

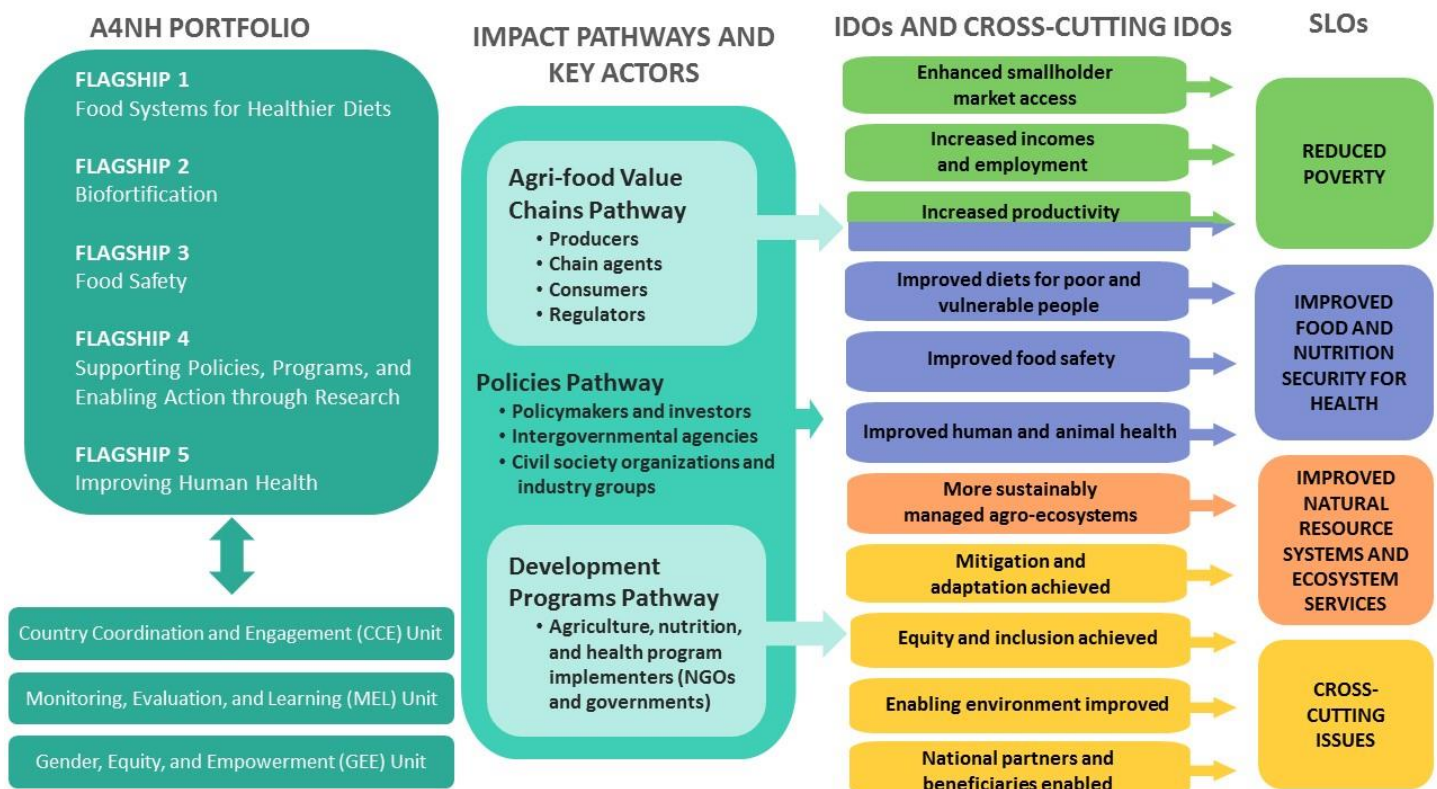
The CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) responds to the global challenge of improving food security, nutrition, and health. CGIAR has a long legacy of building global food security, but ensuring consumers can access enough healthy, affordable, and safe food requires a perspective that encompasses far more than agricultural productivity. Growing global populations, rapid urbanization, and the threat of climate change, all require transformation of agri-food systems that are effective in making safe, diverse, and nutritionally-adequate diets available in all countries, especially for poor, under-nourished populations in South Asia and Africa. Food system innovations are required across commodities, linking policies, programs, technologies, and systems management. Private sector participants drive and dominate agri-food systems – from farmers, to commodity processors, to retailers—and they must be more effectively engaged to identify opportunities, as well as constraints, to healthier diets. Since it began in 2012,

A4NH has built on prior work to accelerate progress in enhancing synergies between agriculture, nutrition, and health.

In August 2015, A4NH submitted a successful pre-proposal to the CGIAR Consortium for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes the research portfolio A4NH is proposing for its second phase.

In Phase II, A4NH will provide knowledge and evidence for nutrition- and health-sensitive agriculture solutions and will assess how to deliver solutions for improved outcomes at scale through a portfolio of six flagships: **Biofortification, Food Safety, Food Systems for Healthier Diets, Improving Human Health, Integrated Programs to Improve Nutrition, and Supporting Country Outcomes through Research on Enabling Environments**. In addition to supporting gender research across the flagships, the A4NH Gender, Equity and Empowerment unit will lead cross-cutting research on strategic issues relevant to the overall program, such as building on the use of the Women’s Empowerment in Agriculture Index in the context of impact evaluations.

FIGURE 1. A4NH Results Framework



The A4NH Results Framework describes the main development outcomes (IDOs) and impacts (SLOs) to which the flagship activities and outputs are expected to contribute. The results framework shows three generic types of impact pathways, which are defined by the types of actors whose capacity and behavior is expected to change as a result of the research. We focus on working through three pathways: value chains, policies, and development programs.

Each of the flagships contributes to improving food and nutrition for health, but they do so in different ways. Some flagships focus on developing and delivering specific agricultural solutions with potential to go to scale. Others focus on improving the pathways through which agricultural research contributes to development outcomes.

## DESCRIPTION OF FIVE RESEARCH AREAS

**Food Systems for Healthier Diets (Flagship 1)** contributes to the goal of healthier diets for poor and vulnerable populations by identifying and enabling interventions by private, public, and civic actors in national and sub-national food systems. Food systems refer to the full set of processes, activities, infrastructure and environment that encompass the consumption, distribution, processing and production of food and the disposal of waste. Food systems are analyzed from a diet and nutrition outcome perspective, identifying practical options and policy strategies for improving diets by both filling gaps and reducing excesses in unhealthy diet components. The flagship builds on research on dietary assessment and methods for improving nutrition through value chains, and puts these in a broader agricultural, environmental, social, economic, and political decisionmaking framework. Research is organized into three main clusters of activities: 1) assessing (sub)regional drivers of food system transformation, and options and constraints for dietary change, 2) testing concrete agri-food chain innovations and interventions for improving diet quality and diversity, and 3) supporting the scaling up of successful actions through effective engagement of multi-stakeholder platforms and multi-sectoral mechanisms. The flagship includes a new partnership arrangement with Wageningen University and Research Centre (Wageningen UR) to implement this research and links to food system actors through a variety of platforms. In the long term, progress will be evaluated through improvements in urban and rural diets, particularly for young women, children, and vulnerable populations. Near-term progress is measured through greater attention to dietary and food system transitions by researchers in other CRPs and partner research organizations, by strategic partners from the private sector and civil society, and by policymakers in target countries.

**Biofortification (Flagship 2)** builds on the strong track record of the HarvestPlus program. During Phase I of A4NH, HarvestPlus transitioned from its development to delivery phase. During Phase II, the flagship will deliver outcomes at scale (reaching 20 million farm households by 2020) and conduct research to fill key



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evidence gaps and to learn lessons from delivery for future research and scaling. As part of building an enabling environment for biofortification in the future, the flagship will engage in policy analysis and evidence sharing at national and international levels and build capacity of key research and development partners to mainstream biofortification in their research and programming. Specifically, the three main clusters of activities in Biofortification will: 1) build on previous research to mainstream crop development, 2) focus on learning about delivery in a contextually rich world of markets, farmer behaviors, and dietary practices, and 3) use evidence to promote an enabling environment for biofortification and develop tools to facilitate delivery by others.

Food safety is moving rapidly up the development agenda as major new studies reveal its severely under-estimated importance. Solutions that are effective in developed countries and export systems have not translated well to informal or formalizing markets. There is an urgent need for technical and institutional solutions to food safety challenges, and broader policy and regulatory approaches to manage food safety risks in dynamic, developing markets. **Food Safety (Flagship 3)** addresses these challenges through targeted research that generates evidence on approaches likely to work, and by examining how to achieve and sustain an enabling environment for innovative approaches to food safety, especially in informal markets. These topics are consolidated into three main clusters of activities: 1) 'Evidence that

Counts' focuses on filling knowledge gaps 2) 'Safe Fresh Foods' focuses on food safety issues in perishable value chains, like animal source foods and 3) 'Aflatoxin Mitigation' focuses research on aflatoxin mitigation and control. In close collaboration with value chain research in other CRPs and with partners, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia.

Given the multisectoral nature of nutrition, agriculture needs to work in harmony with other sectors to maximize its impacts on nutrition. For example, social protection can protect the nutrition and health of poor smallholder households as they grapple with seasonality and climate shocks and stresses. Improved water, sanitation, and hygiene can increase the nutrition benefits of improved diets by reducing disease. Linkages between local agricultural production and school feeding may generate win-win benefits: income for small producers, and nutrition and cognitive gains for school-age children. **Supporting Policies, Programs, and Enabling Action through Research, SPEAR (Flagship 4)** seeks to address major gaps which remain in our understanding of the agriculture-nutrition disconnect. SPEAR will build on current involvement of A4NH staff and partners with global and regional initiatives in Africa and South Asia to support countries in tackling these goals.

To do so, it is structured into three interacting clusters of activities: 1) 'Integrated Programs to Improve Nutrition' (IPIN) focuses on understanding and documenting the contribution of integrated agriculture and nutrition programs to improvements in maternal and child nutrition, 2) 'Supporting Countries through Research on Enabling Environments' (SCORE) focuses on understanding how enabling environments—such as policies, institutions, and governance—for nutrition can be created and sustained, and 3) 'Capacity, Collaboration, Convening' (3C) focuses on strengthening capacity to use and demand evidence, and on providing a bridge to other flagships, CRPs, and relevant national, regional, and global processes to maximize the impact of our work to improve nutrition and health.

**Improving Human Health (Flagship 5)** will undertake new and critical research to assess and manage health risks created by agriculture in order to improve human health through better agricultural practices. This flagship includes a joint partnership arrangement co-convened by the London School of Hygiene and Tropical Medicine (LSHTM) and the International Livestock Research Institute (ILRI), thus bridging agriculture and public health research to deliver high-quality scientific outputs and to identify new key opportunities for integrated actions that improve human health. Priorities for cross-sectoral research include: 1) understanding health effects of agricultural intensification, including changes in water use; 2) studying shared human and animal disease risks and co-locating and aligning health and agricultural interventions for their effective management; and 3) coordinating research on tackling emerging, common problems for health and agriculture, such as antimicrobial resistance and pesticide resistance.

## A4NH AND PARTNERS

There will be different levels of partners in A4NH in our second phase. **Managing Partners** will be represented on the A4NH planning and management committee (PMC), participate across more than one flagship, commit to recruit and co-manage researchers, play a role in the regional and country coordination efforts of A4NH, and actively support CRP-level resource mobilization, communication, and advocacy. Managing partners will include Bioversity International, CIAT, IITA, and ILRI, plus Wageningen UR and LSHTM. The new Phase II partnerships with Wageningen UR and LSHTM are critical if we are to achieve the CGIAR and A4NH goals and objectives. The new partners add comparative advantage for A4NH in newer research areas and both have excellent experience leading and participating in research consortia.

A4NH focuses on partnerships through the development impact pathways it supports. From this perspective, our major partner types are value chain actors, program implementers, and enablers such as policymakers and investors. A4NH also has strong partnerships with researchers. In Phase II, we will build on these partnerships, but with greater emphasis on the following:

- Support to country planning, actions and champions, which are the foundation of improving nutrition and health outcomes;
- Greater engagement with the private sector, particularly small and medium-size enterprises in Africa and Asia that will be key drivers of food system transformation; and
- More strategic research partnerships with research leaders linking evolving agriculture, nutrition, and health issues in food science, consumer behavior, and public health.

Given the new portfolio arrangements in CGIAR for Phase II, A4NH is planning for different collaborations with other research programs. Our approach is built on three assumptions about our role in the CGIAR system. First, A4NH brings expertise in nutrition and health research not widely available in CGIAR through a consumption, rather than production focus. Second, there is a need in CGIAR for advice on how to integrate evidence-based nutrition and health perspectives into its research questions, theories of change, and development outcomes, which A4NH can provide. Lastly, CGIAR cannot achieve its ambitious nutrition and health agenda without the help of partners from the nutrition and health communities; A4NH can convene these communities.

In this regard, A4NH proposes to fulfill this role in CGIAR through three mechanisms:

1. Joint research with other CRPs
2. Networking and mutual learning, through communities of practice hosted by A4NH flagships



- As a bridge to global and regional nutrition and health communities.

A4NH will continue responding to increasing demands from countries and investors to support multi-sectoral, country-led nutrition and health impacts at scale. These changes will enable A4NH to contribute more effectively to global efforts that shape agri-food systems for better nutrition and health.

A4NH will continue to concentrate its work in its target regions in South Asia and Africa south of the Sahara with some research in

other parts of Asia, Latin America and the Caribbean. Five countries will be considered focus countries, where A4NH expects to work closely with CGIAR entities through country coordination teams made up of A4NH affiliated researchers in each focus country. These countries are: Bangladesh, Ethiopia, India, Nigeria, and Vietnam.

The below table (Table 1) highlights A4NH’s current and planned efforts to lead, facilitate, and enhance collaboration within CGIAR in priority research areas and countries.

