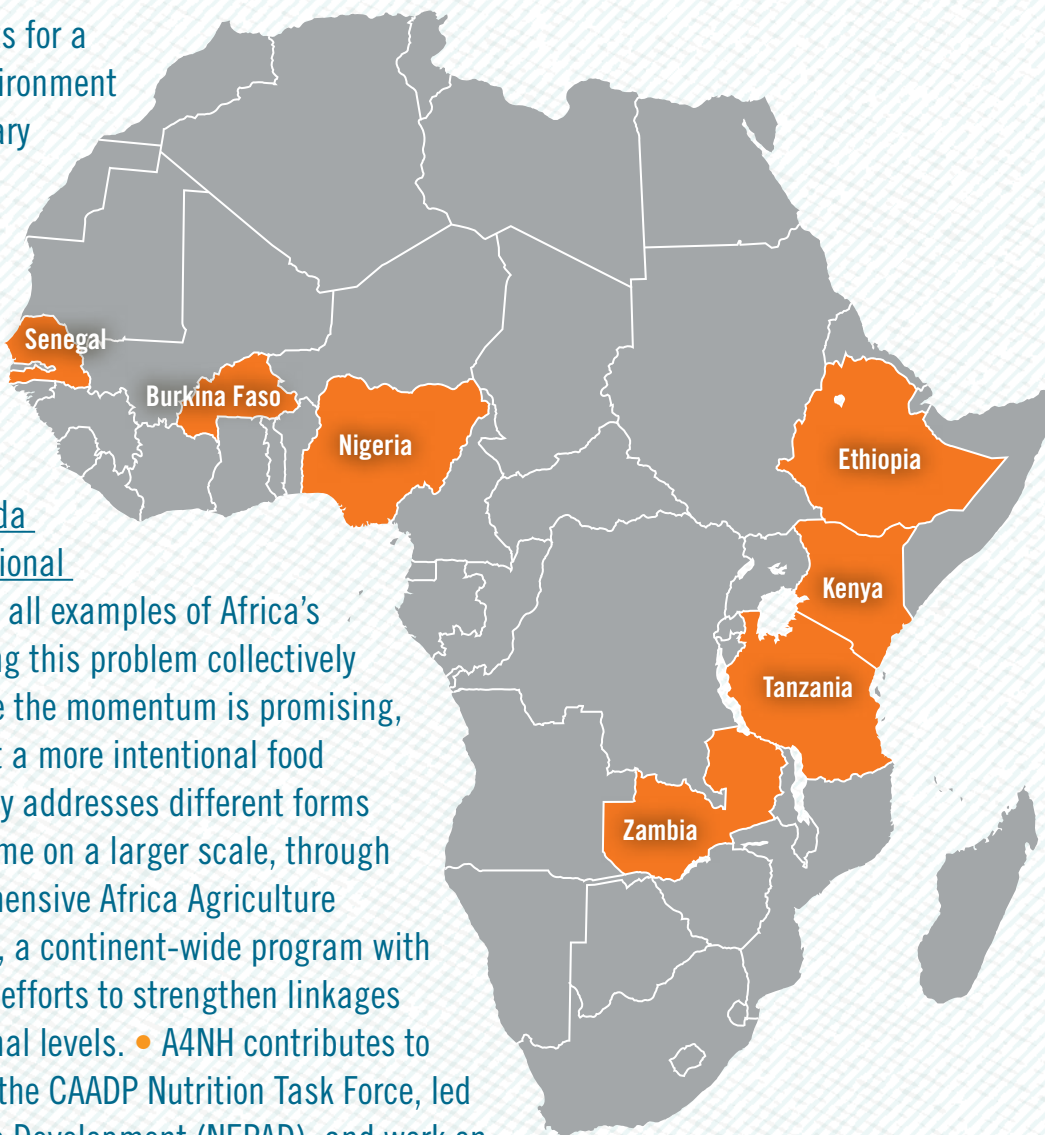
In Phase II, dissemination of evaluation results and data will continue for several ongoing agriculture, nutrition, and health programs, including the PROMIS project, which links prevention and treatment of severe acute malnutrition in Burkina Faso and Mali, the food-assisted maternal and child nutrition program (PM2A) in Burundi and Guatemala, and A&T-2, which focuses on integrating maternal nutrition interventions into maternal, neonatal, and child health programs in Bangladesh.

A4NH will continue exploring different ways of delivering nutrition results, for example, via governments and women's groups, through several new, innovative projects in South Asia (TRAIN, PRADAN/WINGS, ANGeL, and JEEViKA-MC).

In 2017, the Transform Nutrition research consortium will draw to a close. The team will compile a range of project findings, including an overview synthesis, summary briefs, and stories of how its work has influenced changes in nutrition nationally and regionally, in addition to organizing regional events to present and discuss findings in South Asia (Nepal) and East Africa (Kenya). ●

A4NH IN ACTION: FOCUS ON AFRICA

One of the most critical ingredients for a nutrition revolution is a policy environment conducive to enabling the necessary change—components of which have been improving in Africa in recent years. In addition to nutrition policies and strategies increasingly being put in place at country level, the [Maputo Declaration](#) of 2003, [Malabo Declaration](#) of 2014, [Agenda 2063](#) of 2014, and the [African Regional Nutrition Strategy 2015–2025](#) are all examples of Africa's regional commitment to addressing this problem collectively through the African Union. • While the momentum is promising, much work is still needed to adopt a more intentional food systems approach that sustainably addresses different forms of malnutrition. Changes must come on a larger scale, through mechanisms such as the Comprehensive Africa Agriculture Development Programme (CAADP), a continent-wide program with at least 44 countries contributing efforts to strengthen linkages with nutrition, as well as at national levels. • A4NH contributes to CAADP through representation on the CAADP Nutrition Task Force, led by the New Partnership for Africa's Development (NEPAD), and work on the *Annual Trends and Outlook Report*, which recommended that CAADP intentionally adopt a deliberate food systems approach. A4NH also supported the African Union in developing technical capacity to incorporate nutrition in the CAADP biennial review of 2017 and has participated actively in drafting the Africa Regional Nutrition Strategy Implementation Plan. These are just a few of the many examples of how A4NH is supporting nutrition change across Africa.



