RESEARCH PROGRAM ON
Agriculture for
Nutrition and Health

PROPOSAL FOR PHASE II
2017–2022

SECTION I
 SECTION I:
Introduction and CRP Narrative
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>3C</td>
<td>Capacity, Collaboration, Convening</td>
</tr>
<tr>
<td>A4NH</td>
<td>Agriculture for Nutrition and Health</td>
</tr>
<tr>
<td>ACIAR</td>
<td>Australian Center for International Agricultural Research</td>
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<tr>
<td>AFS-CRP</td>
<td>Agri-Food Systems - CGIAR Research Program</td>
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<tr>
<td>AIM</td>
<td>Amsterdam Initiative for Malnutrition</td>
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<tr>
<td>AMR</td>
<td>Antimicrobial resistance</td>
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<tr>
<td>ANGeL</td>
<td>Agriculture, Nutrition, and Gender Linkages</td>
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<tr>
<td>ANH</td>
<td>Agriculture, nutrition and health</td>
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<tr>
<td>ANLP</td>
<td>Africa Nutrition Leadership Programme</td>
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<td>ARENA</td>
<td>Advancing Research on Nutrition and Agriculture</td>
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<tr>
<td>ASF</td>
<td>Animal source foods</td>
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<tr>
<td>AU</td>
<td>African Union</td>
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<tr>
<td>AUC</td>
<td>African Union Commission</td>
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<tr>
<td>AVRDC</td>
<td>World Vegetable Center</td>
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<td>AWARD</td>
<td>African Women in Agriculture Research and Development</td>
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<td>BIDS</td>
<td>Bangladesh Institute of Development Studies</td>
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<td>Bioversity</td>
<td>Bioversity International</td>
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<tr>
<td>BMGF</td>
<td>Bill and Melinda Gates Foundation</td>
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<td>BPI</td>
<td>Biofortification Prioritization Index</td>
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<tr>
<td>CAADP</td>
<td>Comprehensive Africa Agriculture Development Program</td>
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<tr>
<td>CapDev</td>
<td>Capacity development</td>
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<tr>
<td>CCAFS</td>
<td>Climate Change, Agriculture and Food Security</td>
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<tr>
<td>CCE</td>
<td>Country Coordination and Engagement</td>
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<td>CCEE</td>
<td>CRP-Commissioned External Evaluation</td>
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<tr>
<td>CCNFSDU</td>
<td>Codex Committee on Nutrition and Foods of Special Dietary Use</td>
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<tr>
<td>CCT</td>
<td>Conditional cash transfer</td>
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<tr>
<td>CDI</td>
<td>Centre for Development Innovation at Wageningen UR</td>
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<tr>
<td>CEA</td>
<td>Cost-effectiveness analysis</td>
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<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
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<tr>
<td>CFP</td>
<td>Center Focal Points</td>
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<tr>
<td>CIAT</td>
<td>International Center for Tropical Agriculture</td>
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<td>CIMMYT</td>
<td>International Maize and Wheat Improvement Center</td>
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<td>CIP</td>
<td>International Potato Center</td>
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<td>CKM</td>
<td>Communications and Knowledge Management Division</td>
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<td>CoA</td>
<td>Cluster of Activity</td>
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<tr>
<td>COMESA</td>
<td>Common Market for Eastern and Southern Africa</td>
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<td>CoP</td>
<td>Community of practice</td>
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<td>CRP</td>
<td>CGIAR Research Program</td>
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<td>CSA</td>
<td>Climate Smart Agriculture</td>
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<td>CSSP</td>
<td>Country Strategy Support Program</td>
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<tr>
<td>CTA</td>
<td>Technical Centre for Agricultural and Rural Cooperation</td>
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DANS | Data Archiving and Network Services
DC | Dublin Core
DCL | Dryland Cereals and Legume Agrifood System
DDG | Deputy Director General
DFID | Department for International Development, UK
DG | Director General
DHS | Demographic and Health Survey
DRC | Democratic Republic of Congo
EAC | East African Community
ECOWAS | Economic Community of West African States
EU | European Union
EVIDENT | Evidence-informed Decisionmaking in Nutrition and Health
FAIR | Findable, Accessible, Interoperable, Re-usable
FAO | Food and Agriculture Organization of the United Nations
FBD | Foodborne disease
FERG | Foodborne Disease Epidemiology Reference Group
FP | Flagship Program
FTA | Forests, Trees and Agroforestry
GAAP2 | Second phase of the Gender, Assets, and Agriculture Program
GAIN | Global Alliance for Improved Nutrition
GAP | Good Agricultural Practices
GCARD | Global Conference on Agricultural Research for Development
GEE | Gender, Equity and Empowerment
GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit
GMO | Genetically modified organism
GREAT | Gender-responsive Researchers Equipped for Agricultural Transformation
HANCI | Hunger and Nutrition Commitment Index
HFPP | Homestead food production program
HKI | Helen Keller International
IAC | Independent Advisory Committee
IARC | International Agency for Cancer Research
ICDDRB | International Centre for Diarrhoeal Disease Research, Bangladesh
ICN2 | 2nd International Conference on Nutrition
ICRAF | World Agroforestry Centre
ICRISAT | International Crops Research Institute for the Semi-Arid Tropics
ICRP | Integrated CRP
IDO | Intermediate Development Outcome
IDRC | International Development Research Centre
IDS | Institute of Development Studies
IEA | CGIAR Independent Evaluation Arrangement
IFAD | International Fund for Agricultural Development
IFPRI | International Food Policy Research Institute
IITA | International Institute of Tropical Agriculture
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<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<tr>
<td>IMMANA</td>
<td>Innovative Methods and Metrics for Agriculture and Nutrition Actions</td>
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<tr>
<td>INGO</td>
<td>International Nongovernmental Organization</td>
</tr>
<tr>
<td>IPES</td>
<td>International Panel of Experts on Sustainable Food Systems</td>
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<tr>
<td>IPG</td>
<td>International Public Good</td>
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<tr>
<td>IPM</td>
<td>Integrated pest management</td>
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<td>ISC</td>
<td>Independent Steering Committee</td>
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<td>ISPC</td>
<td>Independent Science and Partnership Council</td>
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<tr>
<td>ITM</td>
<td>Institute of Tropical Medicine</td>
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<tr>
<td>IVM</td>
<td>Integrated vector management</td>
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<tr>
<td>JCR</td>
<td>Journal Citation Reports</td>
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<td>JEV</td>
<td>Japanese Encephalitis virus</td>
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<tr>
<td>KM</td>
<td>Knowledge Management</td>
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<tr>
<td>LAC</td>
<td>Latin America and the Caribbean</td>
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<tr>
<td>LANEA</td>
<td>Leveraging Agriculture for Nutrition in East Africa</td>
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<tr>
<td>LANSIA</td>
<td>Leveraging Agriculture for Nutrition in South Asia</td>
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<tr>
<td>LCIRAH</td>
<td>Leverhulme Centre for Integrative Research on Agriculture and Health</td>
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<tr>
<td>LMIC</td>
<td>Low- and middle-income countries</td>
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<td>LOD</td>
<td>Linked Open Data</td>
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<tr>
<td>LSHTM</td>
<td>London School of Hygiene and Tropical Medicine</td>
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<tr>
<td>LSMS</td>
<td>Living Standards Measurement Survey</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and evaluation</td>
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<tr>
<td>MEL</td>
<td>Monitoring, Evaluation, and Learning</td>
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<tr>
<td>MELIA</td>
<td>Monitoring, Evaluation, Learning, and Impact Assessment</td>
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<tr>
<td>MERS</td>
<td>Middle East respiratory syndrome</td>
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<tr>
<td>MLA</td>
<td>Monitoring, Learning and Assessment (HarvestPlus)</td>
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<td>MoU</td>
<td>Memorandum of Understanding</td>
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<td>NWO</td>
<td>Netherlands Organisation for Scientific Research</td>
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<td>N4G</td>
<td>Nutrition for Growth</td>
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<td>NARS</td>
<td>National Agricultural Research System</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>NSAP</td>
<td>Nutrition-Sensitive Agricultural Programs</td>
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<tr>
<td>OA</td>
<td>Open Access</td>
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<tr>
<td>OADMP</td>
<td>Open Access and Data Management Policy</td>
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<td>OARPS</td>
<td>Open Access and Research Publication Support team</td>
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<td>OIE</td>
<td>World Organization for Animal Health</td>
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<td>OPAC</td>
<td>Online Public Access Catalog</td>
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<td>PACA</td>
<td>Partnership for Aflatoxin Control in Africa</td>
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<td>PIM</td>
<td>Policies, Institutions and Markets</td>
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<td>PMC</td>
<td>Planning and Management Committee</td>
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<td>PMU</td>
<td>Program Management Unit</td>
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<tr>
<td>POSHAN</td>
<td>Partnerships and Opportunities for Strengthening and Harmonizing Actions on Nutrition in India</td>
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</tbody>
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PPA  Program Participant Agreement
PPP  Public-private platforms
Pro-WEAI  Project level Women’s Empowerment in Agriculture Index
RBM  Results-based management
RDM  Research Data Management
REACH  Renewed Efforts Against Child Hunger and undernutrition
REC  Regional Economic Community
ReSAKSS  Regional Strategic Analysis and Knowledge Support Systems
RVF  Rift Valley fever
SARS  Severe acute respiratory syndrome
SCORE  Supporting Countries through Research on Enabling Environments
SDG  Sustainable Development Goal
SLO  System Level Outcomes
SMART  specific, measurable, attainable, relevant, time bound
SME  Small and medium-sized enterprises
SPEAR  Supporting Policies, Programs, and Enabling Action through Research
SRF  Strategy and Results Framework
SSRN  Social Science Research Network
SUN  Scaling Up Nutrition
SUSFANS  European Sustainable Food And Nutrition Security
T&C  Training & Certification
TDR  Trusted Digital Repositories
ToC  Theory of Change
ToR  Terms of Reference
TSC  The Sustainability Consortium
UN  United Nations
UNFCC  United Nations Framework Convention on Climate Change
UNICEF  United Nations International Children’s Emergency Fund
UNSCN  United Nations System Standing Committee on Nutrition
USAID  United States Agency for International Development
USDA  United States Department of Agriculture
VC  Value Chains
VCN  Value Chains for Enhanced Nutrition
W1  Window 1
W2  Window 2
W3  Window 3
Wageningen UR  Wageningen University and Research Centre
WASH  Water, sanitation and hygiene
WEAI  Women’s Empowerment in Agriculture Index
WELI  Women’s Empowerment in Livestock Index
WINGS  Women Improving Nutrition through Group-based Strategies
WFP  World Food Program
WHO  World Health Organization
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<th>Acronym</th>
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<tr>
<td>WLE</td>
<td>Water, Land, and Ecosystems</td>
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<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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<tr>
<td>ZARI</td>
<td>Zambia Agriculture Research Institute</td>
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<tr>
<td>ZELS</td>
<td>Zoonosis and Emerging Livestock Systems</td>
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March 31, 2016

The International Food Policy Research Center (IFPRI) is pleased to submit the proposal for Phase II of the CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) on behalf of the six other managing partners: Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Institute for Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI), London School of Hygiene and Tropical Medicine (LSHTM), and Wageningen University and Research Center (Wageningen UR). This proposal covers research to be undertaken in the period of 2017-2022.