**TABLE 1. Cross-CGIAR Collaboration in A4NH**

	Type of coordination mechanisms led by A4NH	Potential CGIAR entities working with A4NH
<b>Bangladesh</b>	<p>Priority country for <b>joint research</b> in Food Systems for Healthier Diets, Biofortification, and SPEAR.</p> <p>Communities of practice for CRP researchers working on food systems and gender and nutrition issues in Bangladesh will facilitate <b>networking and mutual learning</b></p> <p>SPEAR will provide a <b>bridge to other flagships, CRPs and national, regional, and global nutrition and health communities</b> through its cluster of activities called Capacity, Collaboration, Convening (3C)</p>	All the agri-food system CRPs working in Bangladesh, plus CCAFS (Climate Change, Agriculture and Food Security), PIM (Policies, Institutions and Markets), and WLE (Water, Land and Ecosystems)
<b>Ethiopia</b>	<p>Priority country for <b>joint research</b> in Food Systems for Healthier Diets, Biofortification, Food Safety, and SPEAR.</p> <p>Communities of practice for CRP researchers working on food systems and gender and nutrition issues in Ethiopia will facilitate <b>networking and mutual learning</b></p> <p>SPEAR will provide a <b>bridge to other flagships, CRPs and national, regional, and global nutrition and health communities</b> through its cluster of activities called Capacity, Collaboration, Convening (3C)</p>	All the agri-food system CRPs working in Ethiopia, plus CCAFS (Climate Change, Agriculture and Food Security), PIM (Policies, Institutions and Markets), and WLE (Water, Land and Ecosystems)
<b>India</b>	<p>Priority country for <b>joint research</b> in Biofortification, Food Safety, SPEAR, and Improving Human Health.</p> <p>Communities of practice for CRP researchers working on food systems and gender and nutrition issues in India will facilitate <b>networking and mutual learning</b></p> <p>SPEAR will provide a <b>bridge to other flagships, CRPs and national, regional, and global nutrition and health communities</b> through its cluster of activities called Capacity, Collaboration, Convening (3C)</p>	All the agri-food system CRPs working in India, plus CCAFS (Climate Change, Agriculture and Food Security), PIM (Policies, Institutions and Markets), and WLE (Water, Land and Ecosystems)
<b>Nigeria</b>	<p>Priority country for <b>joint research</b> in Food Systems for Healthier Diets, Biofortification, Food Safety, and Improving Human Health.</p> <p>Communities of practice for CRP researchers working on food systems and gender and nutrition issues in Nigeria will facilitate <b>networking and mutual learning</b></p> <p>SPEAR will provide a <b>bridge to other flagships, CRPs and national, regional, and global nutrition and health communities</b> through its cluster of activities called Capacity, Collaboration, Convening (3C)</p>	All the agri-food system CRPs working in Nigeria, plus CCAFS (Climate Change, Agriculture and Food Security), PIM (Policies, Institutions and Markets), and WLE (Water, Land and Ecosystems)
<b>Vietnam</b>	<p>Priority country for <b>joint research</b> in Food Systems for Healthier Diets, Food Safety, and Improving Human Health.</p> <p>Communities of practice for CRP researchers working on food systems and gender and nutrition issues in Vietnam will facilitate <b>networking and mutual learning</b></p> <p>SPEAR will provide a <b>bridge to other flagships, CRPs and national, regional, and global nutrition and health communities</b> through its cluster of activities called Capacity, Collaboration, Convening (3C)</p>	All the agri-food system CRPs working in Vietnam, plus CCAFS (Climate Change, Agriculture and Food Security), PIM (Policies, Institutions and Markets), and WLE (Water, Land and Ecosystems)

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In August 2015, A4NH submitted a pre-proposal for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes what A4NH is building on in Bangladesh for its second phase.

## ACTIVE A4NH PROJECTS IN 2015 BY FLAGSHIP

### FLAGSHIP 1: BIOFORTIFICATION

Biofortification builds on the strong track record of the HarvestPlus program. During Phase I of A4NH, HarvestPlus transitioned from development to delivery phase. During Phase II, the flagship will deliver outcomes at scale (reaching 20 million farm households by 2020) and conduct research to fill key evidence gaps and to learn lessons from delivery for future research and scaling. As part of building an enabling environment for biofortification in the future, the flagship will engage in policy analysis and advocacy at national and international levels and build capacity of key research and development partners to mainstream biofortification in their research and programming.

In 2013, zinc rice was released in Bangladesh as a result of several years of development and testing by HarvestPlus and partners. Orange fleshed sweet potato has also been released in Bangladesh and HarvestPlus and the International Potato Center (CIP) with partners work to make the crop more widely available to farmers and consumers (see more under Flagship 2, for example). Ongoing research is focused on developing, testing, and disseminating more biofortified crops, such as iron lentils, zinc lentils, and zinc wheat.

### Projects that informed Flagship 1 work in Bangladesh

- **Nutritional Quality Assurance and Enhancement Network (NQAEN)**

Led by CIP and funded by A4NH, HarvestPlus, and the International Center for Tropical Agriculture (CIAT), the NQAEN aims to build and strengthen capacities to enable researchers in different

target regions worldwide to conduct accurate and cost-effective assessment of micronutrient content of sweet potato and potato, to guarantee food safety of biofortified clones by keeping low levels of antinutrients in target environments, to contribute to building evidence that minerals of biofortified sweet potato and potato clones and their products are bioavailable for the human body, and that phenolics in sweet potato and potato have a health promoting role.

### FLAGSHIP 2: FOOD SAFETY

The flagship on Food Safety conducts targeted research on specific food safety issues by generating evidence on what approaches are likely to work and how an enabling environment for innovative approaches to food safety can be achieved and sustained in informal markets. The high priority food safety issues in this flagship are biological contamination of perishable products and aflatoxins in staple crops. The flagship will scale-up successfully piloted solutions alongside rigorous monitoring and impact evaluations to increase understanding of the incentives, capacity, and enabling policy environment required for successful delivery at scale. At the same time, it will continue to generate evidence on food safety risks, and their assessment, communication, and management. In close collaboration with the CRPs covering livestock, fish, and grain legumes, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia.

Although there have not yet been any major A4NH-led initiatives on food safety in Bangladesh to date, we expect Phase II research to focus on characterizing and reducing biological contamination of perishable products.



A family enjoys lunch together in Jessore, Bangladesh.  
Credit: M. Yousuf Tushar/WorldFish

### FLAGSHIP 3: FOOD SYSTEMS FOR HEALTHIER DIETS

Food Systems for Healthier Diets aims to contribute to the goal of healthier diets for poor and vulnerable populations through identifying and enabling interventions and innovations by private, public, and civil society actors in national and sub-national food systems. Food systems will be analyzed from a diet and nutrition outcome perspective, focused on both by filling gaps and by reducing excesses in unhealthy diet components. The flagship builds on research on dietary assessment and methods for improving nutrition through value chains and places these in a broader agricultural, environmental, social, economic and political decisionmaking framework. In the long term, progress will be evaluated through improvements in diets, particularly for women, children, and vulnerable populations. Near-term progress will be measured through greater knowledge, awareness and systematic attention to diets and dietary transitions by researchers, by strategic partners from the private sector and civil society, by policymakers, and consumers in target countries.

#### Projects that informed Flagship 3 work in Bangladesh

- **Tuning into women's competitiveness to enhance nutrition: Cooking contests in Bangladesh**

This study led by IFPRI and funded by A4NH tests whether behavioral change communication can enhance nutrition behaviors using a field experiment with adolescent girls and young women in rural Bangladesh. The study tests two elements of behavioral change communication. First, the project implements and evaluates a nutrition training, which is commonly used as behavioral change communication. Second, trainees are invited to participate in a cooking contest that evaluates participants' recipes in terms of taste, nutrition and cooking hygiene, and offers a large prize to the highest-scoring team. By tuning into their competitiveness, the cooking contests aim at motivating participants to create and share healthier recipes, increase attention to nutrition, and improve winning teams' control over their households' food consumption decisions. Baseline interviews, nutrition trainings, cooking contests and a follow-up household survey were completed in 2015. Analyses are currently underway.

- **Building a Framework for Assessing the Impacts of Efforts to Enhance Access to Nutritious Foods Through In-depth Analysis of the Grameen Danone Case**

Funded by A4NH, this study implemented by the International Livestock Research Institute (ILRI) with the Institute of Development Studies and the University of Guelph aims to develop an analytical approach for the analysis of value chain-based initiatives aimed at enhancing access and consumption of nutritious foods by the poor. Using Grameen Danone as an illustrative case study, the research explores the effectiveness of Grameen Danone to achieve consumption of a nutritious food, the likely nutritional impacts, the challenges faced, and the mechanism

through which the challenges have been addressed. The case study will draw general conclusions on the effectiveness of value chain-based initiatives at achieving sustained consumption of a nutritious food and develop skills among partners in understanding the effectiveness of value chain-based interventions.

- **Improving fruit production, marketing and consumption for enhanced livelihoods**

Led by the World Agroforestry Centre (ICRAF) and funded by A4NH, this project seeks to better understand constraints in fruit production, processing, marketing and consumption and to identify entry points for maintaining nutrients along fruit value chains. In Bangladesh, the research focuses on assessing the fruit consumption levels of smallholder farming households and correlate this data with the number and diversity of fruit trees cultivated at the same farms.

- **Research on dried small fish value chains in Bangladesh**

WorldFish leads a number of activities along the dried small fish value chain in Bangladesh. The activities are funded by A4NH and the UK Department for International Development (DFID). The ultimate goal of the work is to elevate the importance of the dried fish value chain for consumption in Bangladesh, especially among the poor. Although dried fish is the most important fish category consumed among the poor, in terms of quantity and frequency, this area is totally neglected in research. Research activities are focused on describing the value of dried fish value chain for consumption in Bangladesh, analyzing nutrient content and contaminants in dried fish samples, and reporting on dried fish for consumption globally. One completed activity was focused specifically on optimizing the potential of fish and fish products to improve nutrition and health of women and young children by testing the nutrient availability and acceptability of a prepared complementary food powder of small fish, rice, and orange-fleshed sweet potato (OFSP), particularly suited for the initiation of complementary feeding, 6-9 months of age. Based on what was learned, the team developed initial plans and partnerships for a business plan for product development and production at scale.

- **The United States Agency for International Development (USAID) Horticulture Project**

Funded by USAID and A4NH, CIP leads this horticulture project with the goal of improving income and nutritional security of 100,000 marginal farmer households in the southern region of Bangladesh. With a gender responsive strategy applied to orange fleshed sweet potato (OSFP) vine multiplication in homestead gardens and at nurseries, the project takes special care to ensure that women are making a contribution to household food and nutrition security, income generation as well as influencing their

relationship with men both inside and outside of their households. The other technologies and innovations the project introduces include home gardens, OFSP vine multiplication at nurseries, OFSP roots production, quality OFSP multiplication, vegetable production, and nutrition messaging for behavior change. There is a strong capacity building component to this project combining nutrition and agricultural training targeted at small-holder farmers and community volunteers.

Furthermore, the project is using schools as a new avenue for promoting OFSP to households.

#### FLAGSHIP 5: SUPPORTING COUNTRY OUTCOMES THROUGH INTEGRATED PROGRAMS AND POLICIES

This flagship responds to demand for evidence from policy-makers and program implementers. Both groups recognize the importance of agriculture within a multi-sectoral approach to improve nutrition and health, but need more evidence on the impacts of particular types of programs and policies, as well as on what constitutes an effective enabling environment and how this can be achieved and sustained. Key accomplishments from Phase I include strong partnerships with countries, global and regional organizations (e.g. SUN, CAADP) and NGOs and a solid portfolio of evaluations designed to look at the impacts of promising integrated agriculture-nutrition interventions across contexts, scales and types of implementers. The flagship will also contribute to the institutionalization of evidence-based, cross-sectoral policy-making and programming by developing methods and tools and building capacity of other researchers and evaluators, both inside and outside the CGIAR, to do high-quality conceptual and empirical research on agriculture-nutrition-health linkages.

#### Projects that informed Flagship 5 work in Bangladesh

- [Alive & Thrive](#)

Alive & Thrive aims to reduce stunting through improved infant and young child feeding (IYCF) practices at scale. Funded by The Bill and Melinda Gates Foundation and A4NH, it is managed by FHI360 with IFPRI as a lead partner. With the goal of implementing large-scale interventions using multiple platforms to improve IYCF practices in Bangladesh, Vietnam, and Ethiopia, the initiative is also charged with developing a measurement, learning, and evaluation (MLE) approach to generate a strong evidence base for future actions to improve IYCF practices. Alive & Thrive's MLE goals, as articulated in the overall proposal, are to document the impact, cost, and cost-effectiveness of IYCF interventions implemented at large scale through Alive & Thrive's activities and to generate learning on how to achieve and replicate Alive & Thrive's impact.

- **Strengthening partnerships, results, and innovations in nutrition globally (SPRING)**

SPRING is aimed at combating undernutrition on a global scale by working across sectors - including health, agriculture, social protection, and economic growth - to facilitate the development of country-led nutrition strategies and provide technical support to ensure that quality programs are taken to scale in a manner that strengthens country capacity for the long run. The project is funded by USAID and implemented by a number of expert groups, including IFPRI. It uses social and behavior change communication at all levels to promote nutrition-sensitive policies, enhance cross-sectoral programming, and achieve better gender equity. SPRING also delivers high impact nutrition interventions to improve infant and young child feeding, control of micronutrient deficiencies, and women's nutrition practices focusing on the first 1,000 days. IFPRI's role in the project is to generate evidence based learning, monitoring and evaluation for effective approaches to scale-up nutrition services in 8-10 target countries, one of which is Bangladesh. IFPRI's approach covers three broad areas: 1) building the evidence base through research; 2) gathering, synthesizing and translating evidence and making it available for potential users; and 3) strengthening capacity to understand, interpret and use this evidence in programs and policy.