NIGERIA AND KENYA:

Adapting and scaling aflasafe™

With A4NH and other donor and national government support, IITA has made remarkable progress in taking aflasafe™, a biocontrol technology developed by IITA with the USDA-ARS, to scale by expanding it to 11 countries in Africa. It has already been registered in Gambia, Kenya, Nigeria, and Senegal, with several other countries close behind.

In Nigeria, by the end of 2016, nearly 33,000 hectares of maize had been treated with the application of the technology by nearly 24,000 farmers as part of the AgResults project, which integrates use of aflasafe™ with good agricultural practice on farms and other quality assurance measures along the value chain. The aflasafe manufacturing facility at IITA's headquarters in Ibadan can now produce 5 tons of aflasafe™ per hour at a cost of US\$12.00 to \$18.75 per hectare. The facility can supply enough aflasafe™ to treat 2 million hectares annually across Africa.

In Kenya, IITA and the Kenya Agriculture and Livestock Research Organization (KALRO) took a major step in scaling out aflasafe™ by signing a Technology Transfer Agreement for Aflasafe KE01™, which officially launched in October. By end of 2016, construction on the Aflasafe Modular Manufacturing Facility, built in KALRO's Katumani Research Station under a cooperative agreement between IITA and KALRO, was completed. This means that in 2017 and beyond, Kenya will be able to supply its own farmers with aflasafe™ instead of relying on shipments from the IITA facility in Nigeria. In 2016, as part of the National Economic Food Security Project, the Kenyan government ordered 238 tons of aflasafe™ from the IITA facility in Nigeria and treated more than 1,214 hectares of maize in Galana. This is a highly productive, but aflatoxin-prone part of Kenya. In spite of a delayed harvest, 99 percent of harvested grains had

less than 4 ppb of aflatoxins, whereas neighboring fields had up to 300 ppb.

ZAMBIA AND KENYA:

Whole diets, year-round

One of Bioversity International's contributions to A4NH has been refining and testing tools and methodologies that help measure dietary diversity and seasonality in a range of contexts. Using household surveys to measure on-farm production diversity and dietary diversity of target groups, such as women and children, they use this data to inform metrics that identify nutrient gaps in specific contexts.

In Zambia, research on seasonal differences in dietary diversity involved recurring intake surveys throughout the year, shedding light on distinct seasonal differences in diets and food availability. With guidance from nutritionists at the Ministry of Agriculture in Zambia, the team then constructed food availability calendars to help inform appropriate behavior change communication messages and interventions. The calendars were distributed directly to communities and to community nutrition clubs.

In Kenya, researchers assessed how the cost and benefit of a nutritious basket of foods can be improved by adding in seasonal, locally available, and nutrient-dense foods. Researchers from Bioversity International are currently assessing the impact of these methodologies in Kenya, with new projects set to begin soon in Malawi and Zambia.

BURKINA FASO AND TANZANIA:

Assessing the impact of enhanced homestead food production on nutrition

Homestead food production is a well-known development intervention developed more than 25 years ago by HKI, which equips women and smallholder farmers with tools and skills to cultivate home gardens, raise small livestock, and improve their nutrition knowledge. Results from an

IFPRI-led evaluation of this model in Burkina Faso, now known as Enhanced Homestead Food Production (E-HFP), clearly showed that a well-implemented program can improve child and maternal nutrition in a relatively short amount of time, in this case, over a two-year period.

More specifically, the IFPRI-led evaluation of E-HFP in Burkina Faso showed that the program reduced the prevalence of underweight in mothers who participated in the program by 8.7 percentage points. The program had a positive effect on women's empowerment, meaning that women in the program reported being more confident in their ability to make decisions about healthcare and household purchases. The program also reduced the prevalence of childhood anemia by 15 percent, wasting by 9 percent, and diarrhea occurrences among children less than one-year-old by 16 percent.

This is exciting news because until now there was no rigorous evidence that this model could make significant improvements on maternal and child health and nutrition. IFPRI's partnership with HKI is an example of how we can learn together how to better design and implement programs to maximize nutritional improvements for infants and young children and their mothers. IFPRI and HKI have been partnering in the Creating Homestead Agriculture for Nutrition and Gender Equity (CHANGE) project funded by Global Affairs Canada, which ended in 2016. This project was designed to add more convincing evidence on how to design, implement, monitor, and evaluate E-HFP models in Burkina Faso and Tanzania. Results will be forthcoming next year.



ETHIOPIA:

ANH Academy Week in Addis Ababa

The Agriculture, Nutrition, and Health (ANH) Academy—a collaboration between A4NH, LCIRAH, and the DFID-funded IMMANA research initiative—was established in 2015 as a new platform to facilitate learning and sharing among researchers and policy makers working at the intersection of agriculture, food systems, nutrition, and health.