A4NH conducts innovative research on the relationships between agriculture, nutrition, and health, and has already made significant contributions to CGIAR’s knowledge, technologies, and evidence for improving nutrition and health outcomes through agriculture. Building on strong existing partnerships and new partnership arrangements, A4NH will contribute to equitable outcomes for millions of poor smallholders and consumers. A4NH has an important integrating role, as CGIAR’s lens on nutrition and health through the second System Level Outcome (SLO2) on improved food and nutrition security for health. A4NH’s research activities are designed to directly contribute to all aspects of SLO2, and to contribute to the other SLOs on poverty and natural resource management, and all priority cross-cutting issues (climate change, gender and youth, policy and institutions, and capacity development). A4NH has experienced considerable success in Phase I, yet there remains even more potential for CGIAR to improve nutrition and health for all people. Additional work is needed to identify and develop nutrition-enhancing production technologies, institutional innovations that support sustainable access to and/or application of these technologies, and program and policy options to increase the contribution of agri-food systems to nutrition and health. There is also an urgent need for new research on how proven approaches to improving nutrition and health through agriculture can be scaled and sustained in specific countries and contexts. While we maintain a strong focus on undernutrition—one of the greatest development challenges—research activities in Phase II will also embrace emerging challenges, such as the epidemic of obesity and overweight in low and middle income countries, the large and growing burden of foodborne disease, and antimicrobial resistance associated with animal agriculture.

The CRP-Commissioned External Evaluation recognized A4NH’s leadership and comparative advantage on nutrition and health issues in CGIAR, as well as the relevance of the research agenda, the quality of researchers, and progress made in delivering high-quality outputs and adding value to ongoing CGIAR work. Recommendations by the external evaluation panel provided very useful advice for CRP research and management, which we have incorporated in three main ways in this proposal.

- Distinguishing the core, collaborative research agenda of A4NH in the five flagship programs (FPs) and the role of A4NH in integrating and adding value to CGIAR research more broadly. For each FP, core research issues and questions are defined in each FP section, along with integration activities, which are also noted generally in Template 1 and in more detail in Template 2a of Annex 3.6.
• Strengthening management through close collaboration with managers in Centers and Partners on human resource management, research quality, ethics, resource mobilization, and country engagement. This is reflected in the concept of Managing Partners, who will have greater roles and responsibilities to co-manage A4NH with IFPRI in Phase II. The objective is to gain synergies by the management capacities of Centers/Partners and the A4NH PMU.

• Strengthening cross-cutting research – particularly for research on equity and for strengthening monitoring, evaluation, and learning across A4NH. This is reflected in a strengthening of A4NH cross-cutting units for Gender, Equity, and Empowerment (GEE), Monitoring, Evaluation, and Learning (MEL) and Country Collaboration and Engagement (CCE). These units support research in all A4NH FPs as well as A4NH integrative activities.

Other activities proposed for Phase II take into consideration lessons learned in Phase I, including recommendations from external evaluations, and input from the Independent Science and Partnership Council (ISPC).

The A4NH portfolio will include five FPs in Phase II. **FP1: Food Systems for Healthier Diets** will contribute to the goal of healthier diets for poor and vulnerable populations through better understanding of food system-diet dynamics and through identifying and enabling innovations in value chains and policies. This FP focuses on catalyzing innovative partnerships between researchers, both within and outside of CGIAR, as well as private, public, and civil society actors in national and sub-national food systems in four target countries. **FP2: Biofortification** will contribute to reducing micronutrient malnutrition by reaching 100 million people in 20 million households with biofortified crops and by researching how delivery can be scaled and sustained, and how biofortification can be mainstreamed into public policy and crop breeding. **FP3: Food Safety** addresses the growing burden of foodborne disease through research on technological and institutional solutions and by identifying appropriate policy and regulatory options that align public health goals with country priorities to ensure that food is both safe and equitable for the poor. This FP will focus on mitigating aflatoxin contamination in key staples, and on managing risks in informal markets for nutrient-rich perishables like meat, milk, fish, and vegetables. **FP4: Supporting Policies, Programs, and Enabling Action through Research (SPEAR)** will contribute to better nutrition outcomes for nutritionally-vulnerable populations, especially mothers and young children, by understanding, evaluating, and strengthening nutrition-sensitive agricultural programs and policies, analyzing the political economy of leveraging agriculture for nutrition and health, and cultivating enabling environments for nutrition in South/Southeast Asia and Africa. **FP5: Improving Human Health** is an innovative collaboration between public health and agriculture researchers to mitigate risks and optimize benefits for human health from agricultural systems. It will focus on managing diseases in intensifying agricultural landscapes, on emerging and neglected zoonotic diseases, and on emerging global challenges, such as antimicrobial resistance. The five FPs will work with all three cross-cutting units: GEE; CCE; and MEL.

In Phase II, we will prioritize greater country-orientation and support to country leadership, capacity, and performance for healthier food systems and more effective cross-sectoral policies and investments. These efforts will align with CGIAR coordination efforts (known as Site Integration). A4NH’s initial focus will be in five countries – Bangladesh, Ethiopia, India, Nigeria, and Vietnam – with the greatest total nutritional deficiency and health burdens. All five of these countries are designated priority countries for CGIAR Site Integration. A4NH activities in each country will be supported by the capacity and networks of at least one A4NH managing partner (or Lead Center), as well as specific financial and coordination support at CRP level. In other countries, FP teams and managing partners will provide country leadership and coordination.
The A4NH research portfolio for 2017-2022 builds on the results framework and impact logic of Phase I. While the logical framework remains, there will be major changes, based on lessons from Phase I in how we work. We have developed a strong core of managing partner institutions, from inside and outside CGIAR, to implement our research agenda and research-for-development partnerships more effectively. These include two non-CGIAR managing partners: LSHTM, bringing in links with public health; and Wageningen UR, leading new research on food systems. Both will join four CGIAR Centers: Bioversity, CIAT, IITA, and ILRI as managing partners of A4NH. IFPRI remains the Lead Center.

All managing partners commit to specific research and country engagement leadership roles and to building and co-managing the human and financial resources of A4NH. Beyond the managing partners, there is an influential group of strategic partners that dedicate human and financial resources in important research areas, and actively engage in planning and implementing research with others in A4NH. Potential strategic partners come from CGIAR (Centers and CRPs) and from the broader research community (for example, the Institute of Development Studies, Public Health Foundation of India, and Hanoi School of Public Health), actors in value chains (such as, seed companies, the Global Alliance for Improved Nutrition, and the Pulse Innovation Platform), development implementers (such as, BRAC, Helen Keller International, and World Vision), and enablers (such as, national governments, the Comprehensive Africa Agriculture Development Programme, Partnership for Aflatoxin Control in Africa, International Fund for Agricultural Development, World Health Organization, World Organization for Animal Health, Food and Agriculture Organization of the United Nations, and World Bank). Collaborative partners include hundreds more entities with which A4NH works on specific research, capacity building, or stakeholder engagement activities.

A4NH looks forward to strengthening links with other CRPs in Phase II. In our proposal, we describe our joint plans to engage others in CGIAR through existing mechanisms, such as HarvestPlus and the gender-nutrition community of practice, as well as new initiatives, such as learning platforms and convening events.

A4NH presents a proposal with a six-year base-budget of $618 million, of which $134 million (22%) is sourced through Windows 1 (W1) and 2 (W2) of the CGIAR Fund, and the remainder through Window 3 (W3) and bilateral contracts. We also provide additional outcomes that could be accomplished depending on the availability of additional (uplift) funding (50% of base budget). Actual levels of funding and the indicative allocation among FPs may vary in the course of implementation in response to realized funds and priorities of partners. The indicative budget presented in this proposal shows 96% for research, and 4% for management and cross-cutting functions performed by the A4NH Program Management Unit (PMU). The on-line budget tool does not allow us to reflect the budgets for the 3 cross-cutting A4NH research units recommended by the A4NH external evaluation ($18M over 6 years) to ensure the overall A4NH impact exceeds the sum of the FP contributions. These will be supported by a mixture of W1/W2 (60%) and W3/bilateral funding (40%) in the base budget. Among the contributing CGIAR Centers, approximately 63% of research funds are budgeted to the Lead Center (46% of W1/W2 and 67% of W3/bilateral), and 37% to Participating Centers and managing partners (54% of W1/W2 and 33% of W3/bilateral). Of the funds allocated to all Centers, approximately 34% of total costs flow through to external partners on a contractual basis for research, capacity development, and monitoring of outputs and outcomes. Cross-cutting theme budget shares of total budget are gender (11%), youth (2%), capacity development (10%), impact assessment (5%), and communications (4%). Furthermore, if additional funding can be secured, A4NH proposes new research areas and additional activities for speeding up and scaling A4NH research to contribute to impact.
The budgets take into account recommendations from the ISPC’s review of the A4NH pre-proposal. Relative allocations of W1/W2 are more evenly spread across FPs. The limited W1/W2 funds for FP2: Biofortification are focused purely on research on efficacy, evaluation and scaling out and on new varietal development; W3/bilateral funds support delivery activities with country partners. The overall A4NH resource mobilization strategy has been and will be to develop a strong and coherent portfolio of W3/bilateral research grants for all the FPs. This will be even more necessary given the availability and volatility of W1/W2 funding in Phase II. We have prepared a summary of W3/bilateral research grants (secured and unsecured) in A4NH for Phase II along with how the A4NH research agenda aligns with important bilateral donors’ agendas in agriculture, nutrition and health. The “Funding the A4NH Agenda” summary can be found in Other Annexes in the full proposal.