- **Leveraging Agriculture for Nutrition in South Asia (LANSA)**

LANSA is a research program made up of IFPRI and five other organizations, led by the M.S Swaminathan Research Foundation and funded by DFID and A4NH. The core question that LANSA addresses is: How can South Asian agriculture and related food policies and interventions be designed and implemented to increase their impacts on nutrition, especially the nutritional status of children and adolescent girls? LANSA's three research pillars (see research objectives below) address these core issues and three cross-cutting themes – gender, fragility, and innovation systems – cut across these three research pillars. LANSA's goal is to ensure that policy-makers and practitioners use the high quality evidence generated on effective strategies and actions to accelerate nutrition security to make agriculture more 'pro-nutrition'. LANSA's work is focused on Afghanistan, Bangladesh, India, and Pakistan.

- [Transform Nutrition Research Program Consortium](#)

Led by IFPRI and funded DFID and A4NH, Transform Nutrition aims to transform thinking and action on the neglected crisis of undernutrition. It seeks to contribute to accelerating the rate of reduction of undernutrition among young children by ensuring the effective scaling-up of evidence-based nutrition-specific and nutrition-sensitive actions for improving nutrition in three focal countries – Bangladesh, Ethiopia, and India – as well as regionally in East Africa and globally. To achieve this outcome it works towards three key output areas. The first, generating a world class, accessible and practicable evidence base on scaling up nutrition-specific interventions, on maximizing the nutrition-sensitivity of



agriculture, social protection and women's empowerment interventions, and on creating and sustaining "enabling environments" for nutrition. Transform Nutrition research outputs are made accessible and are used to facilitate evidence-informed discussions. There is also a stream of capacity building activities to strengthen nutrition-relevant capacity nationally, regionally, and globally.

- **Stories of Change**

Led by IFPRI and funded by A4NH, this research addresses the need for and approaches to integration among the agriculture, nutrition, and health sectors, at both the program and policy levels. Stories of Change builds and expands on prior work to foster and support experiential learning on how to address the challenge of undernutrition in different country contexts including Bangladesh, Ethiopia, India, Nepal, and Zambia. The project applies tools, methods and approaches in selected countries to better understand, engage with, influence and evaluate multisectoral action to reduce undernutrition.

- **International Dietary Data Expansion Project (INDDEX)**

The INDDEX project is funded by the Bill and Melinda Gates Foundation and led by Tufts University with IFPRI as a key partner. The goal of the project is to enable countries to increase their acquisition and use of high-quality, timely dietary data in order to make better evidence-based decisions about agriculture, food and nutrition policies and programs. The research team will accomplish this goal by developing technologies to streamline the collection and analysis of dietary data, improving the design of household consumption and expenditure surveys (HCES), harvesting "fit-for-purpose" indicators and analyses from HCES and food balance sheet (FBS) data, and building global support and country-level capacity to apply the methods, tools and guidance on data collection that will be developed through the project to make appropriate use of the resulting data to inform policy decisions. The initial target countries for INDDEX are Bangladesh and Burkina Faso.

- **Orienting Agriculture Toward Improved Nutrition and Women's Empowerment (ANGeL)**

ANGeL, which refers to Agriculture, Nutrition, and Gender Linkages, is a pilot project being implemented by the Ministry of Agriculture in Bangladesh. It is partially funded by USAID, with technical assistance from IFPRI's Bangladesh Policy Research and Strategy Support Program (PRSSP) and Helen Keller International (HKI). The project aims to identify actions and investments in agriculture that can leverage agricultural development for improved nutrition, and make recommendations on how to invigorate pathways to women's empowerment—particularly within agriculture. Evidence from this project may be used to design, implement, and scale up the most effective interventions to improve nutrition and women's empowerment at a national level.

## OTHER A4NH SUPPORT AND ACTIVITIES

Although we do not expect any projects in Bangladesh under the flagship on Improved Human Health, we will investigate opportunities for Bangladeshi researchers to network with other colleagues in South and Southeast Asia through regional networks and national partners, including the Public Health Foundation of India and the Ecohealth resource centers at Hanoi School of Public Health (Vietnam), Chiang Mai University (Thailand), and Universitas Gadjah Mada (Indonesia). This flagship will be coordinated by ILRI together with the London School of Hygiene and Tropical Medicine. Research will focus on three main areas: agroecosystem change on health outcomes, zoonotic and emerging diseases and global agriculture-health challenges such as anti-microbial resistance.

## CURRENT NATIONAL PARTNERS

- **CGIAR entities:** CIP, ICRAF, IFPRI, ILRI, IRRI, WorldFish,
- **Development implementers:** AVA Development Society (AVA), Agricultural Advisory Society (AAS), Amra Kaj Kori (AKK), Association for Integrated Human Development (AIHD), BRAC, CARE-Bangladesh, Christian Commission for Development in Bangladesh (CCDB), Community Development Centre (CODEC), Concern on National Problems (CONP), Darkina Fish, Friends in Village Development Bangladesh (FIVDB), Integrated Social Welfare Association (ISWA), Global Alliance for Improved Nutrition (GAIN), International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), Natun Zibon Rochi (NAZIR), Patuakhali Development Organization (PDO), People's Development Institute (PDI), PROSHIKA, RDRS Bangladesh, Society Development Committee (SDC), Shariatpur Development Society (SDS), Shushilan Shawdesh Unnayan Kendra (SUK), Thengamara Mohila Saabuj Sangha (TMSS), Unnayan Dhara (UD), Voluntary Rural Development Society (VRDS)
- **NARS:** Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute, Department of Agricultural Extension (DAE)
- **Policymakers:** Bangladesh Bureau of Statistics, Department of Fisheries
- **Research/Academic:** Bangladesh Agricultural University, the World Vegetable Centre (AVRDC)
- **Value Chain:** Bogra Seed Production and Marketing Association (BSPMA), Small & Medium Seed Producing Association (SMSPA), South West Seed Producers Association of Bangladesh (SWSPAB)

## PLANS FOR PHASE II, AS DESCRIBED IN A4NH PRE-PROPOSAL

All flagships except for Improving Human Health have specific plans to conduct research activities in Bangladesh in Phase II, although specific activities have not yet been identified. On a high



level, the beneficiary outcomes A4NH research is expected to contribute to achieving in Bangladesh with partners are summarized in Table 1, below. We will not be able to achieve these outcomes alone. In Table 2, we describe how we anticipate working

with other CGIAR entities participating in the site integration ++ process in order to achieve these development goals.

TABLE 1. A4NH's development goals for Bangladesh in Phase II

Beneficiary outcomes (impacts)	Target development outcomes (or IDOs)	Key assumptions
<b>Improved nutrition by consumption of biofortified crops</b>	Improved diets for poor and vulnerable people	Households reached with planting material will grow and consume the crop, and market excess production; mainstreaming efforts will expand available varieties and financing to additional countries; HarvestPlus and its partners will be able to offer sufficient technical assistance to promote adoption and consumption
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Households adopt improved, biofortified varieties</b>	Increased productivity	Households reached with planting material will grow and adopt biofortified varieties, and will continue to have access to biofortified planting materials as needed. See above for assumption re: mainstreaming.
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
	Enabling environment improved	
<b>Reduced exposure to foodborne hazards</b>	Enhanced smallholder market access	Problems identified have significant impacts on human health; proposed interventions can significantly improve human health or are justified by other benefits (trade, livelihoods, animal welfare); solutions (innovations, policies, and programs) proposed can be adopted at scale and in ways that ensure equitable access to the poor, smallholders, men and women, and the informal sector
	Improved food safety	
	Equity and inclusion achieved	
	Enabling environment improved	
<b>Countries improve food systems for healthier diets</b>	Increased incomes and employment	Incentives to improve food systems for healthier diets can be identified for different groups of actors (policy-makers, private sector, consumers); stakeholders (researchers and enablers) will be committed and able to improve the quality of national data on diets; innovations and interventions will be acceptable to intended beneficiaries; strategic partners can be identified and engaged for scale up
	Improved diets for poor and vulnerable people	
	Mitigation and adaptation achieved (in collaboration with CCAFS)	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Successful and cost-effective integrated nutrition-sensitive programs designed, implemented, scaled-up and evaluated</b>	Increased incomes and employment	Results generated from evaluation activities are useful and relevant and have clear operational implications for implements who have the capacity and resources to use them; programs that are found to be cost-effective are funded and scaled up, achieving high coverage and high quality to achieve expected results (joint with Supporting Country Outcomes through Research on Enabling Environments)
	Improved diets for poor and vulnerable people	
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
	All IDOs under SLO2	

<b>Countries improve the enabling environment for nutrition and health</b>	Mitigation and adaptation achieved (in collaboration with CCAFS)	Champions identified among key decision-makers find ways to take forward key messages within their own sector and beyond; decisionmakers are incentivized to improve the way they find, appraise and use evidence; policymakers and practitioners are motivated to reduce undernutrition and poverty; stakeholders across and within sectoral domains (agriculture, nutrition, health, gender) engage with A4NH evidence.
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	

**TABLE 2. A4NH's-proposed CGIAR relationships in Phase II**

<b>Planned CGIAR entities working with A4NH in Phase II</b>	<b>Type of coordination mechanisms with A4NH flagships in Phase II</b>	<b>What A4NH will do and what it expects to offer in Phase II</b>
All CRPs in the country through site integration ++	CoP/Docking Stations (all CRPs) – Food Systems for Healthier Diets  Biofortification target country  Food Safety docking stations (fish)  Convening Platform (all CRPs) - Supporting Country Outcomes	All flagships except Improving Human Health will be working in Ethiopia.  A4NH expects to work through staff on the ground, project investments, and the IFPRI country office.

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The CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) responds to the global challenge of improving food security, nutrition, and health. CGIAR has a long legacy of building global food security, but ensuring consumers can access enough healthy, affordable, and safe food requires a perspective that encompasses far more than agricultural productivity.

In August 2015, A4NH submitted a pre-proposal for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes what A4NH is building on in Ethiopia for its second phase.

## FEATURED A4NH PROJECTS BY FLAGSHIP

### FLAGSHIP 1: BIOFORTIFICATION

Biofortification builds on the strong track record of the HarvestPlus program. During Phase I of A4NH, HarvestPlus transitioned from development to delivery phase. During Phase II, the flagship will deliver outcomes at scale (reaching 20 million farm households by 2020) and conduct research to fill key evidence gaps and to learn lessons from delivery for future research and scaling. As part of building an enabling environment for biofortification in the future, the flagship will engage in policy analysis and advocacy at national and international levels and build capacity of key research and development partners to mainstream biofortification in their research and programming.

In 2015, HarvestPlus expanded its activities to Ethiopia, including it as one of the nine target countries.

### Projects that informed Flagship 1 work in Ethiopia

- **Nutritional Quality Assurance and Enhancement Network (NQAEN)**

Led by the International Potato Center (CIP) and funded by A4NH, HarvestPlus, and the International Center for Tropical Agriculture (CIAT), the NQAEN builds and strengthens capacities to enable researchers in different target regions worldwide to conduct accurate and cost-effective assessments of micronutrient content of sweetpotato and potato, to guarantee food safety of biofortified clones by keeping low levels of antinutrients, to contribute to building evidence that minerals of biofortified sweetpotato and potato clones and their products are bioavailable for the human body, and that phenolics in sweetpotato and potato have a health promoting role.

### FLAGSHIP 2: FOOD SAFETY

The flagship on Food Safety conducts targeted research on specific food safety issues as well as by generating evidence on what approaches are likely to work and how an enabling environment for innovative approaches to food safety can be achieved and sustained in informal markets. The high priority food safety issues for Phase II are biological contamination of perishable products and aflatoxins in staple crops. The flagship will scale-up successfully piloted solutions alongside rigorous monitoring and impact evaluations to increase understanding of the incentives, capacity, and enabling policy environment required for successful delivery at scale. At the same time, it will continue to generate evidence on food safety risks, and their assessment, communication, and management. In close collaboration with the CRPs covering livestock, fish, and grain legumes, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia.

### Projects that informed Flagship 2 work in Ethiopia

- **Aflatoxin coordination across CGIAR and gap filling dedicated to Ethiopia**

Led by the International Livestock Research Center (ILRI) and funded by A4NH, this project aims to assess the level of aflatoxin contamination in dairy value chains in Ethiopia, identify research gaps in aflatoxin research, and provide evidence, risk assessments and best-bet interventions for policy makers.



Farmers sort tomatoes in Ethiopia. Credit: S.Bachenheimer/World Bank



- **Safe Food Fair Food - Risk based approaches to improving food safety and market access in smallholder meat, milk, fish value chains in four African countries**<sup>1</sup>

Led by ILRI and funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Society for International Cooperation (GIZ), and A4NH, this project's ultimate goal is the improvement of livelihoods of poor producers and consumers by reducing the health risks and increasing the livelihood benefits associated with meat, milk and fish value chains. Its purpose is furthering research into the practical application of risk analysis and economic and social methods by food safety stakeholders and value chain actors, and improving food safety and market participation of the poor in informal markets for livestock products in sub-Saharan Africa. It pioneers and tests a practical, whole value chain application of risk-based approaches to food safety in selected countries. It develops, tests, and communicates the technologies and methods to improve food safety and enhance smallholder market access. At regional scale, it works through food safety 'champions' to better incorporate risk analysis and economic evaluation methods into food safety policy, commercial practice, and veterinary education.

### **FLAGSHIP 3: FOOD SYSTEMS FOR HEALTHIER DIETS**

Food Systems for Healthier Diets aims to contribute to the goal of healthier diets for poor and vulnerable populations through identifying and enabling interventions and innovations by private, public, and civil society actors in national and sub-national food systems. Food systems will be analyzed from a diet and nutrition outcome perspective, focused on both by filling gaps and by reducing excesses in unhealthy diet components. The flagship builds on research on dietary assessment and methods for improving nutrition through value chains and places these in a broader agricultural, environmental, social, economic and political context. There was limited food systems research in A4NH during Phase I, but this flagship will build on food systems work in the country led by our partners. Some examples are IFPRI's policy support to the Agricultural Transformation Agency (ATA) and the research on productive safety net programs. In the Ethiopia Strategy Support Program (ESSP), we expect to find synergies with nutrition activities in Theme 9: Agriculture and Nutritional Linkages and Theme 10: Urbanization and Food System Transformation.