The first ANH Academy Week took place in Addis Ababa, Ethiopia, from June 20–24, attracting over 300 diverse participants, 65 percent from Africa south of the Sahara, including researchers, policy makers, practitioners, and funders representing 141 institutions from 32 countries. Starting with two days of learning labs, the Academy Week included training sessions covering a broad range of impact measurement methods and skills used in interdisciplinary research. This was followed by a three-day abstract-driven research conference featuring oral presentations, mini poster sessions, and keynote speeches, as well as plenary roundtables, side events, and working group discussions. Part of the Academy's strategy is to relocate the annual conference every year in order to expand its scope and participation. The 2017 ANH Academy Week will be held in Kathmandu, Nepal, in partnership with USAID's Feed the Future Innovation Lab for Nutrition.



92% of survey respondents said they made new connections at ANH Academy Week.

70% of survey respondents thought the Learning Labs would be 'useful' or 'very useful' for their work in the next 12 months.

76% of respondents rated Research Conference sessions and Round Tables as 'outstanding' or 'excellent'.

ETHIOPIA, SENEGAL, ZAMBIA:

Stories of Change in Nutrition

To achieve nutrition outcomes, country ownership and leadership, and opportunities to share learning experiences from diverse contexts are key to both international development thinking and A4NH. The Stories of Change initiative compiles evidence from real cases to better understand the political economy and dynamics surrounding nutrition and change processes. In 2016, three African countries, Ethiopia, Senegal, and Zambia, were among the Stories of Change highlighted.

For Ethiopia, multi-layered case studies were combined to track nutrition success resulting from demonstrated government and donor commitment and coordinated action linked to agricultural sector growth, alongside improvements in sanitation. This coordinated, nutrition-sensitive approach, adapted to different regions and segments of the population, showed major progress with reductions in stunting, among other indicators. A4NH has disseminated these results, and key stakeholders are taking note.

The case study from Senegal also highlighted significant nutrition improvements resulting from a long-term vision of grassroots engagement supported by government enabling. This bottom-up approach demonstrated the need to engage multiple sectors in influencing nutrition, enabling national policy and programs to be designed with a nutrition perspective.

The Stories of Change project in Zambia showed yet another strategy for improving nutrition. The case study detailed how policy and programs were informed by international evidence and then adapted to consider local needs and experiences, particularly shaping programs at the district level. Strong leadership at the national level provided a coordinated strategy and implementation plan that then enabled district- and community-led actions.



PHOTO: CGIAR

ACROSS THE CONTINENT:

Contributing to the AU Annual Trends and Outlook Report

The African Union's 2015 Annual Trends and Outlook Report, led by IFPRI and co-edited by an A4NH researcher, calls for a nutrition revolution for Africa. It emphasizes the need for agriculture to become more nutrition-sensitive to play a greater role in promoting improved diets for better nutrition and health. This was also the theme of the October 2016 ReSAKSS Conference, "Achieving a Nutrition Revolution for Africa: The Road to Healthier Diets and Optimal Nutrition," which included discussions on pathways for agriculture to contribute to nutrition impact. The report featured A4NH work on the continent. One of the key recommendations of the report is for CAADP to adopt a more deliberate food systems approach for greater sustainability on current efforts to use agriculture as a key strategy to address nutrition. The report has been well received and has subsequently been used as a textbook for the training of experts who will engage in the appraisal of National Agricultural Investment Plans in the nutrition and food security thematic area. ●



GENDER

Both women and men are involved in food production, nutrition, and health, yet they tend to play different roles. Gender roles can determine who raises which crops and animals, when products are sold, how resources are allocated, and who gets access to food and healthcare. Women are more likely to be responsible for caring for and feeding children and other family members, but often have limited control over household economics and decision making.

The Gender, Equity, and Empowerment Unit ensures that A4NH research contributes to our understanding of how gender influences the relationship between agriculture, nutrition, and health. This research focuses on: understanding how gender impacts nutrition and health outcomes; improving nutrition by empowering women; engaging men and youth in nutrition and health; and avoiding the unintended consequences that agricultural development projects can have on women's well-being and empowerment.

THE GENDER PORTFOLIO CONTINUES TO GROW

In 2016, the second phase of the Gender, Agriculture, and Assets project (GAAP2) began developing a project-level Women's Empowerment in Agriculture Index (pro-WEAI), which agricultural development projects will be able to use to monitor outcomes related to women's empowerment. The GAAP2 portfolio includes 15 agricultural development projects that focus on improving nutrition and income through crop- and livestock-based interventions. GAAP2 held an inception workshop in Nairobi in January 2016, where they identified important aspects of empowerment to include in their work.

A4NH also launched two new gender-focused projects in 2016, both funded by BMGF. SE LEVER, led by IFPRI and Agribusiness Systems International (ASI), evaluates a group of agriculture- and nutrition-focused interventions aimed to increase poultry production and improve the diets of women and children in Burkina Faso. MoreMilk, led by ILRI, assesses whether enhancing training, certification, and marketing in Nairobi's dairy markets, where women make up a large fraction of milk traders, can improve child health and nutrition.

A4NH researchers published gender-focused results related to: vegetable value chains in Benin and Cameroon; pig farmers in Laos and livestock keepers in Nairobi; pastoral communities in northeastern Kenya; and aflatoxins in Kenya's dairy value chain. In partnership with other CGIAR research programs, A4NH continued to support two postdoctoral fellows, whose research includes work on measuring women's empowerment and household time use, as well as impact evaluations of gender-related research.