The IFPRI Director General (DG) and IFPRI Board of Trustees are responsible for the overall governance and performance of A4NH. The Program Director manages a small PMU within IFPRI, chairs the Planning and Management Committee (PMC), and is accountable to the DG of the Lead Center and the Lead Center Board. The current Independent Advisory Committee (IAC) will be replaced by an Independent Steering Committee (ISC). As per CGIAR guidance, the ISC will be delegated a stronger governance role by the IFPRI Board of Trustees in Phase II. ISC will meet more frequently, both face-to-face and virtually, to decide on annual work plans and budgets, to commission external evaluations, and to review the annual performance of the Program Director. The PMC consists of the Program Director, FP leaders, a representative from both the GEE and MEL units, and a senior leader from each of the managing partners. A4NH will report to and be guided by relevant consortium entities, per guidelines to be established for Phase II implementation.

IFPRI is the Lead Center for two CRPs – A4NH and Policies, Institutions and Markets (PIM). This allows for close coordination between A4NH and PIM, especially around value chains, social protection, foresight, and policy processes. More details are provided in the proposal, which also responds to questions from the ISPC on how A4NH aligns with IFPRI’s operational structure through its coordination, for example, with HarvestPlus and the Poverty, Health, and Nutrition Division, leaders of two A4NH FPs.

IFPRI expresses thanks to all who have contributed to the extensive preparation. The A4NH PMU has led development of this proposal with significant input from the current and future FP leaders, the wider A4NH team of researchers, IFPRI DG’s office, A4NH’s IAC, the IFPRI Board of Trustees, CGIAR Science Leaders, invited external experts, and representatives of external partners too numerous to name (both individually and through regional and country consultations). Comments on the pre-proposal from ISPC are acknowledged with gratitude and have been addressed. The specific actions taken to address comments from the ISPC, can be found in “Actions Taken to Address Reviewers’ Comments” in Other Annexes of the full proposal.

We look forward to receiving comments on the full proposal. We express our appreciation in advance to all supporters and partners who will join with us in implementing this important and exciting program over the next six years. If you have any questions about the A4NH Phase II submission, please contact Shenggen Fan, DG of IFPRI, and John McDermott, Director of A4NH.
SECTION 1
CRP SECTION
SECTION 1: THE CRP

RATIONALE AND SCOPE

Overarching case for a CRP on agriculture, nutrition and health

Agricultural development has enormous potential to make significant contributions to reducing malnutrition and ill health. With a growing global population, rising incomes, and increased constraints on the natural resources available for the production of food, realizing this potential in increasingly urgent. The need for agriculture to support better nutrition and health is reflected in the discussions leading up to the United Nations’ (UN) 2030 Agenda for Sustainable Development1 and in the new CGIAR Strategy and Results Framework2 (SRF). Regionally, it is reflected in the initiative to support countries in integrating nutrition interventions into their Comprehensive Africa Agriculture Development Programme (CAADP) investment plans, from design through implementation.

Since beginning in 2012, the CGIAR Research Program (CRP) on Agriculture for Nutrition and Health (A4NH) has provided an innovative perspective on the relationships between agriculture, nutrition, and health through research that strengthens the knowledge base and through new partnerships that lead to outcomes. Annual reports on the progress of A4NH research, partnerships, and other efforts to support development outcomes are available at www.a4nh.cgiar.org. Listed below are some examples of our achievements to date.

• **New frameworks and tools for understanding the multiple pathways through which agricultural development influences nutrition outcomes**: (Gillespie, Harris, and Kadiyala 2012; Kadiyala et al. 2014) and how gender mediates the pathways (Herforth and Harris 2014). The findings have implications for how to support nutrition-sensitive interventions in value chains (Gelli et al. 2015), and enabling policy environments (Gillespie et al. 2013). Researchers, donors, non-governmental organizations (NGOs) and governments have widely adopted these frameworks and tools to inform and guide programs and investments. The agriculture-nutrition pathways have informed agriculture-nutrition strategies in the United States Agency for International Development (USAID) and the Bill & Melinda Gates Foundation (BMGF). The World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD) are piloting the nutrition-sensitive value chain framework.

• **More evidence of the impacts of agriculture on nutrition- and health-related outcomes**: Rigorous impact evaluations documented the effects of nutrition-sensitive agricultural programs, including orange flesh sweet potato, on maternal and child diets and nutrition and child health outcomes (Hotz, Loechl, Lubowa, et al. 2012; Hotz, Loechl, de Brauw, et al. 2012; Olney et al. 2015), women’s empowerment (Quisumbing et al. 2015; N. L. Johnson et al. 2016; van den Bold et al. 2015). Nutritional efficacy has been demonstrated for crops biofortified with vitamin A (maize (Gannon et al. 2014), cassava (Talsma et al. 2016)) and iron (bean (J. Haas et al., n.d.), pearl millet (Finkelstein et al. 2015), rice (J. D. Haas et al. 2005)), with zinc efficacy results expected in 2016.

• **Support to evidence-based decisionmaking for agriculture-health programs and investments**: A4NH has conducted evidence reviews and analysis for the UK Department for International Development (DFID) on priority zoonoses for the Zoonosis and Emerging Livestock Systems (ZELS) initiative, livestock and fisheries-linked antimicrobial resistance (AMR), and food safety in developing countries for DFID Livelihood Officers (Grace 2015b; Grace 2015a; Grace et al. 2012).

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1 The new Agenda calls on countries to begin efforts to achieve 17 Sustainable Development Goals (SDGs) over the next 15 years. Two SDGs are focused on nutrition and health: #2 End hunger, achieve food security and improved nutrition, and promote sustainable agriculture and #3 Ensure healthy lives and promote well-being for all at all ages and others are related to parts of A4NH work (#1, #5, 6, #13, #15, and #17).

2 The new System Level Outcome (SLO) devoted to nutrition and health is: #2 improved food and nutrition security for health.
Partnerships with the public and private sectors for making innovations available and used at scale:
The two most promising cases to date relate to the development and application of aflasafe, a biocontrol technology designed to control aflatoxin in maize production, in two countries in Africa, and delivery of biofortified planting materials to 2 million farmers in nine countries in Africa and South Asia.

Integrating gender and nutrition into agricultural research for development: A4NH convened a community of practice (CoP) on gender, agriculture, and nutrition to support gender researchers and monitoring and evaluation (M&E) specialists in other CRPs achieve their nutrition-related Intermediate Development Outcomes (IDOs). The CoP held two workshops which were attended by about 40 researchers from A4NH, 11 other CRPs and 10 partner organizations. A monthly Gender-Nutrition Idea Exchange (GNIE) blog hosted on the A4NH website featured contributions from researchers inside and outside A4NH on how to conduct high-quality agricultural research that considers gender and nutrition issues. The blog had over 12,500 unique page views in 2015.

Despite these many successes of A4NH, much of CGIAR’s potential to improve nutrition and health for all has yet to be realized. More work is needed to identify and develop nutrition-enhancing production technologies, institutional innovations that support sustainable access to and/or application of these technologies, and policy options that can increase the contribution of agri-food systems to nutrition and health. There is also an urgent need for additional research on how proven approaches to improving nutrition and health can be scaled and sustained in specific countries and contexts.

Key challenges in achieving the agriculture, nutrition, and health development goals by 2030
A4NH has positioned the CGIAR as being an important contributor to reducing undernutrition, both micronutrient deficiency and child growth, through integrated agriculture-nutrition programs and policies and biofortification. Important progress is being made, however, as summarized in the Global Nutrition Report (International Food Policy Research Institute (IFPRI) 2014; IFPRI 2015), achieving the nutrition and health-oriented targets in the Sustainable Development Goals (SDGs) by 2030 will require sustained investment, informed by research. While a focus on undernutrition will continue, the SDGs, CGIAR SRF, and other development processes have identified additional challenges. Through expanded research on agriculture, nutrition, and health in Phase II, A4NH will support CGIAR to respond to additional challenges, including:

Overweight and obesity. Even as undernutrition has declined in some parts of low- and middle-income countries (LMICs), the proportion of children and adults who are overweight or obese has increased (Ng et al. 2014). At the Second International Conference on Nutrition (ICN2), ministers of health and agriculture from 170 countries agreed that under- and overnutrition should be addressed together, by promoting diversified, balanced and healthy diets in sustainable, equitable, accessible and resilient food systems (Food and Agriculture Organisation of the United Nations (FAO) and World Health Organization (WHO) 2014). CGIAR work on value chains and agri-food systems needs to be informed by and aligned to this approach.

Food safety. In 2015, a global study by WHO Foodborne Disease Burden Epidemiology Reference Group (FERG) confirmed that foodborne disease (FBD) is a significant health burden, comparable to malaria, HIV/AIDS, and tuberculosis and largely borne by developing counties (Havelaar et al. 2015). The FBD burden is likely to grow in the future as incomes rise, demand for high-risk, perishable foods like meat, milk, fish and vegetables grows, and climate change affects the growth and distribution of pathogens (Grace and McDermott 2015). Managing food safety in developing country contexts and in informal markets, within a healthy and sustainable food systems framework, will be essential to achieving both nutrition and health goals.
- **Infectious diseases.** There is increasing emphasis on mitigating important health risks from animals. Many emerging diseases have reservoirs in animals (Ebola, Middle East respiratory syndrome (MERS), avian influenza) and animal agriculture practices have given rise to emerging health challenges, such as AMR. Also agriculture will need to intensify, particularly in Africa, where growing demand for food cannot be met just by expanding land and water use. This could lead to health benefits from higher incomes and better diets but also to increased risk of vector-borne and zoonotic diseases. Understanding and optimizing overall benefits from agriculture and health will require close partnership between researchers in clinical medicine, agriculture, public health and social science.

- **Inequality.** It is increasingly recognized that inequality related to gender or other social categories is a development objective in its own right (SDG5) and an important condition for achieving other development objectives (Meinzen-Dick et al. 2011), particularly related to nutrition (Smith and Haddad 2014) and health (Krishna 2004).