### **Projects that informed Flagship 3 work in Ethiopia**

- **Nutrition-sensitive landscapes pilot**

Funded by the Daniel & Nina Carasso Foundation and led by Bioversity International, this pilot project investigates biodiversity in

subnational food systems to address dietary gaps and to simultaneously build resilience in production systems.

### **FLAGSHIP 5: SUPPORTING COUNTRY OUTCOMES THROUGH INTEGRATED PROGRAMS AND POLICIES**

Supporting Country Outcomes through Integrated Programs and Policies responds to demand from policymakers and program implementers. Both groups recognize the importance of agriculture within a multi-sectoral approach to improve nutrition and health, but need more evidence on the impacts of particular types of programs and policies, as well as on what constitutes an effective enabling environment and how this can be achieved and sustained. The flagship builds on key accomplishments in Phase I, including strong partnerships with countries, global and regional organizations (e.g. SUN, CAADP) and NGOs and a solid portfolio of evaluations designed to look at the impacts of promising integrated agriculture-nutrition interventions across contexts, scales and types of implementers. Through working together with policy makers and implementers, including in an action research modes, this flagship will contribute to better policies and investments and reach millions of people, including vulnerable groups such as women and young children by 2022 in target countries. The flagship will also contribute to the institutionalization of evidence-based, cross-sectoral policymaking and programming by developing methods and tools and building capacity of other researchers and evaluators, both inside and out-side the CGIAR, to do high-quality conceptual and empirical re-search on agriculture-nutrition-health linkages.

### **Projects that informed Flagship 5 work in Ethiopia**

- **Alive & Thrive**<sup>2</sup>

Led by the International Food Policy Research Institute (IFPRI) and funded by The Bill and Melinda Gates Foundation and A4NH, Alive & Thrive aims to reduce stunting through improved infant and young child feeding (IYCF) practices at scale. With the goal of implementing large-scale interventions using multiple platforms to improve IYCF practices in Bangladesh, Vietnam, and Ethiopia, the initiative is also charged with developing a measurement, learning, and evaluation (MLE) approach to generate a strong evidence base for future actions to improve IYCF practices. Alive & Thrive's MLE goals are to document the impact, cost, and cost-effectiveness of IYCF interventions implemented at large scale through Alive & Thrive's activities and to generate learning on how to achieve and replicate Alive & Thrive's impact.

- **Expanding policy research**<sup>3</sup>

Led by IFPRI and funded by A4NH, this research addresses the need for and approaches to integration among the agriculture, nutrition, and health sectors, at both the program and policy levels. Leveraging Agriculture for Nutrition in East Africa (LANEA),

<sup>1</sup> <http://safefoodfairfood.ilri.org/>

<sup>2</sup> <http://www.aliveandthrive.org/>

<sup>3</sup> <http://www.a4nh.cgiar.org/2015/06/04/nutrition-in-east-africa-3-country-reports-released/>

(2013-2014 in Ethiopia, Kenya, and Uganda) sought to identify agriculture-nutrition linkages in three case study countries and explore the effect of the political context and institutional structures (government, districts and civil society organizations) on leveraging agriculture for nutrition, and in particular, in relation to scaling up and expanding coverage in nutrition through agriculture and the broader agri-food system. Stories of Change (2015-2016 in Ethiopia, Zambia, Bangladesh, Nepal, and India) builds and expands on this work to foster and support experiential learning on how to address the challenge of undernutrition in different contexts. The project applies tools, methods and approaches in selected countries to better understand, engage with, influence and evaluate multisectoral actions to reduce undernutrition.

- **Transform Nutrition Research Program Consortium<sup>4</sup>**

Led by IFPRI and funded by the UK Department for International Development (DFID) and A4NH, Transform Nutrition aims to transform thinking and action on the neglected crisis of undernutrition. It seeks to contribute to the goal of accelerating the rate of reduction of undernutrition among young children by ensuring the effective scaling-up of evidence-based nutrition-specific and nutrition-sensitive actions for improving nutrition in three focal countries (Ethiopia, Bangladesh, India), as well as regionally and globally. To achieve this outcome they work towards three key output areas. The first, generating a world class, accessible and practical evidence base on scaling up nutrition-specific interventions; the second, maximizing the nutrition-sensitivity of agriculture, social protection and women's empowerment interventions, and third, creating and sustaining "enabling environments" for nutrition. Transform Nutrition research outputs are made accessible and are used to facilitate evidence-informed discussions. There is also a stream of capacity building activities to strengthen nutrition-relevant capacity nationally, regionally, and globally.

## OTHER A4NH SUPPORT AND ACTIVITIES

A4NH will be involved in the second phase of mainstreaming nutrition in national agriculture investment plans as part of the African Union Commission's Comprehensive Africa Agriculture Development Programme (AUC CAADP) process. In addition, some work will involve providing support to the AUC Regional Strategic Analysis and Knowledge Support System (ReSAKSS) process on structuring the monitoring process of nutrition indicators in CAADP in response to the AUC Malabo Declaration of 2014. Action research activities on providing an enabling environment for A4NH at AUC continental, regional, and national level are planned. Next year's AUC Africa Trends and Outlook report will be led by A4NH. For the first time, the annual ReSAKSS conference will focus on nutrition and A4NH will be actively involved.

In 2015, a new capacity building initiative called the Agriculture Nutrition and Health (ANH) Academy was launched. The ANH Academy is jointly founded and initial coordination is provided by the Leverhulme Centre on Integrative Research in Agriculture and Health (LCIRAH), the Innovative Methods and Metrics for Agriculture and Nutrition Actions (IMMANA) project, and A4NH. The ANH Academy is a global research network in agriculture and food systems for improved nutrition and health to serve as a platform for learning and sharing. In June 2016, the ANH Academy will host its first conference in Addis Ababa.

In addition to the specific projects mentioned in this note, A4NH plans to work through country and CGIAR coordination processes to align our research to Ethiopia's priority actions. There will be many opportunities for integration with work like CIFOR's on nutritional and ecological benefits of forest and tree cover on vegetable production and consumption. The site integration work in Ethiopia will take into account the agriculture to nutrition work done by other CRPs and CGIAR centers in order to identify areas of synergy where integration could bring about greater impact. A consultation process is planned for Dec 2015 where Ethiopian government stakeholders will present government priority areas to which integration efforts can be aligned. In the same way, integration with other development partners will be sought.

## CURRENT NATIONAL PARTNERS

- **CGIAR entities:** Bioversity International, the International Maize and Wheat Improvement Center (CIMMYT), CIP, the International Center for Agricultural Research in the Dry Area (ICARDA), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), IFPRI, International Institute of Tropical Agriculture (IITA), ILRI, CRP on Livestock & Fish
- **Development implementers:** Save the Children, United States Agency for International Development (USAID), Vétérinaires Sans Frontières – Suisse (VSF-Suisse), World Vision
- **NARS:** Ethiopian Institute of Agriculture Research (EIAR)
- **Policymakers:** African Union Inter-African Bureau for Animal Resources (AU-IBAR), East African Community (EAC), Ethiopian Public Health Institute, Food and Agriculture Organization of the United Nations (FAO), IGAD Center for Pastoral Areas and Livestock Development (ICPALD), Ministry of Agriculture, Ministry of Health, Woreda Livestock Crop and Rural Development Office, Woreda Health Offices in multiple woredas (Gode, Hargelle, Moyale, Mubarek)

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<sup>4</sup> <http://www.transformnutrition.org/>

- **Research/Academic:** Addis Ababa University, Addis Continental Institute of Public Health, Awassa University (Nutrition Center of Excellence), Consultancy for Social Development, Jigjiga University, Mela Research PLC (MelaRes)
- **Value Chain:** livestock marketing councils; abattoirs; butchers; consumers; processors; retailers; traders, transporters, market officials
- **Other:** JaRco Consulting

## PLANS FOR PHASE II, AS DESCRIBED IN A4NH PRE-PROPOSAL

All flagships except for Improving Human Health plan to conduct research activities in Ethiopia in Phase II, although specific activities have not yet been identified. On a high level, the beneficiary outcomes A4NH research is expected to contribute to achieving in Ethiopia with partners are summarized in Table 1, below. We will not be able to achieve these outcomes alone. In Table 2, we describe how we anticipate working with other CGIAR entities participating in the site integration ++ process in order to achieve these development goals.

TABLE 1. A4NH's development goals for Ethiopia in Phase II

Beneficiary outcomes (impacts)	Target development outcomes (or IDOs)	Key assumptions
<b>Improved nutrition by consumption of biofortified crops</b>	Improved diets for poor and vulnerable people	Households reached with planting material will grow and consume the crop, and market excess production; mainstreaming efforts will expand available varieties and financing to additional countries; HarvestPlus and its partners will be able to offer sufficient technical assistance to promote adoption and consumption
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Households adopt improved, biofortified varieties</b>	Increased productivity	Households reached with planting material will grow and adopt biofortified varieties, and will continue to have access to biofortified planting materials as needed. See above for assumption re: mainstreaming.
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
	Enabling environment improved	
<b>Reduced exposure to foodborne hazards</b>	Enhanced smallholder market access	Problems identified have significant impacts on human health; proposed interventions can significantly improve human health or are justified by other benefits (trade, livelihoods, animal welfare); solutions (innovations, policies, and programs) proposed can be adopted at scale and in ways that ensure equitable access to the poor, smallholders, men and women, and the informal sector
	Improved food safety	
	Equity and inclusion achieved	
	Enabling environment improved	
<b>Countries improve food systems for healthier diets</b>	Increased incomes and employment	Incentives to improve food systems for healthier diets can be identified for different groups of actors (policy-makers, private sector, consumers); stakeholders (researchers and enablers) will be committed and able to improve the quality of national data on diets; innovations and interventions will be acceptable to intended beneficiaries; strategic partners can be identified and engaged for scale up
	Improved diets for poor and vulnerable people	
	Mitigation and adaptation achieved (in collaboration with CCAFS)	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Successful and cost-effective integrated</b>	Increased incomes and employment	Results generated from evaluation activities are useful and relevant and have clear operational implications for
	Improved diets for poor and vulnerable people	



<b>nutrition-sensitive programs designed, implemented, scaled-up and evaluated</b>	Equity and inclusion achieved	implements who have the capacity and resources to use them; programs that are found to be cost-effective are funded and scaled up, achieving high coverage and high quality to achieve expected results
	National partners and beneficiaries enabled	
<b>Countries improve the enabling environment for nutrition and health</b>	All IDOs under SLO2	Champions identified among key decision-makers find ways to take forward key messages within their own sector and beyond; decisionmakers are incentivized to improve the way they find, appraise and use evidence; policymakers and practitioners are motivated to reduce undernutrition and poverty; stakeholders across and within sectoral domains (agriculture, nutrition, health, gender) engage with A4NH evidence.
	Mitigation and adaptation achieved (in collaboration with CCAFS)	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	

**TABLE 2. A4NH's-proposed CGIAR relationships in Phase II**

<b>Planned CGIAR entities working with A4NH in Phase II</b>	<b>Type of coordination mechanisms with A4NH flagships in Phase II</b>	<b>What A4NH will do and what it expects to offer in Phase II</b>
All CRPs in the country through site integration ++	<p>Community of Practice/Docking Station (for all CRPs), hosted by Food Systems for Healthier Diets</p> <p>Target country for Biofortification</p> <p>Docking Station for livestock value chain activities, led by Food Safety</p> <p>Convening Platform (for all CRPs), led by Supporting Country Outcomes through Integrated Programs and Policies</p>	<p>All flagships except Improving Human Health will be working in Ethiopia</p> <p>A4NH expects to work through staff on the ground, project investments, the IFPRI country office, and ILRI's principal campus.</p>

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In August 2015, A4NH submitted a pre-proposal for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes what A4NH is building on in Nigeria for its second phase.

### FEATURED A4NH PROJECTS BY FLAGSHIP

#### FLAGSHIP 1: BIOFORTIFICATION

Biofortification builds on the strong track record of the HarvestPlus program. During Phase I of A4NH, HarvestPlus transitioned from development to delivery phase. During Phase II, the flagship will deliver outcomes at scale (reaching 20 million farm households by 2020) and conduct research to fill key evidence gaps and to learn lessons from delivery for future research and scaling. As part of building an enabling environment for biofortification in the future, the flagship will engage in policy analysis and advocacy at national and international levels and build capacity of key research and development partners to mainstream biofortification in their research and programming.

#### Projects that informed Flagship 1 work in Nigeria

- **HarvestPlus—development and delivery of vitamin A cassava**

Nigeria is one of the HarvestPlus target countries. HarvestPlus has a large and dynamic country team working with partners to develop and deliver vitamin A cassava in innovative ways.

- **Development and testing of innovations for improving nutrition**

Led by the International Institute of Tropical Agriculture (IITA) and funded by the International Center for Tropical Agriculture (CIAT) and A4NH, this research focuses on enhancing the nutrient content of staple food crops such as maize, cassava, plantain, and

cowpea. The strategy is to develop varieties with enhanced nutrient content and reduced anti-nutritional factors to enhance utilization of nutrients. For plantains and cooking bananas, breeding research is focused on increasing the content of provitamin A, vitamin C, and potassium. For maize, researchers are developing inbred lines that combine high levels of provitamin A with high levels of methionine and cysteine in order to develop hybrids and synthetics with multiple nutrient content.

#### FLAGSHIP 2: FOOD SAFETY

The flagship on Food Safety conducts targeted research on specific food safety issues as well as by generating evidence on what approaches are likely to work and how an enabling environment for innovative approaches to food safety can be achieved and sustained in informal markets. The high priority food safety issues for Phase II are biological contamination of perishable products and aflatoxins in staple crops. The flagship will scale-up successfully piloted solutions alongside rigorous monitoring and impact evaluations to increase understanding of the incentives, capacity, and enabling policy environment required for successful delivery at scale. At the same time, it will continue to generate evidence on food safety risks, and their assessment, communication, and management. In close collaboration with the CRPs covering livestock, fish, and grain legumes, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia.