LOOKING FORWARD TO PHASE II

Phase II A4NH research projects will integrate gender and equity into a range of projects about women's and children's nutrition, food retail, mobile health, farmer income and decision making, and more. The Retail Diversity for Dietary Diversity (RD4DD) project, led by Bioversity International and Wageningen University and funded by the University of South Carolina, looks at how the food retail environment impacts women's diets in Viet Nam. The second phase of the Suaahara project, led by IFPRI and funded by USAID and HKI, aims to improve the nutritional status of women and young children in Nepal by improving access to health services, improved sanitation, and healthy foods. The GAAP2 project, led by IFPRI and funded by BMGF, will continue developing project-level measures of women's empowerment. Representatives from the GAAP2 portfolio will convene in March for a midterm workshop to discuss their projects, challenges, and results so far. A4NH's Gender, Equity, and Empowerment unit will also collaborate with FAO to provide analysis and strategies for integrating gender and women's empowerment into FAO's nutrition programs.

Two new gender-focused projects will be added to the A4NH portfolio in 2017, both funded through IMMANA. A study in Guatemala led by CIAT will use economic field experiments to understand how men and women in farm households make decisions about what to eat and how to spend their time and money. The ENRICH project, led by Wageningen University, will develop a tool to measure fruit and vegetable intake and food choices among people in Nairobi. ◀

PHOTO: P. BORDONI, BIOVERSITY INTERNATIONAL



THE ROAD AHEAD: A4NH PLANS FOR PHASE II

In 2011, CGIAR added a fourth strategic goal: improving nutrition and health through agriculture. The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH), which began in 2012, provides a new programmatic platform for CGIAR and partner researchers, policy makers, and stakeholders to join forces and go farther in solving problems of global hunger and malnutrition. • Throughout its first phase, from 2012 to 2016, A4NH supported accelerated progress in biofortification and integrated agriculture-nutrition programs and policies. It also brought to CGIAR an innovative perspective focusing on food consumption and demand, rather than supply, a perspective that complemented existing traditional capacity. In its second phase, which will run from 2017 to 2022, A4NH will expand its focus to address challenges related to food system transformation, including obesity, the rising burden of foodborne disease, and growing health risks such as antimicrobial resistance. Program work will continue to recognize that addressing inequality related to gender or other social categories is a development objective in its own right, and an important condition for achieving other development objectives, particularly improved nutrition and health. • A4NH will continue to be led by IFPRI, but with greater responsibility and accountability shared with six other managing partners: four other CGIAR centers and two academic institutions. It will continue to bring together the talents and resources of a wide range of partners, reconfiguring its research activities into five unique, yet complementary, flagship programs and three cross-cutting units working in at least 30 countries. With such a large and diverse group of partners around the world, A4NH will forge cooperation between the agriculture, nutrition, and health sectors and support countries in their capacity to lead and take ownership of work on these development issues. Recognizing that there is no “one size fits all” approach to development strategies, A4NH will work with national partners on how to best implement programs and solutions to the unique nutrition and health challenges each country faces. • As CGIAR’s only research program on nutrition and health, A4NH’s contributions to specific CGIAR targets related to reducing poverty and improving food and nutrition security for health will continue. The call for agriculture to support better nutrition and health is reflected in the discussions leading up to the [United Nations’ 2030 Agenda for Sustainable Development](#) and in the new [CGIAR Strategy and Results Framework](#). A4NH puts this desire to unite agriculture, nutrition, and health into action, with all five research flagships working to contribute to both Sustainable Development Goal (SDG) 2—*End hunger, achieve food security and improved nutrition, and promote sustainable agriculture*—and SDG 3—*Ensure healthy lives and promote well-being for all at all ages*.

United Nations
Sustainable
Development
Goals



THE A4NH PORTFOLIO: MOVING FROM EVIDENCE AND UNDERSTANDING TO ACTION AND IMPACT

In Phase I, A4NH conducted research to better understand and establish frameworks for how agriculture could improve nutrition and health across several topic areas at varying stages of progress. Throughout the first phase, across the research flagships, we developed an evidence base, looked to see where that base could be proven, and worked to improve evaluation. These efforts resulted in useful frameworks, solid portfolios of evidence that provide policy makers tools to improve nutrition, and pathways to highlight the importance of gender for nutrition and health outcomes. This information, when published, was quickly taken up and put into use by networks and organizations including the USAID-funded SPRING project, the Agriculture-Nutrition Community of Practice, and FAO's Second International Conference on Nutrition, clearly showing the great demand for the high-quality knowledge and evidence that A4NH provided.

Expectations are shifting as A4NH enters Phase II, clarifying the role of agriculture in terms of what can and cannot be done and, armed with this knowledge, reframing perspectives to focus on identifying strategies for particular situations and working to implement them. Key focal points include looking to support national partners, creating an enabling environment for implementing solutions, and working with other sectors to fill the gap between agriculture's necessary but insufficient role in improving nutrition and health, and success in meeting that need. No one solution will meet all needs, but A4NH's evidence base provides local partners with a range of possibilities to draw from when considering answers to unique challenges. This shift in approach emphasizes the need to work with partners at the country level and to forge connections and share experiences across countries. To keep this focus, A4NH has established the Country Coordination and Engagement Unit for Phase II, cutting across all research flagships.