### Box 1.1. Definitions for concepts in A4NH

| **Nutrition-sensitive agricultural programs** | Agriculture programs that have specific nutrition goals and integrate nutrition interventions (e.g. behavior change communications, distribution of micronutrient-fortified products, etc.) to achieve them (Ruel and Alderman 2013). They may or may not also integrate other types of interventions from other sectors such as water, sanitation and hygiene (WASH) or health (e.g. immunization, promotion of use of health services, etc.). |
| **Food system** | The full set of processes, activities, infrastructure, and environment that encompass the production, processing, distribution, waste disposal, and food consumption. Food systems are multidimensional, including sociocultural, economic, environmental, and political aspects, and complex, with multiple actors (food producers, food-chain actors, and consumers) managing multiple linked and nested agri-food value chains within dynamic and interactive food environments. |
| **Gender** | Social category usually associated with being a man or a woman. It encompasses economic, social, political, and cultural attributes and opportunities as well as roles and responsibilities. |
| **Equity** | Based on the idea of moral equality i.e. the principle that people should be treated as equals and that despite many differences, all people share a common humanity or human dignity. The three principles of equity are: equal life chances, equal concern for people’s needs and meritocracy. |
| **Empowerment** | Expansion of people’s ability to make strategic life choices, particularly in contexts where this ability had been denied to them. |

**Implications for how A4NH will work in Phase II**

To meet the challenges CGIAR has prioritized in the new SRF (2016-2030), A4NH is committed to strengthening the contribution of CGIAR to nutrition and health outcomes in three ways: through joint research with other CRPs, particularly in a subset of priority countries identified by CGIAR; through networking and mutual learning with other CRPs and partners; and by bridging the space between CGIAR and the nutrition and health research, development, and policy communities. These Phase II activities are part of our responsibilities as an Integrating

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3 SDG #5 is: Achieve gender equality and empower all women and girls.

4 Sources for definitions: Nutrition-sensitive (Ruel and Alderman 2013) gender (Rubin, Manfre, and Barrett 2009) equity (Jones 2009) and empowerment (Kabeer 2001).
CRP (ICRP) to create and enhance the enabling conditions for delivery of CGIAR research outcomes in terms of nutrition and health.

For its second phase, A4NH proposes five flagship research programs (FPs) and three cross-cutting units (see Figure 1.1).

**Figure 1.1. A4NH Program Structure**

**FP1: Food Systems for Healthier Diets** will contribute to the goal of healthier diets for poor and vulnerable populations through better understanding of food system-diet dynamics and through identifying and enabling innovations in value chains and policies. This FP has a strong focus on building innovative partnerships between researchers inside and outside CGIAR, as well as private, public, and civil society actors in national and sub-national food systems in four target countries.

**FP2: Biofortification** will contribute to reducing micronutrient malnutrition by reaching 20 million households with biofortified crops, and by doing research on how delivery can be scaled and sustained and on how biofortification can be mainstreamed into public policy and crop breeding.

**FP3: Food Safety** addresses the growing FBD burden through research on technological and institutional solutions and appropriate policy and regulatory options that align public health goals with country priorities and capacities to ensure that food is both safe and equitable for the poor. The FP will focus on mitigating aflatoxin contamination in key staples, and on managing risks in informal markets for nutrient-rich perishables like meat, milk, fish, and vegetables.

**FP4: Supporting Policies, Programs, and Enabling Action through Research (SPEAR)** will contribute to better nutrition outcomes for nutritionally-vulnerable populations, especially mothers and young children, through understanding, evaluating, and strengthening nutrition-sensitive agricultural programs and policies, analyzing the political economy of leveraging agriculture for nutrition and health, and on cultivating and sustaining enabling environments for nutrition in South/Southeast Asia and Africa.
**FP5: Improving Human Health** is an innovative collaboration between public health and agriculture researchers to mitigate risks and optimize benefits for human health from agricultural systems. It will focus on managing diseases in intensifying agricultural landscapes, on emerging and neglected zoonotic diseases, and on emerging global challenges such as anti-microbial resistance.

Country priorities are driving the 2030 development agenda and national leadership, in concert with regional and global initiatives, will be the key to delivering on it. With scarce resources and a broad range of development objectives, policymakers will need to carefully consider how to maximize synergies and minimize trade-offs associated with alternative policy and investment options. Appropriate strategies will vary by country depending on the priorities and resources as well as political, social, economic, and agro-ecological contexts. A4NH’s role is to generate knowledge, develop technologies, and design innovative approaches that will support decisionmakers in making informed choices that help them achieve development goals and priorities.

In order to improve our country engagement on nutrition and health issues and fulfill our ICRP role, we will designate three cross-cutting units: Country Coordination and Engagement (CCE), Gender, Equity and Empowerment (GEE), and Monitoring, Evaluation, and Learning (MEL). The CCE unit will initially support in-country research teams comprised of partners from inside and outside CGIAR in five of the CGIAR Site Integration countries—Bangladesh, Ethiopia, India, Nigeria, and Vietnam. The GEE unit will conduct strategic research and support a CoP on gender and nutrition to strengthen capacity within A4NH FPs, other CRPs and key partners. The MEL unit will work with FPs and units on results-based management (RBM) and learning, driven on theories of change, and will work closely with the other ICRPs and the CGIAR MEL CoP.

IFPRI will continue as Lead Center for A4NH in Phase II. Our managing partners will be four CGIAR Centers: Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Institute of Tropical Agriculture (IITA), and the International Livestock Research Institute (ILRI)—plus two non-CGIAR institutions: Wageningen University and Research Centre (Wageningen UR) and the London School of Hygiene and Tropical Medicine (LSHTM).

**GOALS, OBJECTIVES, TARGETS**

The goal of A4NH is to strengthen the capacity of CGIAR to contribute globally to the second System Level Outcome (SLO2) on improved food and nutrition security for health and the 2030 Agenda for Sustainable Development (Table 1.1).

A4NH will contribute to all four IDOs under the SLO on *improved food and nutrition security for health* (Figure 1.2). Through four of its FPs, A4NH will contribute to specific IDOs under SLO1 on *reduced poverty*. Together with the CRPs on Water, Land, and Ecosystems (WLE) and Climate Change, Agriculture, and Food Security (CCAFS), we will contribute to specific IDOs under SLO3 on *improved natural resource management and ecosystem services*. The four CGIAR cross-cutting issues—gender and youth, policies and institutions, climate change and capacity development—will be integrated into all A4NH FPs. We will collaborate with CCAFS on *climate change*, with special emphasis on healthy, sustainable food systems, WLE on sustainability of food systems, and Policies, Institutions, and Markets (PIM) on gender and youth and policies and institutions. The cross-cutting issues of gender and youth, as well as policies and institutions have been central to the A4NH Results Framework since Phase I and we have had a strong emphasis on capacity development for agriculture, nutrition and health research, program implementation and enabling.

**Table 1.1. A4NH contributions, by FP, to the SDGs and the CGIAR SRF**
<table>
<thead>
<tr>
<th>SDGs</th>
<th>SLOs</th>
<th>IDOs</th>
<th>Sub-IDOs</th>
<th>Expected A4NH Flagship Contributions by 2022 (x) and beyond (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced poverty</td>
<td>Enhanced smallholder</td>
<td>Reduced market barriers</td>
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<td>FP1</td>
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<td></td>
<td>market access</td>
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<td>FP2</td>
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<td></td>
<td></td>
<td>Increased incomes and employment</td>
<td>Diversified enterprise opportunities x</td>
<td>FP3</td>
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<td></td>
<td></td>
<td>Increased livelihood opportunities x</td>
<td>FP4</td>
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<tr>
<td></td>
<td></td>
<td>Increased productivity</td>
<td>Closed yield gaps through improved agronomic and animal husbandry practices</td>
<td></td>
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<tr>
<td>Improved food and nutrition security for health</td>
<td>Improved diets for poor and vulnerable people</td>
<td>Increased availability of diverse nutrient-rich foods x x x</td>
<td>FPS</td>
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<td></td>
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<td>Increased access to diverse nutrient-rich foods x x x</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Optimized consumption of diverse nutrient-rich foods x x</td>
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<td></td>
<td></td>
<td>Improved food safety</td>
<td>Reduced biological and chemical hazards in the food system x *</td>
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<td></td>
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<td></td>
<td>Appropriate regulatory environment for food safety x *</td>
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<tr>
<td></td>
<td></td>
<td>Improved human and animal health through better agricultural practices</td>
<td>Improved water quality *</td>
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<td></td>
<td>Reduced livestock and fish disease risks associated with intensification and climate change * x</td>
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<td></td>
<td>Increased safe use of inputs * x</td>
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<tr>
<td>Improved natural resource systems and ecosystem services</td>
<td>More sustainable managed agro-ecosystems</td>
<td>Increased resilience of agro-ecosystems and communities- especially those including smallholders</td>
<td>FPS</td>
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<td>Enhanced adaptive capacity to climate risks *</td>
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<tr>
<td>Climate Change</td>
<td>Mitigation/ adaptation</td>
<td>Enabled environment for climate resilience</td>
<td></td>
<td>FP1</td>
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<td>FPS</td>
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<td>Gender and youth</td>
<td>Equity and inclusion</td>
<td>Gender-equitable control of productive assets and resources x x x</td>
<td>FPS</td>
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<td></td>
<td>Improved capacity of women and young people to participate in decisionmaking x x x</td>
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<td>Policies and institutions</td>
<td>Enabling environment</td>
<td>Increased capacity of beneficiaries to adopt research outputs x x x</td>
<td>FPS</td>
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<td>improved</td>
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<td></td>
<td>Increased capacity of partner organizations... x x x</td>
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<td></td>
<td>Conducive agricultural policy environment x x x</td>
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<td></td>
<td>Conducive environment for managing shocks and vulnerability...</td>
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<tr>
<td>Capacity development</td>
<td>National partners and</td>
<td>Enhanced institutional capacity of partner research organizations x x x x x x</td>
<td>FPS</td>
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<td></td>
<td>beneficiaries enabled</td>
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<td>Enhanced individual capacity in partner research organizations... x x x</td>
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<td>Increased capacity for innovation in partner research organizations x x</td>
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<td></td>
<td></td>
<td>Increased capacity for innovation in partner development organizations...</td>
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</table>
During Phase II, A4NH will make significant contributions to three of the SRF’s SLO targets for 2022, as described in Table A of the Performance Indicator Matrix:

- 20 million more farm households in at least 12 countries will have adopted improved varieties, breeds or trees and/or improved management practices (FP2: Biofortification and FP3: Food Safety);
- 150 million more people, of which 50% are women, in at least 14 countries will be without deficiencies of one or more of the following essential micronutrients: iron, zinc, iodine, vitamin A, folate, and vitamin B12 (FP2: Biofortification and F4: SPEAR); and
- 10% fewer women of reproductive age will be consuming less than the adequate number of food groups in Ethiopia, Bangladesh, Vietnam and Nigeria (FP1: Food Systems).