A researcher inspects cassava in Abuja. Photo: M.Mitchell/ IFPRI

## Projects that informed Flagship 2 work in Nigeria

- **AgResults Aflasafe™ Pilot Project<sup>1</sup>**

Led by IITA, this pilot project will create a niche market for aflatoxin-free maize that will deliver three critical preconditions for enabling further development of the market. Firstly, the efficacy of biocontrol is being proven “beyond the lab” as a commercially viable product. Secondly, in order to build momentum around aflatoxins, teams promote broad-based awareness of the health impacts of aflatoxin among smallholder farmers. Thirdly, the pilot introduces a critical mass of certified maize into the market. The combination of these three preconditions are intended to create the space and momentum for other critical actors, such as the private sector, to act, in order to ensure the market continues over time. The research agenda will help investors, implementers, and governments better understand the factors that can create market preconditions that would enable the establishment of a long-term market for aflatoxin-free maize as well as the pull mechanisms that can successfully introduce a new product like aflasafe. The research also seeks to identify factors that can enhance mitigation of the negative health impacts of aflatoxin-infested maize and increase farmer incomes through yield enhancement. This pilot project is funded by a consortium of donors including the United States Agency for International Development (USAID); Department for International Development (DFID); Australian Agency for International Development (AUSAID); Canada Finance; the Bill & Melinda Gates Foundation (BMGF); and the World Bank.

- **Partnership for Aflatoxin Control in Africa (PACA) projects - Expansion of biological control in Africa and testing of a large-scale manufacturing model for aflasafe**

Led by IITA and funded by the Meridian Institute and A4NH, these projects serve several purposes. By building upon the relatively new demonstration-scale plant for aflasafe production in Nigeria, the project intends to adapt the manufacturing process and transfer the production technology to public and private sector investors in Nigeria and other countries in Africa, demonstrating that mass production of aflasafe is commercially viable.

## FLAGSHIP 3: FOOD SYSTEMS FOR HEALTHIER DIETS

The flagship on Food Systems for Healthier Diets aims to contribute to the goal of healthier diets for poor and vulnerable populations through identifying and enabling interventions and innovations by private, public, and civil society actors in national and sub-national food systems. Nigeria is one of the four focus countries for this flagship, meaning there will be an in-depth analysis

of food systems at national and sub-national levels. Food systems will be analyzed from a diet and nutrition outcome perspective, addressed by filling nutrition gaps while also reducing excesses in unhealthy diet components. This flagship builds on research on dietary assessment and methods for improving nutrition through value chains, placing both in a broader agricultural, environmental, social, economic, and political context.

## Projects that informed Flagship 3 work in Nigeria

- **Improve food quality and diets of nutritionally disadvantaged populations, especially women and children**

Led by IITA, this project involves food consumption and nutrition studies to characterize the diets and nutritional status of women, children, and other vulnerable groups. Information is generated for researchers to use in the development of technologies that leverage the nutritional qualities and minimize the anti-nutritional qualities of processed foods. The team conducts consumer acceptability studies of new processed products, including research on ways to improve traditional processing and storage methods. The activities are funded by several donors, including A4NH, the International Fund for Agricultural Development (IFAD), USAID, and the Swedish International Development Cooperation Agency (Sida).

## FLAGSHIP 6: SUPPORTING COUNTRY OUTCOMES THROUGH RESEARCH ON ENABLING ENVIRONMENTS

The aim of the flagship on Supporting Country Outcomes through Research on Enabling Environments is to identify, exploit, and enhance synergies between agriculture, nutrition, and health policy processes and to promote enabling cross-sectoral policy and investment environments. This will be achieved through a combination of strategic, action-oriented research – guided by a conceptual framework and carried out in target countries, with global and regional organizations – and through coordinated support to other flagships and CRPs in areas where a multisectoral lens could add value to their sectoral policy work. By contributing to improved national enabling environments, this flagship enhances the impacts and sustainability of many investments of A4NH and other research and development organizations in target countries, resulting in a measurable shift in current trends for key nutrition, health, and equity indicators.

- **Using HCES data to measure and track intermediate development outcome (IDO) indicators**

This project, led by the International Food Policy Research Institute (IFPRI), builds upon ongoing work to develop standardized approaches and guidelines to strengthen the use of Household Consumption and Expenditure Surveys (HCES), as a proxy for 24-

<sup>1</sup> Aflasafe is a registered trademark of IITA.

<http://agresults.org/en/283/NigeriaAflasafePilot>



hour dietary recall survey data. There is a dearth of dietary intake data in low- and middle-income countries with which to diagnose nutrition problems and design, monitor, and evaluate nutrition programs. HCES are already being routinely conducted and funded in more than 120 countries. They are now being repurposed to provide a less precise alternative, but one that is much more readily available, affordable, and sustainable relative to nutritionists' traditional mainstay, 24-hour recall surveys. This particular project analyzes HCES data to support the design, implementation, and/or evaluation of A4NH research. This activity is funded by A4NH.

## OTHER A4NH SUPPORT AND ACTIVITIES

Although we do not expect any projects in Nigeria under the flagship on Improving Human Health, coordinated by the International Livestock Research Institute (ILRI) and the London School of Hygiene and Tropical Medicine, we will investigate opportunities for Nigerian researchers to network with other colleagues in West and Central Africa through the regional networks supported by IITA and others.

## CURRENT NATIONAL PARTNERS

- **CGIAR entities:** Bioversity International, International Maize and Wheat Improvement Center (CIMMYT), IITA, ILRI, IFPRI, HarvestPlus, and WorldFish
- **Development implementers:** Africa Agriculture Technology Foundation, AgResults, Development Dynamics, Dominican Centre for Human Resources Development, Forward Africa, Global Alliance for Improved Nutrition (GAIN), Helen Keller International, Human Empowerment and Development Project (HEMADEP), JSI Research & Training Institute, Inc., Oxfam, Redeemed AIDS Programme Action Committee (RCCG/RAPAC), Save the Children, Senator Adeyemo Women Empowerment Cooperative
- **NARS:** Agriculture Development Programs (ADP) – in multiple states, Institute for Agricultural Research (IAR)

– Zaria, Institute of Agricultural Research & Training (IAR&T), National Agricultural Extension and Research Liaison Services (NAERLS), National Horticultural Research Institute (NIHORT), and National Root Crops Research Institute (NRCRI)

- **Policymakers:** Federal Ministry of Agriculture and Rural Development, Federal Ministry of Education, Federal Ministry of Health, National Agency for Food And Drug Administration and Control, National Bureau of Statistics, National Malaria Control Program, and National Orientation Agency
- **Research/Academic:** Ahmadu Bello University, Akwa Ibom State University, Federal College of Agriculture – Abeokuta and Akure, Obafemi Awolowo University, University of Ibadan, University of Maiduguri, and University of Uyo
- **Value Chain:** Cassava Growers Association of Nigeria, Commercial Agriculture Development Projects, ENVOY Agricultural Services, Manufacturer Association of Nigeria, Nigerian Export Promotion Council, Niji Farms Ltd., Poultry Association of Nigeria, and at least 24 different national agriculture enterprises and companies participating in AgResults (not listed here)
- **Other:** Damisa Gurus, Justice Development and Peace Commission (JDPC), National Television Authority (NTA), Radio Nigeria, and Smile Africa Network

## PLANS FOR PHASE II, AS DESCRIBED IN A4NH PRE-PROPOSAL

All flagships except for Improving Human Health and Integrated Programs to Improve Nutrition plan to conduct research activities in Nigeria in Phase II, although specific activities have not yet been identified. On a high level, the beneficiary outcomes A4NH research is expected to contribute to achieving in Nigeria with partners are summarized in Table 2, below.

TABLE 1. A4NH's development goals for Nigeria in Phase II

Beneficiary outcomes (impacts)	Target development outcomes (or IDOs)	Key assumptions
<b>Improved nutrition by consumption of biofortified crops</b>	Improved diets for poor and vulnerable people	Households reached with planting material will grow and consume the crop, and market excess production; mainstreaming efforts will expand available varieties and financing to additional countries; HarvestPlus and its partners will be able to offer sufficient technical assistance to promote adoption and consumption
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	

<b>Households adopt improved, biofortified varieties</b>	Increased productivity	Households reached with planting material will grow and adopt biofortified varieties, and will continue to have access to biofortified planting materials as needed. See above for assumption re: mainstreaming.
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
	Enabling environment improved	
<b>Reduced exposure to foodborne hazards</b>	Enhanced smallholder market access	Problems identified have significant impacts on human health; proposed interventions can significantly improve human health or are justified by other benefits (trade, livelihoods, animal welfare); solutions (innovations, policies, and programs) proposed can be adopted at scale and in ways that ensure equitable access to the poor, smallholders, men and women, and the informal sector
	Improved food safety	
	Equity and inclusion achieved	
	Enabling environment improved	
<b>Countries improve food systems for healthier diets</b>	Increased incomes and employment	Incentives to improve food systems for healthier diets can be identified for different groups of actors (policymakers, private sector, consumers); stakeholders (researchers and enablers) will be committed and able to improve the quality of national data on diets; innovations and interventions will be acceptable to intended beneficiaries; strategic partners can be identified and engaged for scale up
	Improved diets for poor and vulnerable people	
	Mitigation and adaptation achieved (in collaboration with CCAFS)	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Countries improve the enabling environment for nutrition and health</b>	All IDOs under SLO2	Champions identified among key decision-makers find ways to take forward key messages within their own sector and beyond; decisionmakers are incentivized to improve the way they find, appraise and use evidence; policymakers and practitioners are motivated to reduce undernutrition and poverty; stakeholders across and within sectoral domains (agriculture, nutrition, health, gender) engage with A4NH evidence.
	Mitigation and adaptation achieved (in collaboration with CCAFS)	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	

**TABLE 2. A4NH's proposed CGIAR relationships in Phase II**

<b>Planned CGIAR entities working with A4NH in Phase II</b>	<b>Type of coordination mechanisms facilitated by A4NH flagships in Phase II</b>	<b>What A4NH will do and what it expects to offer in Phase II</b>
All CRPs in the country through site integration++	<p>Community of Practice/Docking Stations (for all CRPs), hosted by Food Systems for Healthier Diets</p> <p>Docking Stations for aflatoxins activities, led by Food Safety</p> <p>Convening Platform (for all CRPs), led by Supporting Country Outcomes through Research on Enabling Environments</p>	<p>All flagships except Improving Human Health and Integrated Programs to Improve Nutrition will be working in Nigeria</p> <p>A4NH expects to work through staff on the ground, project investments, and the IFPRI country office</p>

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The CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) responds to the global challenge of improving food security, nutrition, and health. CGIAR has a long legacy of building global food security, but ensuring consumers can access enough healthy, affordable, and safe food requires a perspective that encompasses far more than agricultural productivity.

In August 2015, A4NH submitted a pre-proposal for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes what A4NH is building on in Tanzania for its second phase.

## FEATURED A4NH PROJECTS BY FLAGSHIP

### FLAGSHIP 2: FOOD SAFETY

The flagship on Food Safety conducts targeted research on specific food safety issues as well as by generating evidence on what approaches are likely to work and how an enabling environment for innovative approaches to food safety can be achieved and sustained in informal markets. The high priority food safety issues for Phase II are biological contamination of perishable products and aflatoxins in staple crops. The flagship will scale-up successfully piloted solutions alongside rigorous monitoring and impact evaluations to increase understanding of the incentives, capacity, and enabling policy environment required for successful delivery at scale. At the same time, it will continue to generate evidence on food safety risks, and their assessment, communication, and management. In close collaboration with the CRPs covering livestock, fish, and grain legumes, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia.

### Projects that informed Flagship 2 work in Tanzania

- **Development of policies for aflatoxin mitigation in the East African Community countries**

Led by IITA and funded by USAID and A4NH this work involved coordinating the development of a set of technical papers on situational analysis, scientific basis for aflatoxin control, and policy recommendations for the East African Community (EAC). Through the USAID-funded project, Aflatoxin Policy and Programs for the East Africa Region (APPEAR), IITA and partners developed 13 technical papers that fell into six clusters: (i) communication, (ii)

health, (iii) agriculture, (iv) alternative uses and disposal systems, (v) animal health, and (vi) impacts on trade. The technical papers address areas of standards for food and feed, impacts on human and animal health, biocontrol, post-harvest handling, alternative uses and disposal systems, economic impact on trade, and communication strategies. These technical papers were migrated into policy briefs for EAC Ministerial Councils, to address policy and capacity development across the health, agriculture, trade, environment, and communications sectors for East Africa. The APPEAR project also includes a local capacity development component focused on fostering increased technical expertise and leadership skills among East African nationals responsible for aflatoxin abatement activities across the health, agriculture, trade, environment and communications sectors.

- **Capacity and action for aflatoxin reduction in East Africa (CAAREA)**

This project led by the Biosciences eastern and central Africa International Livestock Research Institute (BeCA - ILRI) Hub helps build laboratory-based capacity for aflatoxins and provide important evidence characterizing the program in East Africa. Not only does this establish aflatoxin research capacity and a platform at BeCA (based in Nairobi), it characterizes maize fungi from Kenya and Tanzania, identifies maize germplasm resistant to aflatoxin, and tests modelling as a potential predictive tool. The project is expected that with increased knowledge and capacity, breeders in East Africa will affect subsequent changes to maize breeding programs in the region. This work receives funding from A4NH, AusAid, CSIRO and ABCF Fellowship which is also funded by the Swedish, British, Australian governments, BMGF, and the Syngenta Foundation for Sustainable Agriculture.



Fisherwoman with her family in Bagamoyo, Tanzania. (Credit: S.Stacey/WorldFish)

- **Evaluation of aflatoxin and fumonisin contamination along maize and bean value chains in Tanzania**

Led by IITA and funded by USAID and A4NH, this project is under the umbrella of Africa RISING Feed the Future, “Research in Sustainable Intensification in the sub humid maize-based cropping systems of Babati, Tanzania.” It identifies and deploys control interventions to mitigate mycotoxin contamination in six target villages of Babati.