As food systems get more complicated, the role of food safety becomes more important. This growing concern is a development challenge that extends to middle-income countries, whose food systems become more complex as they develop. This global trend will only progress, and in turn, the importance of food systems and food safety will continue to grow. In Phase I, A4NH recognized room for improvement in how CGIAR and others consider and invest in value chains, including acting on the recognition that food systems are driven by demand and consumption. In Phase I, we built the conceptual basis and evidence for food safety: coordination, a risk-based approach, and the important role of markets—many of them informal—in diversifying diets. In Phase II, A4NH will seek to link demand with supply in the food system, looking particularly at the increasing demand for quality and safe food.

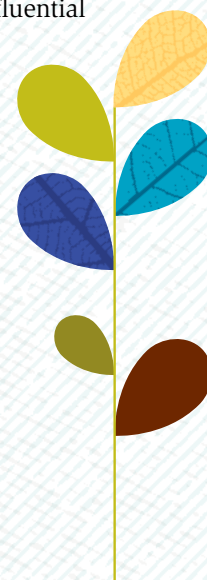
It's not enough to just have evidence of what to do, so as we enter Phase II, A4NH will focus more on how to take this evidence and adapt it to different contexts, in different countries, and will provide country support and leadership. This effort will build on HarvestPlus and the Stories of Change in Nutrition case studies' successes in improving our understanding of what drives impact, as we consider challenges ranging from how to build partnerships to how to build micronutrient breeding into programs. This approach will lend itself to the question of how to build capacity and support countries better, as A4NH moves from a regional approach in Phase I to supporting focus countries in Phase II.

A4NH will also work more with outside partners and other sectors to bring value chains into food systems and to partner more effectively with public health. The A4NH partnerships were first built around engaging the CGIAR partners, but as program goals evolve, so does the program approach to partnerships. Shaped by our Phase I theories of change, Phase II will see a smaller number of partners, led by a group of Managing Partners who provide unique resources to support and drive the research flagships forward, while other partners will join for specific projects.

A4NH's unique understanding of the relationship between agriculture, nutrition, and health in low- and middle-income countries, combined with our knowledge and evidence base, has given the program an influential voice globally. Taking this influence and focusing on how programs can work in different countries will support the country ownership that is central to the SDGs, but also critical to empowering those able to enact change with the tools they need to improve the nutrition and health of those most vulnerable worldwide. ●



PHOTO: G. SMITH, CIAT



Setting the Stage for Phase II

SPOTLIGHT: ENHANCING A4NH PARTNERSHIPS TO MAXIMIZE IMPACT

In Phase II, A4NH will have seven Managing Partners, who will work together to plan, implement, and evaluate the program.



IFPRI continues as the Lead Center and:

- will host the Program Management Unit and cross-cutting research support units: (1) country coordination and engagement, (2) monitoring, evaluation, and learning, and (3) gender, equity, and empowerment.
- will lead two of the five A4NH flagships: biofortification (through the HarvestPlus program with CIAT) and SPEAR, as well as contributing economic and evaluation expertise to all other flagships.
- will coordinate country activities in India and Bangladesh.

The other CGIAR Managing Partners for Phase II are:



Bioversity International—which will co-lead research in dietary assessment and foresight under food systems and coordinate A4NH cooperation with FAO, IFAD, and WFP (UN Rome-based agencies).



International Center for Tropical Agriculture (CIAT)—which will co-lead biofortification with IFPRI and contribute to a new Food Systems for Healthier Diets flagship, co-leading the research cluster on policy and scaling. CIAT will also coordinate country activities in Viet Nam.



International Institute for Tropical Agriculture (IITA)—which will lead aflatoxin mitigation research under food safety, contribute to research on improving human health and food systems, and coordinate country activities in Nigeria.



International Livestock Research Institute (ILRI)—which will lead the flagship on food safety and co-lead with LSHTM the flagship on improving human health (both under Agricultural-Associated Diseases in Phase I). ILRI will also coordinate country activities in Ethiopia.

Two non-CGIAR institutions have been recruited as Managing Partners for Phase II:



London School of Hygiene and Tropical Medicine (LSHTM)—will co-lead research on the improving human health flagship, bringing its broad range of public health expertise to A4NH. LSHTM will also convene partnerships with the public health community, playing a critical role as A4NH seeks to bridge the divide between agriculture and public health.



Wageningen University and Research (WUR)—will lead a new flagship on Food Systems for Healthier Diets. In this it brings its capacity to integrate across a broad range of disciplines from consumption and behavior to primary production. The food systems flagship will provide a portal for A4NH, and WUR will lead our efforts to partner with the private sector and other CGIAR Centers and Research Programs focusing on food supply.

In addition to these Managing Partners, A4NH has a number of **strategic partners** with which it conducts joint research. Moving into Phase II, these include continuing partnerships with national partners in approximately 30 countries, other CGIAR Centers, development partners such as BRAC and HKI, and large public health partners such as the Public Health Foundation of India.

PHOTO: N. PALMER, CIAT



SPOTLIGHT: EMERGING CHALLENGES IN FOCUS COUNTRIES

Supporting healthy food system transformation in Ethiopia

In 2016, A4NH and partners began to discuss new areas of focus and new approaches for Phase II. For example, following a workshop on food systems for healthier diets convened by the country team in Ethiopia, A4NH shifted from a regional to a country-specific emphasis.