To achieve these and future goals, A4NH FPs will achieve the following outcomes by 2022 (Table B of the Performance Indicator Matrix and more details in the FP sections):

**FP1: Food Systems will ensure that:**
- Partners and other CRPs incorporate nutrition, health, and gender in agri-food value chains and food systems programs;
- Stakeholders (investors, civil society, policymakers) consider healthier diets in processes related to food systems; and
- Partners implement A4NH strategies for agri-food value chain/food system innovations at scale.

**FP2: Biofortification will demonstrate that:**
- High-yielding micronutrient enhanced varieties are developed and released in target and expansion countries;
• Biofortification is mainstreamed into CGIAR and National Agricultural Research System (NARS) breeding efforts;
• High-yielding micronutrient enhanced varieties are delivered at scale in target and expansion countries;
• Evidence on nutritional efficacy and impact informs value chain actors, as well as national and international investors; and
• Biofortification is supported by global institutions and incorporated into plans and policies by stakeholders.

FP3: Food Safety will demonstrate that:
• Key food safety evidence users (donors, academics, international NGOs (INGOs), national policymakers, civil society, and industry) are aware of and use evidence to formulate and/or implement pro-poor and risk-based food safety approaches;
• Market-based food safety innovations are delivered at scale in key countries, along with understanding of their impact and appropriate use; and
• Biocontrol and good agricultural practices (GAP) delivered at scale in key countries, along with understanding of their impact and appropriate use.

FP4: SPEAR will demonstrate that:
• Development program implementers and investors (governments, NGOs, UN institutions) use evidence, tools, and methods to design and implement cost-effective nutrition-sensitive agricultural programs at scale;
• Researchers and evaluators, including in CGIAR and other CRPs, use evidence, tools, and methods to design high-quality evaluations of nutrition-sensitive agricultural programs and other multisectoral programs, and continue to build evidence;
• Regional, international, and UN agencies and initiatives as well as investors use evidence, tools, and methods to inform decisions and investment strategies to guide and support nutrition-sensitive agricultural programming and nutrition-sensitive policies;
• National policymakers and stakeholders from different sectors, civil society, and industry use evidence to design effective nutrition-sensitive policies and strategies to enable effective programming; and
• Stakeholders from different sectors, civil society, and industry, including CGIAR and other CRPs, have improved capacity to generate and use evidence to improve nutrition-sensitive agricultural programming, nutrition-sensitive policymaking, and implementation.

FP5: Improving Human Health will demonstrate that:
• Agricultural research initiatives, including those in farming communities, measure health risks and benefits;
• Agricultural and public health policymakers and implementers deliver coordinated and effective solutions to cysticercosis and other zoonotic threats; and
• Public and private sector policymakers implement measures to reduce health risks from AMR in hotspot livestock systems.

IMPACT PATHWAY AND THEORY OF CHANGE
The A4NH Results Framework (Figure 1.2) describes our impact pathways, reflecting the different ways in which A4NH research activities and outputs, including knowledge, technologies, capacity, and stakeholder engagement, contribute to outcomes in food systems. In some cases, A4NH research provides value chain actors with technologies and capacity to enhance and protect the nutritional content of foods, while mitigating key food safety risks (agri-food value chains pathway). We also provide evidence and tools to development implementers to increase the effectiveness of their nutrition- and health-sensitive agricultural programming
Finally, we support governments and donors to improve an enabling environment and create better-informed, better-targeted, and better-implemented policies (policies pathway). Value chains, policies and programs are key components of the food system, and while we seek to have impact through individual pathways, it is always with an eye toward how the changes in the pathway(s) will influence the system as a whole. The three food system pathways are mutually reinforcing, with the policy pathway underlying and sustaining the other two.

**Agri-food value chains pathway**

There are several points along agri-food value chains where actors can use A4NH research outputs to contribute to nutrition and health outcomes. At the farm level, a traditional area of strength in CGIAR, two FPs work closely with public- and private-sector actors, mainly in input supply, to demonstrate and learn from the delivery at scale of two technologies to improve nutrition and health (biofortified varieties by FP2: Biofortification, and biocontrol and GAP by FP3: Food Safety). The delivery at scale of biofortified varieties represents an important part of A4NH’s contribution to the SRF targets on micronutrient deficiency, but together, the two technologies represent our main contribution to this target. The impact pathways for these farm-level technologies go from on-farm production either directly to consumption by the farm household members or through sale to traders and, in some cases, processors, to eventual purchase and consumption by target consumers. All along the pathway, there are important assumptions underlying expected outcomes. Gender and equity issues are key in most of the outcomes, from deciding what crops to plant and sell or what foods to purchase, to determining intra-household food allocation. The detailed ToCs developed for each of these cases (N. Johnson, Guedenet, and Saltzman 2015; N. Johnson, Atherstone, and Grace 2015), together with assessments of the strength of existing evidence for the assumptions, will guide decisions about delivery and support learning about the potential for on-farm technologies to contribute to improvements in nutrition and health. This work will take place within each FP and in collaboration with the agri-food system CRPs (AFS-CRPs), and with CCAFS to consider the impacts of climate change on the effectiveness of technologies and practices.

Another point along the value chain where A4NH research can contribute to improved nutrition and health outcomes is through **improving trader practices**. This is especially important in value chains for perishable foods, which can lose their nutritional value or even become a risk for foodborne infections or zoonotic pathogens, such as avian influenza, if not handled properly. FP3: Food Safety is working on proof of concept of an institutional innovation for traders called ‘training and certification’ (T&C), designed to improve the quality and safety of livestock products in informal and formalizing value chains. T&C provides traders with the capacity and incentives to improve their practices in contexts where enforcement of regulations through penalties is challenging. The ToC describes the conditions under which T&C can lead to increases in consumption of safer animal source foods (ASF) by target consumers, as well as the conditions under which such a scheme can be sustainable and scalable (N. Johnson et al. 2015). The T&C innovation is currently being implemented at scale in dairy value chains in India and Kenya, reaching 6.5 million consumers. Based on lessons learned from this experience, A4NH is adapting the approach to markets for other livestock products in collaboration with the CRPs on Fish, Livestock, and, with WLE, on vegetables. Gender and equity issues are important along the pathway, in particular because risk of FBD often varies by gender when men and women play different roles along the value chain, from production through slaughter and processing, to sale.

Agricultural value chain analysis and interventions have typically focused on the supply side, but if the goal of value chain development is to improve diets, then analysis needs to extend to the demand side. Changing

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5 We use the term traders, but this could be any group of intermediaries between what’s produced on the farm and the consumer.
consumer behavior will need to become a key entry point for improving value chain performance (keeping in mind that in many of our contexts, consumers may also be producers and traders). In Phase I, a conceptual framework was developed (Gelli et al. 2015) and is being validated with development partners such as WFP and IFAD. In Phase II, more research will build upon these initiatives. FP1: Food Systems will work closely with public and private actors (through Global Alliance for Improved Nutrition (GAIN), business schools (e.g. Desautels Faculty of Management at McGill University) and other CRPs to integrate diet into the indicators used to assess value chain performance and food system interventions and innovations. Our work with CCAFS on sustainable food systems and on the environmental implications for changing diets (Gill et al. 2015) will be particularly important, and is expected to have impacts on both under- and over-nutrition. It will be through this consumer-oriented work on improving value chains in a food systems context that we expect to achieve our SRF target on improving dietary quality and diversity.

Development programs pathway
Markets are the drivers of agricultural development, but development programs that successfully integrate agriculture, nutrition, and health also represent an important avenue for reaching key target beneficiaries cost-effectively (Masters et al. 2014). Nutrition-sensitive agricultural programs are important for reaching two critical target populations: pregnant women and children under two years of age. These groups are particularly vulnerable to poor nutrition, and improvements in nutrition can have life-changing impacts on a child’s physical and cognitive development and future potential. Similarly, integrated agriculture and health programs can be cost-effective options for achieving both public health and agricultural development objectives, especially in poor, rural areas. The disease, cysticercosis, is a priority example, where elimination is possible with coordinated and sustainable control efforts between public health and agricultural programs linked with value chain incentives and interventions (Maurice 2014).

During Phase I, FP4: SPEAR (known then as Integrated Programs and Policies) began building an evidence base on how and how much integrated agriculture and nutrition programs can improve nutrition outcomes, working closely with both development programs and with the governments and donor agencies that fund them. Findings from these studies are being incorporated into the design of new programs and the scale-up of future programs, enhancing their coverage and effectiveness. For example, on the basis of emerging evidence on gender-agriculture-nutrition linkages, the Ministry of Agriculture of Bangladesh is investing in a large-scale evaluation of alternative approaches to integrating nutrition and gender into agricultural extension. This work constitutes an important part of A4NH’s contribution to the SRF target on reducing micronutrient deficiencies.

Policies pathway
A4NH research provides the evidence base, knowledge, tools, and technical inputs to help decisionmakers make smarter policy choices and better (and bigger) investments. All FPs have policy objectives, but these vary. For example, the first three FPs will focus on national and sub-national policies and regulations that influence farmers, market agents and small and medium enterprises along and, especially, across agri-food value chains to support safe, healthy and sustainable food system transformation. FP4: SPEAR will focus on national processes and capacities of national actors to shape public policy and programs so that improved nutrition and health outcomes can be achieved through agriculture. Key assumptions that underlie the pathway from policy commitment to implementation and impact on the ground relate to the availability of (1) knowledge and evidence, especially about implementation at scale, (2) cross-sector political commitment both from supporting integrating ministries such as finance, planning and science and technology and fostering understanding on potential synergies from ministries that compete for funding such as social development, health and agriculture, and (3) sufficient capacity and resources, which often requires careful prioritization of actions (Gillespie et al. 2013; Gillespie, Menon, and Kennedy 2015). A4NH expects that that half of its
commitment to the SRF target on reducing micronutrient deficiencies (as well as to other country priorities such as stunting and anemia) will come from improvements in the enabling environment.