- **Enhancing child nutrition and livelihoods of rural households through post-harvest value chain technology improvements in groundnuts**

Led by ICRISAT and funded by the McKnight Foundation and A4NH, this work has several aims to address postharvest losses of groundnuts due to aflatoxins and promote groundnut-based weaning foods. Recognizing that gender issues are important considerations in the groundnut value chains in Tanzania, the project strives to improve productivity and reduce daily labor borne by women, through utilization of more efficient and rapid post-harvest and food-processing technologies for groundnuts. A related objective is to empower farm families, especially women and youth, and their associations or producer organizations in ways that enable them to strengthen their links to markets, manage their farms as enterprises, learn how to find needed information and external support, identify more beneficial ways to associate, and better defend their interests in the future. The project also has a capacity building component focused on transferring technical and manufacturing expertise to local organizations.

- **Multiple activities to manage and reduce aflatoxin contamination in groundnuts**

ICRISAT has several activities in Tanzania to manage and reduce aflatoxin and raise awareness among farmers, which are funded by A4NH. Some of their work includes research on pre- and post-harvest integrated management approaches and training groundnut farmers in how to implement the different approaches. Another stream of work includes testing the robustness of a lateral flow device and field sample extraction protocols for aflatoxin detection at points-of-sale for groundnuts in east and southern Africa. Researchers are identifying reliable laboratory assays for characterization of toxigenic and atoxigenic *A. flavus* strains and developing aflatoxin mitigation and decisionmaking tools for policymakers. ICRISAT works with NARS to develop the diagnostic capacity of national researchers in order to determine the effects of factors on aflatoxin contamination and to characterize *A. flavus* and other fungi from *Aspergillus* spp. for toxin production and to raise community awareness about aflatoxins.

- **Risk based approaches to improving food safety and market access in smallholder meat, milk, fish value chains in four African countries (Safe Food Fair Food)**

Led by ILRI and funded by BMZ, GIZ, and A4NH, this project’s ultimate goal is to improve the livelihoods of poor producers and consumers by reducing health risks and increasing the livelihood benefits associated with meat, milk and fish value chains. Its purpose is furthering research into the practical application of risk analysis and economic and social methods by food safety stakeholders and value chain actors, improving food safety and market participation of the poor in informal markets for live-stock products in sub-Saharan Africa. It pioneers and tests a practical, whole-value-chain application of risk-based approaches to food safety in selected countries and livestock value chains which are the focus of the CRP on Livestock & Fish. It develops, tests, and communicates technologies and methods to improve food safety and enhance smallholder market access. At regional scale, it works through food safety ‘champions’ to better incorporate risk analysis and economic valuation methods into food safety policy, commercial practice and veterinary education. In Tanzania, the project focuses on dairy value chains.

- **Rapid assessment of potential benefits to human health and nutrition from research on livestock and fish market chains in Asia and Africa (RIA)**

Led by ILRI and funded by the Australian Centre for International Agricultural Research (ACIAR) and A4NH, this project develops tools to conduct a rapid assessment of the potential benefits to human health and nutrition from changes to livestock and fish market chains. The project teams develop and test methods and approaches for assessing value chains in relation to nutrition and health and conduct assessments of food quality and safety research priorities in value chains with high potential for pro-poor transformation and of interest to CGIAR and ACIAR. In Tanzania, the project focuses on dairy value chains.

### FLAGSHIP 3: FOOD SYSTEMS FOR HEALTHIER DIETS

Food Systems for Healthier Diets aims to contribute to the goal of healthier diets for poor and vulnerable populations through identifying and enabling interventions and innovations by private, public, and civil society actors in national and sub-national food systems. Food systems will be analyzed from a diet and nutrition outcome perspective, focused on both by filling gaps and by reducing excesses in unhealthy diet components.

### **Projects that informed Flagship 3 work in Tanzania**

- **Developing Agrobiodiversity-based Strategies: Alleviation of Micronutrient and Protein Deficiencies among Smallholder Households in Banana Growing Regions of East Africa**

Led by Bioversity International and funded by the Austrian Development Agency, HarvestPlus, and A4NH, the goal of this project is to help children aged 6-59 months from rural banana-dependent smallholder households of East Africa to consume diversified



diets with sufficient micronutrients and protein through incorporation of greater agrobiodiversity in their family farms. The work includes several activities including a preliminary and detailed analysis of dietary sufficiency for young children (6-59 months) and for the overall household, followed by participatory household experimentation groups designed to develop and promote agrobiodiversity-based strategies to increase access to nutritious and diversified plant and animal food sources. The project pilots novel food preparation and combination methods for foods consumed by young children in order to promote more diverse food sources with enhanced content of protein, vitamin A and iron and optimized retention and bioaccessibility. In partnership with a community learning alliance, they also develop strategies for outreach knowledge networks and partnerships.

- **Enhanced adoption of harmonized standards in Eastern and Central Africa**

Led by IITA and funded by A4NH and the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), this project aims to enhance the access and availability of information on harmonized East African standards for cassava and potato and to enhance the capacity of different value chain actors in the application of the harmonized standards to improve the quality and safety of marketed products. The project also includes activities to increase the effectiveness of monitoring and regulation of compliance to standards.

#### FLAGSHIP 5: SUPPORTING COUNTRY OUTCOMES THROUGH INTEGRATED PROGRAMS AND POLICIES

This flagship responds to demand for evidence from policy-makers and program implementers. Both groups recognize the importance of agriculture within a multi-sectoral approach to improve nutrition and health, but need more evidence on the impacts of particular types of programs and policies, as well as on what constitutes an effective enabling environment and how this can be achieved and sustained. Key accomplishments from Phase I include strong partnerships with countries, global and regional organizations (e.g. SUN, CAADP) and NGOs and a solid portfolio of evaluations designed to look at the impacts of promising integrated agriculture-nutrition interventions across contexts, scales and types of implementers. The flagship will also contribute to the institutionalization of evidence-based, cross-sectoral policy-making and programming by developing methods and tools and building capacity of other researchers and evaluators, both inside and outside the CGIAR, to do high-quality conceptual and empirical research on agriculture-nutrition-health linkages.

#### **Projects that informed Flagship 5 work in Tanzania**

- **Creating Homestead Agriculture for Nutrition and Gender Equity (CHANGE)**

Led by IFPRI and funded by DFATD and A4NH, the overall goal of this project is to design, implement, monitor and evaluate a broad-scale Enhanced Homestead Food Production (EHFP) model in two countries in Sub-Saharan Africa – Burkina Faso and Tanzania - that improves the nutritional status of infants and young children and their mothers through homestead food production and nutrition behavior change using the Essential Nutrition Actions (ENA) framework. The EHFP model is expected to improve child and maternal nutrition and health by increasing access to nutrient-rich fruit, vegetable and animal-source foods; diversifying diets; increasing household incomes; improving intra-household allocation of re-sources to favor women; empowering women with sound knowledge, attitudes, practices and greater control over re-sources; improving nutrient intakes and infant and young child feeding and care practices; and increasing the use of preventive health services. IFPRI leads the program evaluation, which helps to explain the impact of the EHFP model in Tanzania on anemia levels iron status among pre-school aged children, child growth, and infant and young child feeding (IYCF) practices and maternal health, hygiene and nutrition-related knowledge.

#### **OTHER A4NH SUPPORT AND ACTIVITIES**

We do not expect any projects in Tanzania under the flagship on Improving Human Health, but we will investigate opportunities for Tanzanian researchers to network with other colleagues in East and Southern Africa through regional networks and national partners, including the Southern African Centre for Infectious Disease Surveillance (SACIDS) and the Sokoine University of Agriculture. Improving Human Health will be coordinated by ILRI together with the London School of Hygiene and Tropical Medicine and its research will focus on three main areas: agro-ecosystem change on health outcomes, zoonotic and emerging diseases and global agriculture-health challenges such as anti-microbial resistance.

#### **CURRENT NATIONAL PARTNERS**

- **CGIAR entities:** Bioversity International, CIMMYT, ICRISAT, IFPRI, IITA, ILRI, WorldFish, CRP on Livestock & Fish
- **Development implementers:** Farm Concern International, Helen Keller International, MoreMilkIT project, NAFKA Staples Value Chain activity (USAID and ACIDI-VOCA)
- **NARS:** Agricultural Research Institute (ARI) – multiple substations, Sahelian Research Institute - Arusha
- **Policymakers:** African Union Inter-African Bureau for Animal Resources (AU-IBAR), East African Community

(EAC), IGAD Center for Pastoral Areas and Livestock Development (ICPALD), Partnership for Aflatoxin Control in Africa (PACA), Ministry of Health and Social Welfare, Ministry of Livestock and Fisheries Development, Kiteto and Kongwa District councils

- **Research/Academic:** Sokoine University of Agriculture
- **Value Chain:** milk hawkers, consumers, processors, traders, transporters, market officials, retailers, millers, livestock marketing councils.

## PLANS FOR PHASE II, AS DESCRIBED IN A4NH PRE-PROPOSAL

All flagships except for Biofortification and Improving Human Health have specific plans to conduct research activities in Tanzania in Phase II, although specific activities have not yet been identified. On a high level, the beneficiary outcomes A4NH research is expected to contribute to achieving in Tanzania with partners are summarized in Table 1, below. We will not be able to achieve these outcomes alone. In Table 2, we describe how we anticipate working with other CGIAR entities participating in the site integration ++ process in order to achieve these development goals.

TABLE 1. A4NH's development goals for Tanzania in Phase II

Beneficiary outcomes (impacts)	Target development outcomes (or IDOs)	Key assumptions
<b>Reduced exposure to foodborne hazards</b>	Enhanced smallholder market access	Problems identified have significant impacts on human health; proposed interventions can significantly improve human health or are justified by other benefits (trade, livelihoods, animal welfare); solutions (innovations, policies, and programs) proposed can be adopted at scale and in ways that ensure equitable access to the poor, smallholders, men and women, and the informal sector
	Improved food safety	
	Equity and inclusion achieved	
	Enabling environment improved	
<b>Countries improve food systems for healthier diets</b>	Increased incomes and employment	Incentives to improve food systems for healthier diets can be identified for different groups of actors (policy-makers, private sector, consumers); stakeholders (researchers and enablers) will be committed and able to improve the quality of national data on diets; innovations and interventions will be acceptable to intended beneficiaries; strategic partners can be identified and engaged for scale up
	Improved diets for poor and vulnerable people	
	Mitigation and adaptation achieved	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Successful and cost-effective integrated nutrition-sensitive programs designed, implemented, scaled-up and evaluated</b>	Increased incomes and employment	Results generated from evaluation activities are useful and relevant and have clear operational implications for implementers who have the capacity and resources to use them; programs that are found to be cost-effective are funded and scaled up, achieving high coverage and high quality to achieve expected results
	Improved diets for poor and vulnerable people	
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
<b>Countries improve the enabling environment for nutrition and health</b>	All IDOs under SLO2	Champions identified among key decision-makers find ways to take forward key messages within their own sector and beyond; decisionmakers are incentivized to improve the way they find, appraise and use evidence; policymakers and practitioners are motivated to reduce undernutrition and poverty; stakeholders across and within sectoral domains (agriculture, nutrition, health, gender) engage with A4NH evidence.
	Mitigation and adaptation achieved	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	

**TABLE 2. A4NH's proposed CGIAR relationships in Phase II**

Planned CGIAR entities working with A4NH in Phase II	Type of coordination mechanisms facilitated by A4NH flagships in Phase II	What A4NH will do and what it expects to offer in Phase II
To be determined based on CGIAR coordination arrangements	<p>Community of Practice/Docking Stations (for all CRPs), hosted by Food Systems for Healthier Diets</p> <p>Docking Stations for aflatoxin and ASF value chain activities, led by Food Safety</p> <p>Convening Platform (for all CRPs), led by Supporting Country Outcomes through Integrated Programs and Policies</p>	<p>All flagships except Biofortification and Improving Human Health will be working in Tanzania</p> <p>A4NH expects to work through staff on the ground, project investments, and the IITA country office</p>

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In August 2015, A4NH submitted a pre-proposal for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes what A4NH is building on in Vietnam for its second phase.

## ACTIVE A4NH PROJECTS IN 2015 BY FLAGSHIP

### FLAGSHIP 1: BIOFORTIFICATION

Biofortification builds on the strong track record of the HarvestPlus program. During Phase I of A4NH, HarvestPlus transitioned from development to delivery phase. During Phase II, the flagship will deliver outcomes at scale (reaching 20 million farm households by 2020) and conduct research to fill key evidence gaps and to learn lessons from delivery for future research and scaling. As part of building an enabling environment for biofortification in the future, the flagship will engage in policy analysis and advocacy at national and international levels and build capacity of key research and development partners to mainstream biofortification in their research and programming. HarvestPlus has not conducted any major activities in Vietnam to date, but it is planning to test and release zinc rice during Phase II.

### FLAGSHIP 2: FOOD SAFETY

The flagship on Food Safety conducts targeted research on specific food safety issues as well as by generating evidence on what approaches are likely to work and how an enabling environment for innovative approaches to food safety can be achieved and sustained in informal markets. The high priority food safety issues for Phase II are biological contamination of perishable products and aflatoxins in staple crops. The flagship will scale-up successfully piloted solutions alongside rigorous monitoring and impact evaluations to increase understanding of the incentives, capacity, and enabling policy environment required for successful delivery at scale. At the same time, it will continue to generate

evidence on food safety risks, and their assessment, communication, and management. In close collaboration with the CRPs covering livestock, fish, and grain legumes, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia. Vietnam will be a priority country for food safety research in Phase II, particularly around risks associated with perishable foods such as vegetables and animal source foods. The flagship team will engage a number of national partners as well as those working with the Global Food Safety Partnership (GFSP) of the World Bank.