The workshop brought together representatives from the agriculture, environment, health, financial, education, and industry sectors, government and nongovernment institutions, and donors. Emerging from the meeting, attendees had created a list of 10 insights and discussion points laying the groundwork for A4NH food systems work in Ethiopia. These ranged from fundamental points, such as agreeing on a definition of food systems, to more intricate and nuanced matters, such as considering how the country's rapidly growing economy, and corresponding changing food environment, will pose new challenges across a diverse set of needs.

The wisdom of A4NH's move to focus on particular countries was evident throughout the discussions, as issues specific to Ethiopia, such as environmental challenges or the history of other projects and efforts to date, were central to the conversation. The country team and participating stakeholders laid out areas specific to Ethiopia where particular attention will need to be paid. These included matters such as the efficacy of focusing on both demand- and supply-side incentives for healthier food choices, linking food and nutrition programs to land management and climate resiliency strategies, and expanding nutrition projects to look beyond undernutrition to other emerging needs. Identifying and filling knowledge gaps will be key to progress in Phase II, as will training and capacity building in areas identified by attendees.

The workshop was a first step in moving forward with the recognition that country-specific needs will require country-specific solutions, and while lessons can be learned from experiences elsewhere, ultimately, stakeholders within a country need the tools and knowledge to make informed decisions on how to create appropriate food systems for their own unique populations. Entering Phase II, A4NH is well-positioned to provide the resources and support to make this approach a success, and the country team and stakeholders are already setting goals with an eye toward 2017 and beyond.

Strengthening food safety in Viet Nam

In Viet Nam, food safety is an important issue to the public. Food scares, regardless of their level of seriousness, can alarm the public, harm trade, and detract government attention and resources from major health and development issues. In 2016, the government of Viet Nam requested assistance from the World Bank and partners to assess food safety risks and provide policy recommendations on how to improve food safety risk management. [ILRI](#) was the lead technical partner for this assessment. ILRI and partners mobilized a series of activities including a thorough literature review on food safety evidence, targeted field visits, roundtable discussions, interviews with experts, and data analyses. The study took stock of the food safety situation in Viet Nam, analysed the food safety risks for selected key food value chains, and provided recommendations to improve food safety.

This partnership with the World Bank follows years of collaborative work ILRI has conducted in Viet Nam to build awareness and capacity for using risk assessment in food safety management. Risk assessment, a scientific process for identifying the known or potential adverse health effects from being exposed to hazards that may come from food production, preparation, or consumption, is widely accepted as the gold standard for assessing, managing, and communicating risks. However, in Viet Nam, there was limited capacity for using risk assessment approaches in food safety. In 2013, ILRI helped establish the National Task Force of Food Safety Risk Assessment. This task force was institutionalized by the Hanoi University of Public Health in 2016. Its purpose is to strengthen the capacity of national researchers to apply risk assessment. In turn, the researchers can provide this expertise to the two ministries responsible for food safety in Viet Nam—the Ministry of Health and the Ministry of Agriculture and Rural Development. Some examples of the type of support ILRI has provided more recently include the production of Viet Nam-specific guidelines for chemical and microbial risk assessment, as well as the first published quantitative microbial risk assessment for pork in Viet Nam and a complementary chemical risk assessment. Experiences and lessons learned will be summarized in a report, *Food Safety Risk Management in Vietnam: Challenges and Opportunities*, slated for 2017 release. ●

“There is no single way to address food safety issues, but international experience provides us with quite a few tested ideas that should be considered to improve food safety in Viet Nam.”

—Nguyen Viet Hung, regional representative of the International Livestock Research Institute (ILRI) in East and Southeast Asia



2016 FINANCIAL SUMMARY

2016 was a transition year, as we wound down Phase I activities and developed plans for Phase II, yet A4NH largely kept on its performance trajectory. Grant funding, either through the CGIAR Fund (Window 3) or from bilateral grant agreements to A4NH Partner Centers, was very consistent with previous years. Total grant funding from all bilateral sources in 2016 was \$68.4 million, marginally below the 2015 total of \$74.7 million. CGIAR funding to A4NH (Window 1 and 2) was less predictable, which resulted in adjustments to the budget over the course of the year. Activities were initially planned based on the 2016 CGIAR Financing Plan, which forecast a budget that, at \$9.3 million, was less than half of 2015's \$18.9 million. During the year, however, several donors to A4NH via the CGIAR

Fund updated their funding, allowing us to allocate and spend an additional \$0.86 million. Later in 2016, CGIAR confirmed additional funding of approximately \$5 million, which will be allocated and expended in 2017.

These funding changes had impacts on A4NH's four flagship programs. CGIAR funding was cut by almost 50 percent from the initial 2016 budget for Biofortification and Integrated Programs and Policies. For newer flagships, Value Chains for Enhanced Nutrition and Agriculture-Associated Diseases, the CGIAR Consortium mandated greater CGIAR funding cuts—initially up to two-thirds reduction. Nevertheless, these flagships were favorably reviewed for Phase II (2017–2022) and are strengthening both their grant portfolios and allocation of CGIAR funds in 2017.

| Program Components | 2012–2016 | | 2016 | |
|---|-----------------------------------|----------------|------------------------------|---------------|
| | Cumulative Expenditure (Millions) | | Total Expenditure (Millions) | |
| | CGIAR Fund | Grants | CGIAR Fund | Grants |
| Flagship 1: Value Chains for Enhanced Nutrition | \$10.6 | \$14.6 | \$1.7 | \$1.9 |
| Flagship 2: Biofortification | \$34.9 | \$197.0 | \$2.7 | \$41.8 |
| Flagship 3: Agriculture-Associated Diseases | \$21.4 | \$29.7 | \$1.7 | \$4.6 |
| Flagship 4: Integrated Programs and Policies | \$14.1 | \$77.2 | \$2.4 | \$20.1 |
| Management/Coordination Total | \$8.2 | | \$1.6 | |
| TOTAL | \$89.2 | \$318.5 | \$10.1 | \$68.4 |

DONORS + CGIAR PARTNERS

We would like to thank all donors that supported this research through their contributions to the CGIAR Fund.