While the challenge for undernutrition is converting policy commitment to action, the challenge for other health and nutrition issues is to get on the policy agenda. The agriculture sector has not seen health as a priority (and vice versa), but this is changing as more evidence becomes available on the burden of agriculture-associated diseases, the incidence and impacts of FBDs (Havelaar et al. 2015), and on the availability of cost-effective policy options. Similarly, the availability of better data on changes in diets at the national and subnational level and on links between diets and food systems is expected to influence policies that shape food systems. Getting these issues on the policy agenda will be a key objective for FP1: Food Systems, FP3: Food Safety and FP5: Improving Human Health in Phase II and will involve engaging with key stakeholders in agriculture, health, and other sectors. It will also involve building country-level capacity for cross-sector policy analysis so that analysts can identify and assess appropriate policy options. The policy pathway is expected to lead to important reductions in exposure to FBDs and other agriculture-associated diseases and in overnutrition. Indicators and targets will be set for these impacts.

In addition to the three food systems pathways described above, as an ICRP A4NH contributes indirectly to outcomes through the support it provides to other CRPs, by facilitating networking and mutual learning through CoPs and learning platforms. While we expect these contributions to be reported through other CRPs, following the advice of the A4NH external evaluation and true to the role of an ICRP, we will develop ToCs for our investment in networking, co-learning and bridging work in order to be more systematic about monitoring and learning from these investments. This has already been done for the gender-nutrition CoP which was established in Phase I and will be done for others once they are operational.

GENDER
Gender is widely recognized as an integral part of the different systems of agriculture, nutrition, and health. Women are traditionally thought of as the guardians of household food security and nutrition, yet decisions about what foods to produce and how to produce them, which foods are sold and purchased, and how foods are prepared and allocated to different household members can be made by both men and women. These household decisions have varying effects on agricultural outcomes and on the health and nutritional status of household members, and are therefore fundamental to A4NH research and impact. This section is based on the A4NH Gender Strategy, which summarizes existing (A4NH and other) research on the role of gender in agriculture-nutrition-health (ANH) pathways to identify evidence gaps and research priorities. The Gender Strategy sets out the ways in which the GEE unit, one of the three cross-cutting units within the Program Management Unit (PMU), will ensure that gender is integrated into the research and activities of the CRP. This section should be read along with the gender annex (Annex 3.3), which provides more details on how research and evidence on gender in Phase I informed A4NH’s research priorities for Phase II, the gender milestones A4NH research hopes to achieve in Phase II, and the resources needed to do so.

How is gender reflected in the A4NH agenda?
All A4NH FPs expect to contribute to the IDO on gender, and in particular, to the sub-IDOs on gender-equitable control of productive assets and resources and improved capacity of women and young people to participate in decisionmaking. Findings from Phase I research revealed three priority areas for research where evidence gaps

6 In Phase I, GEE was referred to as the Strategic Gender Unit. The name change reflects a recommendation of the A4NH External Evaluation to pay more attention to equity issues. See Annex 3.3 for definitions and additional information.
remain about how agricultural research can contribute to outcomes (details can be found in the A4NH Gender Strategy):

- Impact of gender-based differences on nutrition- and health-related outcomes;
- Improving nutrition through women’s empowerment; and
- Avoiding unintended consequences to women’s well-being and empowerment.

These translate into specific research questions in each FP (see Table 1.2 for a summary of the key gender research questions for each FP).

How is gender operationalized in A4NH?

Gender research in FPs

Many FP research teams include gender expertise, and they are responsible for framing gender research questions for the overall FP and for ensuring that gender is integrated within the FP. The GEE unit supports these researchers through workshops, webinars, blogs and other gender-related capacity development activities. FPs with weaker gender capacity can use funds allocated for gender research to hire gender experts or to establish strategic partnerships with other FPs or with other external institutions with the required gender skills. The external evaluation of A4NH noted that the reported gender focus of projects in A4NH increased over the course of Phase I. More details of how each FP has set its gender research priorities can be found in Annex 3.3.

In addition to gender researchers in each FP team, A4NH has worked with other CRPs to recruit gender postdoctoral fellows, funded in part by the Consortium. One fellow is working with the CRPs PIM and HumidTropics on building capacity within CGIAR on indicators of empowerment; another fellow is working with CRPs Livestock and Fish and Grain Legumes on evaluating the gender and nutrition impacts of value chains; and a third fellow will work with the CRPs Grain Legumes and Dryland Cereals to investigate gender issues in varietal selection, breeding, and adoption processes.

Gender at the CRP level

In addition to supporting gender research in the FPs, the GEE leads cross-cutting research on strategic issues relevant to the overall research program. These topics fill major knowledge gaps, build evidence on key conceptual and methodological questions (such as survey experiments on decisionmaking), and develop and validate indicators, tools, and metrics that can be used to measure gender outcomes.

An example of such cross-cutting research is the second round of the Gender, Assets, and Agriculture Program (GAAP2) which is working towards adapting the Women’s Empowerment in Agriculture Index (WEAI) and validating it for the use in agricultural development projects, including nutrition-sensitive agricultural interventions. Along with this validated tool (pro-WEAI), lessons from GAAP2 on how agriculture projects can empower women and improve gender equity and nutrition and health outcomes will be useful for research projects across A4NH FPs.

Four priority research themes have been identified for cross-cutting research. Across these themes, explicit attention will be paid to how gender interacts with other sources of inequity, including:

- How women’s empowerment affects nutrition and health;
- How to engage men in nutrition and health;
- How to target youth, especially adolescent girls (see also Annex 3.4); and
- Linkages between gender, agriculture, health, and nutrition.

For background research and further details on how these areas were selected, please refer to the A4NH Gender Strategy.
**Strengthening research capacity on gender, nutrition, and health**

A4NH will build on the internationally recognized research capability of IFPRI and its partners in studying the implications of gender for agricultural research, and food and nutrition security.\(^7\) The gender specialists in A4NH work closely with those in PIM, ensuring there is cross-CRP exchange of methods and learning; a number of projects cut across both CRPs. In line with recommendations from a recent portfolio review, which emphasized the need to continue building gender research and M&E capacity across CGIAR and its external partners, A4NH will continue providing gender methods training and support through the following activities:

- **Annual Gender-Nutrition Methods Workshop:** A4NH has conducted two workshops to date, attended by about 40 researchers belonging to A4NH, other CRPs with a nutrition focus, and partner organizations. The first workshop focused on establishing common frameworks, while the second workshop focused on women’s empowerment and decision-making. These workshops were well attended, and participants expressed continued demand for future workshops.\(^8\) In lieu of a third workshop in 2016, A4NH participants were invited to the **GAAP2 Inception Workshop**, which focused on different approaches to empowerment in agricultural projects and developing project-level indicators for measuring women’s empowerment (pro-WEAI). Selected sessions from the workshop were recorded and shared with A4NH gender researchers and the larger gender CoP within CGIAR.

- **Gender Nutrition Idea Exchange (GNIE):** A monthly blog hosted on the A4NH website features contributions from researchers on how to conduct high-quality agricultural research that considers gender and nutrition issues. The blog has a large and growing readership\(^9\) and offers a space for highlighting newer research topics, such as the relationship of gender to agriculture and health and linkages between agriculture, climate change, and gender (a post which was cross-posted on the Agrilinks USAID website).

- **Learning events and other outreach activities for gender researchers:** A4NH will reach out to gender researchers in A4NH and other CRPs to help identify and support specific needs for capacity building. Activities could include, for example, holding workshops on specific topics or methods, organizing panels at major conferences to showcase gender research in A4NH, and establishing a rotating webinar series.

- **Small grants for gender research:** A number of small grants will be provided to A4NH-mapped research projects that will build the evidence base around strategic gender research priorities. These grants will be combined with technical advising from the GEE unit. A more detailed process for providing targeted support will be developed for Phase II in consultation with the Planning and Management Committee (PMC) conditional on the availability of an uplift budget.

**Tracking gender**

**Gender in ToC**

\(^7\) Notable examples include a multicountry program on gender and intrahousehold research that “shifted the burden of proof” by demonstrating that households do not behave as monolithic units with common interests and preferences (Alderman et al. 1995; Quisumbing 2003); the background research drawn upon for the FAO SOFA 2011 (Quisumbing et al. 2014); the background paper on gender for GCARD1 (Meinzen-Dick et al. 2011); and the development of the WEAI, and numerous guides for collecting sex-disaggregated data and conducting gender analysis.

\(^8\) In the future, we will explore alternative ways of extending the reach of these trainings, including providing access to workshop videos, webinars, and other virtual platforms.

\(^9\) The blog had 12,500 unique page views in 2015.
In addition to gender being integrated in FP-level ToCs, a ToC was developed specifically for the support to gender research\textsuperscript{10} carried out at the CRP-level to clarify how our gender activities are expected to make changes that lead to desired outcomes (Figure 1.3). The primary target audience for our gender activities and outputs will be the CGIAR gender researchers, who will be reached through various modes of communication, including direct participation in A4NH events [1]\textsuperscript{11}. We will use web analytics, attendance lists, and evaluation forms to track access and participation for each type event or output. These activities will help increase the capacity of these target researchers to conduct high-quality gender-nutrition-health research [2].

To achieve these first two outcomes—reaching researchers and improving their capacity—we need to make sure that we are reaching the right people in the FPs and other CRPs and that our activities are designed to address their most pressing capacity gaps. Details on how we will use our monitoring system to track progress are outlined in the following section, and our capacity-strengthening plans have already been discussed above [a1, a2].

Once researchers have increased their capacity to conduct high-quality gender research, we expect that they will incorporate new knowledge, skills, and tools into their work [3]. However, if they are engaged in projects that are unable to incorporate new gender components, perhaps due to resource constraints or other reasons, then there may be a significant lag between the time that capacity is built and the integration of gender into projects [a3]. To help shorten this lag and to maintain momentum and interest in our capacity-building activities, we propose to provide a number of small grants combined with technical advising from the GEE unit, targeted to A4NH-mapped research projects that participate in the CoP. This will provide immediate opportunities for researchers to incorporate gender considerations in existing projects. As they gain more experience in using their new skills and tools, we also expect that this will increase the likelihood that researchers will propose and design future projects that are more gender-responsive.