### Projects that informed Flagship 2 work in Vietnam

- **Rapid assessment of potential benefits to human health and nutrition from research on livestock and fish market chains in Asia and Africa (RIA)**

Led by ILRI and funded by the Australian Centre for International Agricultural Research (ACIAR) and A4NH, this project developed and tested methods and approaches for assessing value chains in relation to nutrition and health and conducted assessments of food quality and safety research priorities in value chains with high potential for pro-poor transformation and of interest to CGIAR and ACIAR. The project officially ended in 2013, but research teams continue to analyze data that was collected. In Vietnam, the research teams focused the rapid assessment on pork value chains.



Farmers in Hoa Binh Province. NW Vietnam. Credit: N.Palmer/CIAT



- **Reducing disease risks and improving food safety in small pig value chains in Vietnam (PigRisk)**

Funded by ACIAR and A4NH, PigRisk aims to improve the livelihoods of the rural and urban poor in Vietnam by reducing the disease risks associated with pig value chains. The research team, led by ILRI, assesses the impacts of pork-borne diseases on human health and the livestock sector, and identifies critical points for risk management. The project develops and tests incentive-based innovations to improve the management of animal and human health risks in smallholder pig value chains.

- **Scoping study to evaluate the potential of integrated indigenous pig systems to improve livelihoods and safe pork consumption for poor ethnic minority smallholders in the Central Highlands of Vietnam**

This cross-CGIAR project with the CRPs on A4NH, Livestock and Fish, and Humidtropics, plus ILRI and CIAT, is designed to assess food safety hazards and zoonoses in indigenous pig populations, including the awareness of butchers and pig farmers of risks from zoonoses, particularly *Taeniasis* and *Trichinellosis*. The research team provides baseline information on the presence of these diseases in native slaughter pigs. Results from the project can inform future in-depth research topics on food safety.

- **National task force of risk assessment for food safety management in Vietnam**

With funds from A4NH and support from ILRI and other partners, a task force was established in 2013 to build capacity of decisionmakers and national researchers in Vietnam to use risk-based approaches for food safety management. Bringing together risk assessment experts from universities and research institutes as well as representatives from the Ministry of Health and the Ministry of Agriculture and Rural Development (MARD), the task force develops training courses on advanced risk assessment for task force members as well as for veterinary staff from the Department of Animal Health in MARD. To date, the task force has conducted a series of case studies to characterize the health risks associated with vegetables and fish grown and caught in wastewater, ready-to-eat vegetable and noodle soup, and antibiotic residues in pork.

### **FLAGSHIP 3: FOOD SYSTEMS FOR HEALTHIER DIETS**

Food Systems for Healthier Diets aims to contribute to the goal of healthier diets for poor and vulnerable populations through identifying and enabling interventions and innovations by private, public, and civil society actors in national and sub-national food systems. Food systems will be analyzed from a diet and nutrition outcome perspective, focused on both by filling gaps and by reducing excesses in unhealthy diet components. Vietnam will be one of the four focus countries for research on national and subnational food systems.

### **Projects that informed Flagship 3 work in Vietnam**

- **Nutrition-sensitive landscapes pilots**

This cross-CRP initiative applies a Nutrition-Sensitive Landscapes (NSL) approach in three pilot sites in Kenya, Vietnam, and Zambia. The research team represents A4NH and the CRP on Humid Tropics and Aquatic Agricultural Systems (AAS). The NSL approach considers the diverse interactions and interconnectivity within a given landscape to optimize the multiple goals of food and nutrition security, sustainable use of natural resources and conservation of biodiversity, both for human health and environmental health. Some of the questions the pilots seek to answer are: What is the relationship between ecosystems, agricultural management and human nutrition in various settings? How does this relationship change over time when landscapes are going through a transition, e.g., agricultural intensification, from subsistence to commercial agriculture, or rural to urban migration? Lastly, the pilots can provide more information on how landscapes, their ecosystems, biodiversity and the services it provides, can be managed for human nutrition, and other components of human well-being and environmental sustainability, and identify potential game changers that can break the vicious cycle of poor agricultural management, environmental degradation and human nutrition.

### **FLAGSHIP 4: IMPROVING HUMAN HEALTH**

Improving Human Health will assess and manage health risks created by agriculture in order to improve human health and agricultural productivity. Research will contribute to innovation in three main areas: diseases in agricultural landscapes, emerging and neglected zoonotic diseases, and global challenges linking agriculture and health. In Phase II, we propose a new joint partnership arrangement co-convened by the London School of Hygiene and Tropical Medicine and the International Livestock Research Institute, thus bridging agriculture and public health research to identify key opportunities for integrated actions that improve human health. Priorities for cross-sectoral research include health effects of ecosystem changes (such as large scale agricultural water use), shared disease risks and their control between people and animals, and opportunities to increase health benefits by co-locating and aligning health and agriculture interventions. We also note some key emerging challenges, such as antimicrobial resistance and chemical resistance, in which coordinated health and agriculture actions are critical.

### **Projects that informed Flagship 4 work in Vietnam**

- **Ecosystem approaches to the better management of zoonotic emerging infectious diseases in Southeast Asia (EcoZD)**

The EcoZD project was a four year project in six Southeast Asian countries, including Vietnam. Led by the International Livestock

Research Institute (ILRI) and funded by the International Development Research Centre, EcoZD was designed to increase the knowledge and skills of Southeast Asian researchers and implementers to prevent and control zoonotic diseases by using a novel Ecohealth approach. Since the project ended in 2013, A4NH has provided funds to help continue the capacity building efforts in the region, through generation of case studies and training at various levels, including universities, field teams, and extension services.

- **Surveillance and early warning systems for climate sensitive diseases in Vietnam and Laos (Pestforecast)**

Funded by CCAFS and A4NH, Pestforecast develops tools to forecast climate-sensitive animal and plant diseases in Vietnam and Laos that will help livestock keepers, rubber and maize planters to prepare and avoid diseases. More specifically, this project, led by ILRI, develops and disseminates maps of hotspots for climate-sensitive animal and zoonotic diseases, develops and pilots a real-time seasonal prediction system for Japanese encephalitis and leptospirosis in people and animals, and explores the potential for weather-based forecasting for aflatoxin mitigation in Vietnam.

### CURRENT NATIONAL PARTNERS

- **CGIAR entities:** Bioversity International, CIAT, ICRISAT, IFPRI, IITA, ILRI, IRRI, WorldFish
- **Policymakers:** Department of Animal Health; Ministry of Agriculture and Rural Health; Ministry of Health; Vietnam Food Administration

- **Research/Academic:** Hanoi School of Public Health; Institute of Meteorology, Hydrology and Environment; Institute for Social and Medical Studies; Institute For Social Development Studies; Institute of Environmental Health and Sustainable Development of the Vietnam Union of Science and Technology Associations; National Institute of Animal Science; National Institute of Nutrition; Nong Lam University; Pasteur Institute, Ho Chi Minh City; Research Institute for Oil and Oil Plants; Tay Nguyen University; Vietnam National University of Agriculture
- **Other:** HealthBridge Foundation of Canada

### PLANS FOR PHASE II, AS DESCRIBED IN A4NH PRE-PROPOSAL

All flagships except for Supporting Country Outcomes through Integrated Programs and Policies have specific plans to conduct research activities in Vietnam in Phase II, although specific activities have not yet been identified. On a high level, the beneficiary outcomes A4NH research is expected to contribute to achieving in Vietnam with partners are summarized in Table 1, below. We will not be able to achieve these outcomes alone. In Table 2, we describe how we anticipate working with other CGIAR entities participating in the site integration ++ process in order to achieve these development goals.

TABLE 1. A4NH's development goals for Vietnam in Phase II

Beneficiary outcomes (impacts)	Target development outcomes (or IDOs)	Key assumptions
<b>Improved nutrition by consumption of biofortified crops</b>	Improved diets for poor and vulnerable people	Households reached with planting material will grow and consume the crop, and market excess production; mainstreaming efforts will expand available varieties and financing to additional countries; HarvestPlus and its partners will be able to offer sufficient technical assistance to promote adoption and consumption
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Households adopt improved, biofortified varieties</b>	Increased productivity	Households reached with planting material will grow and adopt biofortified varieties, and will continue to have access to biofortified planting materials as needed. See above for assumption re: mainstreaming.
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
	Enabling environment improved	
<b>Reduced exposure to foodborne hazards</b>	Enhanced smallholder market access	Problems identified have significant impacts on human health; proposed interventions can significantly improve human health or are justified by other benefits (trade,
	Improved food safety	
	Equity and inclusion achieved	

	Enabling environment improved	livelihoods, animal welfare); solutions (innovations, policies, and programs) proposed can be adopted at scale and in ways that ensure equitable access to the poor, small-holders, men and women, and the informal sector
<b>Countries improve food systems for healthier diets</b>	Increased incomes and employment	Incentives to improve food systems for healthier diets can be identified for different groups of actors (policy-makers, private sector, consumers); stakeholders (researchers and enablers) will be committed and able to improve the quality of national data on diets; innovations and interventions will be acceptable to intended beneficiaries; strategic partners can be identified and engaged for scale up
	Improved diets for poor and vulnerable people	
	Mitigation and adaptation achieved	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Reduced risks of emerging pandemics from animals, of agriculture-associated diseases of poor populations, of health implications of ecosystem change</b>	Improved human and animal health through better agricultural practices	Innovations and interventions will be acceptable and accessible for intended beneficiaries; program implementers (government, civil society and communities can design and implement interventions for key target groups that are scalable and sustainable.
	More sustainably managed agro-ecosystems	
	Mitigation and adaptation achieved (in collaboration with CCAFS)	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Global agri-health challenges addressed</b>		

**TABLE 2. A4NH's proposed CGIAR relationships in Phase II**

Planned CGIAR entities working with A4NH in Phase II	Type of coordination mechanisms facilitated by A4NH flagships in Phase II	What A4NH will do and what it expects to offer in Phase II
To be determined based on CGIAR coordination arrangements	Community of Practice/Docking Stations (for all CRPs), hosted by Food Systems for Healthier Diets  Docking Station for livestock value chain activities, led by Food Safety	All flagships except Supporting Country Outcomes through Integrated Programs and Policies will be working in Vietnam  A4NH expects to work through staff on the ground, project investments, and the CIAT country office

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The CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) responds to the global challenge of improving food security, nutrition, and health. CGIAR has a long legacy of building global food security, but ensuring consumers can access enough healthy, affordable, and safe food requires a perspective that encompasses far more than agricultural productivity.

In August 2015, A4NH submitted a pre-proposal for a second, six-year phase of the program to begin in 2017. A full proposal will be submitted in March 2016 for approval. This brief describes what A4NH is building on in Zambia for its second phase.

## FEATURED A4NH PROJECTS BY FLAGSHIP

### FLAGSHIP 1: BIOFORTIFICATION

Biofortification builds on the strong track record of the HarvestPlus program. During Phase I of A4NH, HarvestPlus transitioned from development to delivery phase. During Phase II, the flagship will deliver outcomes at scale (reaching 20 million farm households by 2020) and conduct research to fill key evidence gaps and to learn lessons from delivery for future research and scaling. As part of building an enabling environment for biofortification in the future, the flagship will engage in policy analysis and advocacy at national and international levels and build capacity of key research and development partners to mainstream biofortification in their research and programming.

Zambia is one of the HarvestPlus target countries. HarvestPlus has a large and dynamic country team working with partners to develop and deliver biofortified crops in innovative ways.

### Projects that informed Flagship 1 work in Zambia

- **Development and testing of innovations for improving nutrition**

Led by IITA and funded by CIAT and A4NH, this research focuses on enhancing the nutrient content of staple food crops such as maize, cassava, plantain, and cowpea. The strategy is to develop varieties with enhanced nutrient content and reduced anti-nutritional factors to enhance utilization of nutrients. For plantains and cooking bananas, breeding research focuses on increasing the content of provitamin A, vitamin C, and potassium. For maize,

researchers develop inbred lines that combine high levels of provitamin A with high levels of methionine and cysteine in order to develop hybrids and synthetics with multiple nutrient content

### FLAGSHIP 2: FOOD SAFETY

The flagship on Food Safety conducts targeted research on specific food safety issues by generating evidence on what approaches are likely to work and how an enabling environment for innovative approaches to food safety can be achieved and sustained in informal markets. The high priority food safety issues in this flagship are biological contamination of perishable products and aflatoxins in staple crops. The flagship will scale-up successfully piloted solutions alongside rigorous monitoring and impact evaluations to increase understanding of the incentives, capacity, and enabling policy environment required for successful delivery at scale. At the same time, it will continue to generate evidence on food safety risks, and their assessment, communication, and management. In close collaboration with the CRPs covering livestock, fish, and grain legumes, this flagship will reach tens of millions of consumers, millions of farmers, and thousands of market agents working in priority countries in Africa and Asia.



Woman cooking in the Barotse floodplain of Zambia. Photo credit: E.Hermanowicz/ Bioversity International



## Projects that informed Flagship 2 work in Zambia

- **AAS Barotse: Nutrition and Food Safety**

This cross-CRP project with the CRP on Aquatic Agricultural Systems (AAS) is funded by A4NH and implemented by a team of scientists from Bioversity International, ILRI, and WorldFish. For prioritized foods and food safety hazards, the team measures levels of contamination with disease causing agents at different points along the value chain, followed by assessing the effect of interventions on contamination levels using this data to estimate disease reduction and impact if interventions were applied at scale. The priority groups in this study are mothers and infants. One stream of work examines food safety of dried fish as part of a strategy for improving diets.

- **Effects of aflatoxin exposure on nutritional status for children aged 9-24 months in Chipata and Monze districts of Zambia, the critical role of homemade complementary foods**

Funded by CARE and A4NH and implemented by IITA, the goal of this project is to determine aflatoxin content of maize- and groundnut-based complementary foods for young children (9-24 months), assess the aflatoxin levels in the young children, and establish an association between consumption of contaminated maize- and groundnut-based complementary foods and the nutritional status of young children in Chipata and Monze districts.