Foundations, International Financing Institutions, and Government Funding Agencies

| | |
|---|--|
| Australia | Ireland |
| Austria | M.S. Swaminathan |
| Bill & Melinda Gates Foundation | Research Foundation |
| Biotechnology and Biological Science Research Council | The Netherlands |
| Canada | The Royal Institute of International Affairs (Chatham House) |
| Children's Investment Fund Foundation | Spencer Foundation |
| Common Fund for Commodities | Sweden |
| European Commission | Switzerland |
| Finland | Syngenta Foundation |
| Food and Agriculture Organization of the United Nations | United Kingdom |
| Ford Foundation | United Nations Environment Programme/Global Environment Facility |
| Germany | United States |
| International Development Research Center | World Bank |
| International Fund for Agricultural Development | World Food Programme |

Partners Providing Resources*

| | |
|--|--|
| CAB International | London School of Hygiene and Tropical Medicine |
| CARE-Zambia | McGill University |
| Catholic Relief Services —Malawi | Natural Resources Institute, University of Greenwich |
| Concern Worldwide | Public Health Foundation of India |
| Cornell University | Save the Children |
| Deloitte Consulting LLP | Swedish University of Agricultural Sciences |
| Emory University | Tufts University |
| FHI360 | University of Edinburgh |
| Global Alliance for Improved Nutrition (GAIN) | World Vision Canada |
| Helen Keller International | |
| Institute of Development Studies | |
| International Initiative for Impact Evaluation (3ie) | |
| London School of Economics | |

**This section encompasses A4NH's work with a range of partners. Resources from these partners may also include shared funding and/or expertise.*



GOVERNANCE

These governing bodies and individuals help ensure that the program succeeds by providing invaluable strategic input and guidance, planning and monitoring oversight, and day-to-day management support.

A4NH INDEPENDENT ADVISORY COMMITTEE

Mary Amuyunzu-Nyamongo, executive director and co-founder, African Institute for Health and Development

Jeroen A. Bordewijk, former senior vice president, Supply Chain Excellence Programme, Unilever

Inge D. Brouwer, assistant professor, Food and Nutrition Security Division of Human Nutrition, Wageningen University

S. Mahendra Dev, director, Indira Gandhi Institute of Development Research; board member, International Food Policy Research Institute (IFPRI)

Shenggen Fan, director general, IFPRI, ex-officio member

Joyce Kinabo, professor, Human Nutrition, Sokoine University of Agriculture, Department of Food Science and Technology

Robert Paarlberg (Chair), Betty Freyhof Johnson Class of 1944 professor of political science (retired), Wellesley College

Niteranya Sanginga, director general, International Institute of Tropical Agriculture (IITA), ex-officio member; represented by **Ylva Hillbur**, deputy director general for research, IITA

Emmy Simmons, former assistant administrator, United States Agency for International Development (USAID)

A4NH PLANNING AND MANAGEMENT COMMITTEE

Howarth Bouist[†], program director (retired), HarvestPlus, IFPRI; flagship leader for Biofortification

Alan de Brauw, senior researcher, Markets, Trade, and Institutions Division, IFPRI; flagship leader for Value Chains for Enhanced Nutrition

Delia Grace, manager, Agriculture-Associated Diseases, International Livestock Research Institute (ILRI); flagship leader for Agriculture-Associated Diseases

Manish Kakkar, senior public health specialist, communicable diseases, and adjunct assistant professor, Public Health Foundation of India

Gina Kennedy, theme leader, Diet Diversity for Nutrition and Health, Bioversity International

John McDermott, director, A4NH, IFPRI

Beverley Postma[†], chief executive officer, HarvestPlus, IFPRI

Maya Rajasekharan, head, program coordination, International Center for Tropical Agriculture (CIAT)

Marie Ruel, director, Poverty, Health, and Nutrition Division, IFPRI; flagship leader for Integrated Programs and Policies

Jeff Waage, former director, London International Development Centre

A4NH CENTER FOCAL POINTS

Robert Ackatia-Armah[†], regional nutritionist, CIP

Delia Grace, manager, Agriculture-Associated Diseases, ILRI; flagship leader for Agriculture-Associated Diseases

Gina Kennedy, theme leader, Diet Diversity for Nutrition and Health, Bioversity International

Bussie Maziya-Dixon, crop utilization specialist, IITA

Gordon Prain[†], leader, Social and Health Sciences Global Program, International Potato Center (CIP)

Maya Rajasekharan, head, program coordination, CIAT

CREDITS

COORDINATORS AND CO- LEAD WRITERS

Janet Hodur and Kimberly Keeton

EDITOR

Pamela Stedman-Edwards

CONTRIBUTORS

Ekin Birol, Alan de Brauw, Namukolo Covic, Tigist Defabachew, Stuart Gillespie, Delia Grace, Hazel Malapit, Elena Martinez, John McDermott, Marie Ruel, and Amanda Wyatt

DESIGNER

Anne C. Kerns, Anne Likes Red, Inc.