If researchers conduct more gender-responsive research, their research outputs will be more likely to benefit women and promote gender equity [4]. This implies that using a gender-responsive approach yields new insights that would otherwise not be revealed [a4], which is very likely given the growing evidence that shows that inattention to gender is not benign, and may even derail success. Even if new insights exist, however, decisionmakers in A4NH FPs and other CRPs must be willing to use this information in their programming decisions [a5]. More details on how this will be monitored can be found in the following section.

\textit{Monitoring and evaluation of gender integration in A4NH research}

Gender research priorities and fundamental gender research questions aim to close evidence gaps (Table 1.2), informed by each FP’s ToC. While gender is well-integrated at the planning stage for Phase II, we will continue to monitor projects throughout the research process to ensure that gender dimensions do not get lost in implementation and are appropriately reflected in research outputs. Monitoring will also help us gather periodic feedback from projects to identify what types of support they may require from the GEE unit.

In 2014, A4NH started systematically collecting information on the gender research focus of projects mapped to A4NH (from all funding sources). All projects are asked to report whether or not there is a gender research dimension to the project (and if not, why not), the gender research questions to be addressed, the types of sex-disaggregated data collected, the level of gender focus of each project deliverable (none, some, significant),

\textsuperscript{10} This was one of the recommendations for the GEE by the external evaluation.

\textsuperscript{11} Numbers in brackets in this section refer to the numbers in the ToC diagram (Figure 1.3)
and the name of the person responsible for gender research\textsuperscript{12}. Responses to these questions enabled us to assess how well the gender research questions identified are reflected in project deliverables, and track progress over time. The information gathered at the work planning stage will be reviewed by the GEE to help advise research teams on improving gender research before research plans are implemented. As deliverables are completed, the GEE will review completed deliverables to assess the quality of gender analysis in our research products.\textsuperscript{13} A4NH is also working with PIM to harmonize its M&E systems for tracking progress on the integration of gender in research. Further guidelines and updates to the gender section of the work plan template are expected to be used as part of future work planning processes. See more in Annex 3.5.

Beyond monitoring the gender focus of research outputs, projects that focus solely on women or that collect but do not analyze sex-disaggregated data are particularly important to identify because they have the potential for doing more gender analysis, such as expanding analysis to include men and/or using sex-disaggregated data to conduct gender analyses. Such projects can be targeted for additional technical assistance, linking up researchers with gender experts and providing small grants to add a gender component or to collect gender-relevant data.

<table>
<thead>
<tr>
<th>Table 1.2. Gender research priorities in each of the A4NH FPs</th>
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<tr>
<td><strong>A4NH FP</strong></td>
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<tr>
<td>FP1: Food Systems for Healthier Diets</td>
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<tr>
<td>FP2: Biofortification</td>
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<tr>
<td>FP3: Food Safety</td>
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<tr>
<td>FP4: Supporting Policies, Programs and Enabling Action through Research (SPEAR)</td>
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\textsuperscript{12} We have developed standardized definitions for each category and plan to expand the “levels of gender analysis” in deliverables to reflect increasing depth in gender analysis: 0) None, 1) Woman-focused, 2) Sex-disaggregated data reported but no gender research questions, 3) Some gender analysis but not main focus of research, and 4) Significant gender analysis is main focus of research.

\textsuperscript{13} This will be based on a random sample of completed deliverables per flagship; actual sample size will depend on available resources.
health (Unintended consequences)? How can policymakers develop cross-sectoral, gender-responsive policies? (Gender-based differences; Women’s empowerment; Unintended consequences) How can nutrition-sensitive agriculture programs engage men and sensitize them about the importance of gender equity? (Gender-based differences)

| FP5: Improving Human Health | How do the health risks and benefits of agriculture vary by gender (Unintended consequences; Gender-based differences)? How can measures to improve human health proactively include women (Gender-based differences)? How can women be more involved in decisions about how to improve management of agricultural intensification to improve health outcomes (Gender-based differences)? How can integrated agricultural and health development interventions engage women and girls while avoiding harm to women’s time and health (Unintended consequences) and engage men to play a greater role in supporting better health (Gender-based differences)? |

**Figure 1.3. Theory of change for integration of gender in A4NH research**

**Youth**

The recognition and integration of youth issues in agriculture, nutrition, and health research is an under-explored topic. A4NH can learn from and build on experiences with sex- and age-disaggregated data collection, analysis and targeting, and with integrating gender issues, in order to make A4NH research teams more

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14 Youth is defined as ages 15 – 24
cognizant of incorporating youth issues when defining outcomes, setting and implementing the research and partnership agendas, and identifying and validating impact pathways.

Within agri-food systems, young people play a range of roles (e.g. producers, employees, consumers). Youth is a time of transition and is a crucial window for interventions focusing on changing knowledge, attitudes, and practices about dietary choices, gender roles, agricultural production, and other issues that could influence for nutrition and health outcomes. Adolescent nutrition, specifically for girls, is important with respect to the life cycle approach to nutrition because it has implications for maternal nutrition. Age is also an important factor in intra-household decisionmaking, as young people, especially young wives or daughters-in-law, may not be empowered to make decisions that affect nutritional and health outcomes.

Some A4NH projects already use age-sensitive approaches (e.g. innovative behavior change communication strategies targeted at different age groups); in Phase II, we aim to make age-sensitive methodologies more explicit and informative.

A4NH youth issues will fall under the mandate of the GEE unit. To develop and implement our youth strategy (Annex 3.4), we will build on our experience integrating gender conceptually (e.g. through agriculture-nutrition pathways) and operationally in A4NH research projects. Projects will be expected to treat youth as a distinct social group, reporting if data collected and analyzed are disaggregated by age groups, and identifying the youth-centered research questions in their study design.

PROGRAM STRUCTURE AND FLAGSHIP PROGRAMS
A4NH has made some important changes in program structure that reflect lessons learned from Phase I and the increased emphasis on health in the new SRF. As a result, we have three aims for Phase II of A4NH:

- Increase the attention to consumption and diet quality, and expand the value chains for enhanced nutrition approach to a food systems approach that look across individual commodities and value chains. Thus, we will launch a new partnership with Wageningen UR, and benefit from its disciplinary expertise and experience in food system analysis and private sector partnerships.
- Give greater importance to engaging with countries around nutrition-sensitive agricultural programs and policies, and on new food systems research. This builds on major successes in Phase I creating and supporting an enabling environments for nutrition. Important IFPRI policy vehicles, such as Regional Strategic Analysis and Knowledge Support System (ReSAKSS) and Country Strategy Support Programs (CSSPs) are increasingly being asked for knowledge and evidence on agricultural solutions for improving nutrition and health. We will also provide support to country M&E activities, strengthen capacity for cross-sectoral nutrition and health engagement, and support leadership in national policy processes.
- Expand our work on agriculture and human health to respond to emerging threats where agriculture may have a role, such as the use of antibiotics in livestock and its contribution to AMR. Consequentially, we need to strengthen CGIAR’s relationships with public health research institutions. The new partnership with LSHTM will help us engage the public health research community in joint research with CGIAR. Appropriately, the four A4NH FPs from Phase I will be adjusted to form five FPs in Phase II (Figure 1.1), which fit together to create a portfolio of research designed to catalyze the development of nutrition- and health-sensitive agriculture and food systems.

FP1: Food Systems will focus on food systems through a value chain impact pathway and the associated policy enabling required to accelerate food system innovation, scaling, and anchoring. This FP responds to concerns about global diet trends, and demands from countries for systemic solutions that address problems, such as food insecurity, undernutrition, and overnutrition. By focusing on how food systems establish the food environment in which consumers make dietary choices, A4NH will engage with the AFS-CRPs and complement
the sustainable food systems approaches of CCAFS and WLE. It will build upon and expand the research progress from the Phase I FP on Value Chains for Enhanced Nutrition, such as the framework on value chains for nutrition (Gelli et al. 2015) as well as mechanisms for strengthening integration of nutrition into other CRPs (e.g. work with systems CRPs around nutrition-sensitive landscapes and the small-grants scheme). This FP will play an important role in building capacity within CGIAR in food systems approaches and in integrating diet, nutrition, and equity concerns through a learning platform, which will draw upon expertise from across A4NH and partners. Since food systems lies outside CGIAR’s traditional expertise, A4NH has invited Wageningen UR to lead this FP.

**FP2: Biofortification** will continue building on its highly successful phases of discovery (2003-2007) and development (2008-2013), and progress on the ambitious delivery phase, which started in 2014. While this FP still has important nutrition efficacy and effectiveness research to do, the main research questions for Phase II are not around whether biofortification works, but rather, how it can work at scale for specific crops and crop-country combinations. Innovative research in the delivery phase will focus on identifying and addressing technical, social (including gender), and institutional constraints associated with reaching hundreds of millions of micronutrient-deficient women and children, learning lessons for reaching 1 billion by 2030. Rarely have agricultural researchers, especially in CGIAR, focused on delivery science, and the HarvestPlus experience represents important opportunities to generate lessons and methods with potential application well beyond biofortification to other issues in A4NH. This FP works with crop AFS-CRPs with CCAFS and PIM.

**FP3: Food Safety** builds on Phase I achievements related to cross-Center (IFPRI, ILRI, IITA, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)), and cross-CRP (Fish, Grain Legumes, Livestock, MAIZE) collaboration, and on new global evidence of the burden of FBD. This FP takes an impact-oriented approach to food safety in markets for staples and perishables through appropriate technologies, market innovations, policies, and regulations. While there are proven strategies for managing food safety in commercial food systems, these are often inappropriate and ineffective in informal markets, where the majority of poor people buy and sell food—especially nutrient-rich perishable, like meat, milk, fish, and vegetables. FP3: Food Safety will conduct research on technological and institutional solutions and appropriate policy and regulatory options that align public health goals with country priorities to ensure that food is both safe and equitable for the poor.