- **Evaluation of aflatoxin in maize value chain in Zambia**

Led by IITA and funded by USAID and A4NH, this project is a component of the Partnership for Aflatoxin Control in Africa (PACA). It incorporates experiences and lessons learned from similar projects implemented by IITA and ICRISAT in East, West, and Southern Africa. Its objectives are to quantify the incidence of aflatoxin in maize and groundnut, and to estimate population densities and characterize *Aspergillus flavus* in Eastern Zambia and identify, with farmers, the best atoxigenic strains for biocontrol in maize and groundnut. The project aims to commercialize the best atoxigenic strains into a commercial product and engage in product stewardship and market development, nurture national capacity in aflatoxin research and monitoring, and create awareness on aflatoxin contamination. Lastly, the team investigates and promotes integrated management approaches against pre- and postharvest aflatoxin contamination and trains farmers in integrated management options, and evaluates the effectiveness of aflatoxin management in maize and groundnut, with a focus on biocontrol.

- **Evaluation of country-specific aflasafe™ biocontrol products for aflatoxin mitigation in farmer's fields**

IITA leads this activity funded by the Meridian Institute and A4NH to determine the value of the Zambian aflasafe™ product and promote its utilization amongst the private sector. A second

objective is to develop a business plan for commercializing aflasafe™ ZM01 and ZM02 in Zambia.

- **Multiple activities to manage and reduce aflatoxin contamination in groundnuts**

ICRISAT has several activities in Zambia to manage and reduce aflatoxin and raise awareness among farmers, which are funded by A4NH. Some of their work includes research on pre- and post-harvest integrated management approaches and training groundnut farmers in how to implement the different approaches. Another stream of work includes testing the robustness of a lateral flow device and field sample extraction protocols for aflatoxin detection at points-of-sale for groundnuts in east and southern Africa. Researchers identify reliable laboratory assays for characterization of toxigenic and atoxigenic *A. flavus* strains and develop aflatoxin mitigation and decisionmaking tools for policymakers. ICRISAT works with NARS to develop the diagnostic capacity of national researchers in order to determine the effects of factors on aflatoxin contamination and to characterize *A. flavus* and other fungi from *Aspergillus* spp. for toxin production and to raise community awareness about aflatoxin.

- **Partnership for Aflatoxin Control in Africa (PACA) projects - Expansion of biological control in Africa and testing of a large-scale manufacturing model for aflasafe™**

Led by IITA and funded by the Meridian Institute and A4NH, these projects serve several purposes. By building upon the relatively new demonstration-scale plant for aflasafe™ production in Nigeria, the project intends to adapt the manufacturing process and transfer the production technology to public and private sector investors in other countries in Africa, including Zambia, demonstrating that mass production of aflasafe™ is commercially viable.

## FLAGSHIP 3: FOOD SYSTEMS FOR HEALTHIER DIETS

The flagship on Food Systems for Healthier Diets aims to contribute to the goal of healthier diets for poor and vulnerable populations through identifying and enabling interventions and innovations by private, public, and civil society actors in national and sub-national food systems. Food systems will be analyzed from a diet and nutrition outcome perspective, focused on both by filling gaps and by reducing excesses in unhealthy diet components. The flagship builds on research on dietary assessment and methods for improving nutrition through value chains and places these in a broader agricultural, environmental, social, economic and political decisionmaking framework. In the long term, progress will be evaluated through improvements in diets, particularly for women, children, and vulnerable populations. Near-term progress will be measured through greater knowledge, awareness and systematic attention to diets and dietary transitions by

researchers, by strategic partners from the private sector and civil society, by policymakers, and consumers in target countries.

### Projects that informed Flagship 3 work in Zambia

- **Improve food quality and diets of nutritionally disadvantaged populations especially women and children**

Led by IITA, this project involves food consumption and nutrition studies to characterize the diets and nutritional status of women, children, and other vulnerable groups. Information is generated for researchers to use in the development of technologies that leverage the nutritional qualities and minimize the anti-nutritional qualities of processed foods. The team conducts consumer acceptability studies of new processed products, including research on ways to improve traditional processing and storage methods. The activities are funded by several donors, including A4NH, the International Fund for Agricultural Development (IFAD), USAID, and the Swedish International Development Cooperation Agency (Sida).

- **Nutrition-sensitive landscapes pilots**

This cross-CRP initiative applies a Nutrition-Sensitive Landscapes (NSL) approach in three pilot sites in Kenya, Vietnam, and Zambia. The research team represents A4NH and the CRP on Humid Tropics and Aquatic Agricultural Systems (AAS). The NSL approach considers the diverse interactions and interconnectivity within a given landscape to optimize the multiple goals of food and nutrition security, sustainable use of natural resources and conservation of biodiversity, both for human health, as well as environmental health. Some of the questions the pilots seek to answer are: What is the relationship between ecosystems, agricultural management and human nutrition in various settings? How does this relationship change over time when landscapes are going through a transition, e.g., agricultural intensification, from subsistence to commercial agriculture, or rural to urban migration? Lastly, the pilots provide more information on how landscapes, their ecosystems, biodiversity and the services they provide, can be managed for human nutrition, and other components of human well-being and environmental sustainability and identify potential game changers that can break the vicious cycle of poor agricultural management, environmental degradation and human nutrition.

### FLAGSHIP 5: SUPPORTING COUNTRY OUTCOMES THROUGH INTEGRATED PROGRAMS AND POLICIES

This flagship responds to demand for evidence from policymakers and program implementers. Both groups recognize the importance of agriculture within a multi-sectoral approach to improve nutrition and health, but need more evidence on the impacts of particular types of programs and policies, as well as on what constitutes an effective enabling environment and how this can be achieved and sustained. Key accomplishments from Phase

I include strong partnerships with countries, global and regional organizations (e.g. SUN, CAADP) and NGOs and a solid portfolio of evaluations designed to look at the impacts of promising integrated agriculture-nutrition interventions across contexts, scales and types of implementers. The flagship will also contribute to the institutionalization of evidence-based, cross-sectoral policy-making and programming by developing methods and tools and building capacity of other researchers and evaluators, both inside and outside the CGIAR, to do high-quality conceptual and empirical research on agriculture-nutrition-health linkages.

### Projects that informed Flagship 5 work in Zambia

- **Expanding policy research**

Led by IFPRI and funded by A4NH, this research addresses the need for and approaches to integration among the agriculture, nutrition, and health sectors, at both the program and policy levels. Leveraging Agriculture for Nutrition in East Africa (LANEA), (2013-2014 in Ethiopia, Kenya, and Uganda) sought to identify agriculture-nutrition linkages in three case study countries and explore the effect of the political context and institutional structures (government, districts and civil society organization) on leveraging agriculture for nutrition and in particular in relation to scaling up and expanding coverage in nutrition through agriculture and the broader agri-food system. Stories of Change (2015-2016 in Ethiopia, Zambia, Bangladesh, Nepal, and India) builds and expands on this work to foster and support experiential learning on how to address the challenge of undernutrition in different contexts. The project applies tools, methods and approaches in selected countries to better understand, engage with, influence and evaluate multisectoral action to reduce undernutrition.

- **Making agricultural innovations work for smallholder farmers affected by HIV/AIDS in southern Africa (MIRACLE)**

Funded by the Swedish International Development Agency (SIDA) and implemented by IITA, the MIRACLE project was a multi-year project operating in Malawi, Mozambique, Swaziland and Zambia. Its overall purpose was to improve the health and nutritional status, food security, and income of people with living and affected by HIV and AIDS (PLWHA). This integrated agriculture-nutrition project included promoting the production, consumption and marketing of nutritionally-enhanced crop and livestock products while strengthening capacity of stakeholders engaged in agricultural activities. It also had activities aimed at changing the enabling environment for agricultural and health policies.

- **RAIN: Realigning agriculture to improve nutrition**

The RAIN project aims to reduce the prevalence of stunting in children through integrated agriculture, health and nutrition interventions during the critical period from conception until 24 months of age by supporting effective agriculture interventions to increase year-round availability of and access to good-quality foods at household level through improved production, and to optimize health and care through delivery of social behavior change communication around optimal nutrition and health practices. The project is funded by Irish Aid and implemented by Concern Worldwide. IFPRI’s role is to evaluate the impact of the RAIN model, including monitoring process indicators to understand the intended impact pathways, and document and disseminate learning from the project at local, national and international levels. The evaluation assesses the impact of two different RAIN interventions on stunting among young children (24 months and older), on the availability of and access to a year-round supply of diverse and micronutrient-rich plant and animal source foods at household level, and on preventive and curative health and nutrition knowledge among caregivers.

#### CURRENT NATIONAL PARTNERS

- **CGIAR entities:** Bioversity International, CIFOR, CIMMYT, CIP, ICRISAT, IFPRI, IITA, ILRI, WorldFish, CRPs on Aquatic Agricultural Systems, HumidTropics, and Livestock & Fish
- **Development implementers:** CARE-Zambia, Civil Society Organisation on Scaling Up Nutrition (CSO-SUN), Concern Worldwide, Development Aid From People to People, Mumbwa Child Development Agency, Peace Corps-Zambia, Programme Against Malnutrition, USAID-Zambia, World Vision-Zambia

- **NARS:** Golden Valley Agricultural Research Trust (GART), Zambia Agriculture Research Institute (ZARI)
- **Policymakers:** Common Market For Eastern And Southern Africa (COMESA), Micronutrient Malnutrition Taskforce, Ministry of Agriculture and Cooperatives (including Department of Agriculture, Department of Fisheries, Department of Livestock, Department of Veterinary Services), Ministry of Health, National Food and Nutrition Commission of Zambia, Zambia Bureau of Standards
- **Research/Academic:** National Institute For Scientific And Industrial Research, Tropical Diseases Research Centre, Indaba Agricultural Policy Research Institute, US Department of Agriculture-Agricultural Research Service, University of Zambia
- **Value Chain:** Eastern Province Farmers’ Cooperative, EMVEST Farms, Kamano Seed, Land ‘O Lakes, ProfitPlus, SeedCo, Star Milling, Waka Waka Estates, Ltd., Zambia Seed Traders Association, ZamSeed, ZAGRA

#### PLANS FOR PHASE II, AS DESCRIBED IN A4NH PRE-PROPOSAL

All flagships except for Improving Human Health have specific plans to conduct research activities in Zambia in Phase II, although specific activities have not yet been identified. On a high level, the beneficiary outcomes A4NH research is expected to contribute to achieving in Zambia with partners are summarized in Table 1, below. We will not be able to achieve these outcomes alone. In Table 2, we describe how we anticipate working with other CGIAR entities participating in the site integration process in order to achieve these development goals.

TABLE 1. A4NH’s development goals for Zambia in Phase II

Beneficiary outcomes (impacts)	Target development outcomes (or IDOs)	Key assumptions
<b>Improved nutrition by consumption of biofortified crops</b>	Improved diets for poor and vulnerable people	Households reached with planting material will grow and consume the crop, and market excess production; mainstreaming efforts will expand available varieties and financing to additional countries; HarvestPlus and its partners will be able to offer sufficient technical assistance to promote adoption and consumption
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Households adopt improved, biofortified varieties</b>	Increased productivity	Households reached with planting material will grow and adopt biofortified varieties, and will continue to have access to biofortified planting materials as needed. See above for assumption re: mainstreaming.
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
	Enabling environment improved	
<b>Reduced exposure to foodborne hazards</b>	Enhanced smallholder market access	Problems identified have significant impacts on human health; proposed interventions can significantly improve human health or are justified by other benefits (trade,
	Improved food safety	

	Equity and inclusion achieved	livelihoods, animal welfare); solutions (innovations, policies, and programs) proposed can be adopted at scale and in ways that ensure equitable access to the poor, small-holders, men and women, and the informal sector
	Enabling environment improved	
<b>Countries improve food systems for healthier diets</b>	Increased incomes and employment	Incentives to improve food systems for healthier diets can be identified for different groups of actors (policy-makers, private sector, consumers); stakeholders (researchers and enablers) will be committed and able to improve the quality of national data on diets; innovations and interventions will be acceptable to intended beneficiaries; strategic partners can be identified and engaged for scale up
	Improved diets for poor and vulnerable people	
	Mitigation and adaptation achieved	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	
<b>Successful and cost-effective integrated nutrition-sensitive programs designed, implemented, scaled-up, evaluated</b>	Increased incomes and employment	Results generated from evaluation activities are useful and relevant and have clear operational implications for implements who have the capacity and resources to use them; programs that are found to be cost-effective are funded and scaled up, achieving high coverage and high quality to achieve expected results
	Improved diets for poor and vulnerable people	
	Equity and inclusion achieved	
	National partners and beneficiaries enabled	
<b>Countries improve the enabling environment for nutrition and health</b>	All IDOs under SLO2	Champions identified among key decision-makers find ways to take forward key messages within their own sector and beyond; decisionmakers are incentivized to improve the way they find, appraise and use evidence; policymakers and practitioners are motivated to reduce undernutrition and poverty; stakeholders across and within sectoral domains (agriculture, nutrition, health, gender) engage with A4NH evidence.
	Mitigation and adaptation achieved	
	Equity and inclusion achieved	
	Enabling environment improved	
	National partners and beneficiaries enabled	

TABLE 2. A4NH's proposed CGIAR relationships in Phase II

Planned CGIAR entities working with A4NH in Phase II	Type of coordination mechanisms facilitated by A4NH flagships in Phase II	What A4NH will do and what it expects to offer in Phase II
TBD based on CGIAR coordination arrangements developed	<p>Community of Practice/Docking Stations (for all CRPs), hosted by Food Systems for Healthier Diets</p> <p>Docking Stations for aflatoxin and fish value chain activities, led by Food Safety</p> <p>Convening Platform (for all CRPs), led by Supporting Country Outcomes through Research on Enabling Environments</p>	<p>All flagships except Improving Human Health will be working in Zambia</p> <p>A4NH expects to work through staff on the ground, project investments, and the IITA and WorldFish country offices</p>

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