A4NH PROGRAM MANAGEMENT UNIT

Mysbah Balagamwala, research analyst

Tigist Defabachew, contract and grants administrator/senior administrative coordinator

Nancy Johnson, senior research fellow

Kimberly Keeton, communications specialist

Hazel Malapit, gender research coordinator

John McDermott, director

Christi Ometu, program assistant

Amanda Wyatt, program manager

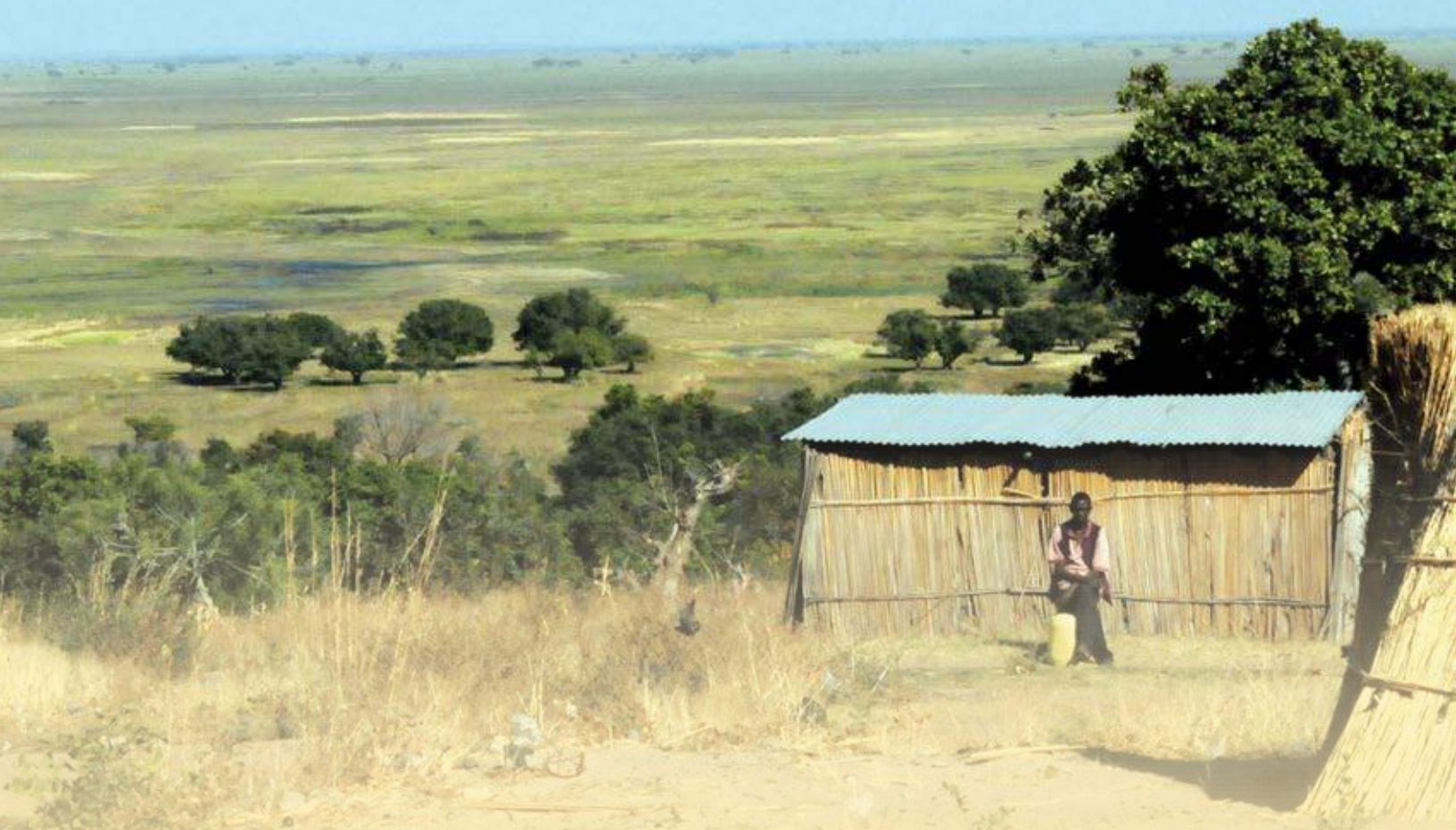
[†] Served in role for part of 2016. Please visit a4nh.cgiar.org for the most current list.



About the CGIAR Research Program on Agriculture for Nutrition and Health

The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) aims to maximize the health and nutritional benefits of agricultural development. A4NH's research outputs are intended to support agricultural researchers, value-chain actors, program implementers, and policy makers in reshaping their actions to better contribute to nutrition and health outcomes and impacts. The program also aims to identify, develop, and support synergies between agriculture and the nutrition and health sectors to maximize the benefits and minimize the risks of agricultural actions to human nutrition and health.

The program draws on expertise from 12 CGIAR Centers as well as partners from across the agriculture, nutrition, and health sectors, collaborating on new research and developing joint solutions to reduce the global burden of malnutrition and disease. This program is led by the International Food Policy Research Institute.



INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

A world free of hunger and malnutrition

1201 Eye Street, NW, Washington, DC 20005, USA

Tel: 1-202-862-5600 | Fax: 1-202-862-5606 | Email: ifpri@cgiar.org | www.ifpri.org

For more information please contact:

John McDermott, director of CGIAR Research Program on Agriculture for Nutrition and Health

j.mcdermott@cgiar.org

www.a4nh.cgiar.org