**FP4: SPEAR** will continue important research in strengthening the evidence base for agricultural solutions to improve nutrition and health. It will build on faster-than-expected progress on ANH policy, and will pro-actively respond to demands for cross-sectoral capacity and engagement at country and global levels. This FP includes a solid portfolio of evaluations that will help answer key questions about program impacts and cost-effectiveness in Phase II. Methods and findings from impact and process evaluations will have an important influence on future directions of research and investment in this area. FP4: SPEAR builds on Phase I research on creating and sustaining enabling environments that deliver impact at scale as well as on Phase I involvement with the Scaling Up Nutrition (SUN) movement, the Africa Union’s CAADP investment planning process, and the 2014 and 2015 Global Nutrition Reports. This FP will provide greater guidance to other FPs and CRPs on cross-sectoral policy process analysis and engagement, and play a greater role in representing CGIAR in national and regional nutrition and health policy processes.

Phase I included limited research on human health risks associated with agricultural production. Starting in the Extension Phase, A4NH began engaging with a select group of public health research institutes and donors to explore (and ultimately confirm) interest in partnering on a new FP on agriculture and health. We conducted a series of regional consultations with public health partners, which culminated in a consultation in London in June 2015. To bridge agriculture and public health research and facilitate integrated actions to improve human
health, A4NH has invited LSHTM to co-lead **FP5: Improving Human Health** with ILRI. Research priorities include health effects of ecosystem changes (e.g. large-scale agricultural water use), shared disease risks and their control between people and animals, and opportunities to increase health benefits, in addition to emerging challenges, such as AMR and chemical resistance, requiring coordinated health and agriculture actions.

While each FP has distinct research questions, impact pathways, and partnerships, cross-FP collaboration is expected to enhance efficiency and effectiveness. FPs will also work closely with three cross-cutting units: CCE, GEE, and MEL.

**CROSS-CRP COLLABORATION AND SITE INTEGRATION**

A4NH has a dual role in providing a strong research program on ANH in CGIAR’s portfolio as well as an integrating role as the CGIAR lens on nutrition and health (SLO2). For this integrating role, A4NH seeks to work with CGIAR Centers and other CRPs in three main ways:

- Joint research with other CRPs, particularly in CGIAR Site Integration countries;
- Networking and mutual learning, including capacity strengthening, conducted through FP-led learning platforms or CRP-led communities of practice; and
- As a bridge to global, regional, and national nutrition and health communities.

All of A4NH’s FPs in Phase II will collaborate with other CRPs in one or more of the ways listed above. The specific activities are described in detail in Annex 3.6. Some illustrative examples for each FP are listed below.

- **FP1: Food Systems** will conduct joint research with several AFS-CRPs linking value chain innovations to changes in diet quality, including with CCAFS and WLE on sustainability issues in food systems, and with PIM on agriculture and economic development issues in food systems. This FP will also host a new learning platform for networking and mutual learning around food systems for healthy diets with other CRPs.

- For **FP2: Biofortification**, this CGIAR-wide function pre-dated A4NH (Challenge Program) and has continued with strong and well-funded joint research and, in Phase II, a focus on mainstreaming nutrition into breeding.

- **FP3: Food Safety** will add a food safety perspective to value chain research conducted by the AFS-CRPs on Dryland Cereals and Legume Agrifood System (DCL), Fish, Livestock, and MAIZE.

- **FP4: SPEAR** will collaborate with two FPs in PIM to do research on integrating social protection with complementary agricultural interventions and on understanding and supporting cross-sectoral policy processes.

- **FP5: Improving Human Health** will host a Platform for Public Health and Agriculture Research Collaboration, convened by LSHTM, which will serve as a resource for other CRPs looking to collaborate on agriculture and health. For its work on irrigated cropland and health, research sites will be coordinated with RICE, and scientists from WLE will consult with scientists from this FP on health risks and benefits in expansion of irrigation in Africa.

CGIAR Site Integration intends to improve the alignment of research, the coordination of delivery, and improve country-level collaborations. Improving partnerships with country-level stakeholders is also a central objective of the second phase of A4NH. A4NH has identified five focus countries for Phase II, four of the highest priority countries for CGIAR Site Integration (Bangladesh, Ethiopia, Nigeria, and Vietnam) plus India. In these countries, the new A4NH CCE unit will support country teams comprised of A4NH FP researchers, other CRPs, and partners who will carry out joint research and take responsibility for the Site Integration Plans (when developed). The country teams will each be managed by one A4NH managing partner (IITA in Nigeria, ILRI in Ethiopia, CIAT in Vietnam, and IFPRI in Bangladesh and India). Given our strong emphasis on country strategy and planning, we will coordinate with IFPRI’s CSSPs (in Bangladesh, Ethiopia, and Nigeria), and in the focus
countries in Africa through the ReSAKSS network. For the other Site Integration countries where A4NH is active, responsibility for the Site Integration Plans will be managed by individual FPs. For example in Kenya, most A4NH research is in FP3: Food Safety and FP5: Improving Human Health, which are led or co-led by ILRI; ILRI will be responsible for linking A4NH with Site Integration. All of this is detailed in Annex 3.6.

PARTNERSHIPS AND COMPARATIVE ADVANTAGE
A4NH partners with four broad categories of individuals or organizations: researchers, actors in value chains, development program implementers, and enablers. The relative level of involvement varies (e.g. grows, reduces, or maintains) based on the stage of research (Figure 1.4).

Figure 1.4. Partner involvement at each stage of research

More than 30% of the total budget was expended by non-CGIAR partners in Phase I, and this is expected to continue to increase as A4NH scales up its work and invests in strengthening national partnerships, especially in our five focus countries.

In terms of CRP functions, partners fall into three categories in Phase II: managing partners, strategic partners, and collaborating partners.

Managing partners will include the five CGIAR Centers (Bioversity International, CIAT, IFPRI [as Lead Center], IITA, and ILRI) plus Wageningen UR and LSHTM. They will be represented on the A4NH PMC, will recruit and co-manage FP and cluster leaders and researchers, and will actively support CRP-level resource mobilization, communication, and advocacy.

Strategic partners will conduct joint research and will carry out country coordination activities in our five focus countries. They will participate in at least one FP, dedicate human and financial resources to the FP, and will actively engage in research with other A4NH partners.
Collaborating Partners represent all others working with A4NH to make research for development contributions. These are usually partnerships for specific research, country activities, or communication.

For more detail on partners and partnership modalities, see Annex 3.1

Comparative advantage of CGIAR and A4NH on nutrition and health
The A4NH external evaluation cited A4NH’s considerable comparative advantage in ANH research. CGIAR is the world’s leading international agricultural research for development organization, and IFPRI, our Lead Center, has a unique comparative advantage within CGIAR as having a critical mass of leading nutritionists and economists evaluating nutrition-sensitive programs and policies that link to global processes, such as SUN. For regional and national policy engagement and relevance on nutrition-sensitive agriculture, A4NH is well-positioned to work through IFPRI’s ReSAKSS and CSSPs. The other managing partners have experience managing multi-institutional programs in particular sectors and regions. To address the emerging challenges in Phase II, A4NH will go outside the CGIAR to seek expertise in two key areas: food systems and public health. As described above, Wageningen UR and LSHTM will play leadership roles in two FPs, bringing with them research excellence, partnership skills and collaborator networks.

Delivering International Public Goods (IPGs)
Our Phase I FPs delivered important IPGs in the form of publications, technologies, and datasets, which are described in the respective FP sections of this proposal. In Phase II, we expect our IPG potential to expand, as more advanced FPs (including FP2: Biofortification, FP3: Food Safety, and FP4: SPEAR) begin to produce comparative and meta-analyses and syntheses based on breeding, nutrition, and impact work. Scientific results will be translated into tools and guidelines to facilitate widespread uptake and use. For FP1: Food Systems, there will be multi-country assessments and analyses of food systems to better understand the drivers of diet change, food system and nutrition transformation for improved health, as well as innovative methods and metrics for looking at nutrition and health issues in value chains and food systems. Research from FP5: Improving Human Health will fill important evidence gaps on key global issues, such as agriculture’s role in AMR and generating important data sets such as linking detailed spatial data from agriculture and health. A4NH will also support three platforms and a community of practice to share findings, strengthen capacity and build stronger networks between the CGIAR and nutrition and public health communities.

EVIDENCE OF DEMAND AND STAKEHOLDER COMMITMENT
Nutrition is at an historic high on the global policy agenda. Through the SUN movement, donors and national leaders from 56 countries have made commitments to reducing malnutrition. Agriculture and food systems play key roles in the solution. In Africa, there has been an explicit recognition of the important role of agriculture, as evidenced by the food and nutrition security pillar of CAADP, which represents 20 of the 34 countries with the highest burden of malnutrition. These high-level commitments are stimulating demand for evidence of what works and what can be cost-effectively scaled out. In Phase I, even intermediate A4NH research products such as presentations of initial results and discussion papers were quickly translated into guidance and manuals by platforms such as Ag2Nut and Secure Nutrition, nutrition strategies of donors and countries, and the Global Nutrition Report that supports countries to monitor and improve nutrition performance.

Despite obvious linkages between agriculture and health, and between health and nutrition outcomes, the health sector is not as closely aligned to agriculture development as nutrition currently is. The one exception is around One Health thinking, particularly on the control of zoonoses that have human epidemic or pandemic potential (Severe Acute Respiratory Syndrome (SARS), avian flu). The new SRF increases the focus on generating evidence and raising awareness of the potential for agriculture to contribute to improved health
outcomes. Collaboration between the agriculture and health sectors, not only on food safety issues—which are likely to move quickly up the global health agenda during Phase II on the basis of new evidence on the size of the burden of FBD (Havelaar et al. 2015)—but also on other emerging global health threats, such as AMR, vector and pest resistance, and misuse of chemicals, can help meet the growing demand for better evidence and more effective, sustainable solutions. Our public health partners have expressed strong interest in engaging agriculture not only for its role in reducing the risk of diseases, but also for more sustainable prevention of disease in the face of drug and chemical resistance.

As a reflection of demand for A4NH research, our bilateral funds have grown dramatically from roughly $30 million in 2012 to over $70 million in 2015. Much of this has been in our proven research areas, such as FP2: Biofortification, FP3: Food Safety, and FP4: SPEAR. We have documented this expanded grant portfolio to show how the current grants fit into a coherent research program and included it with our full proposal (see “Funding the A4NH Agenda” in Other Annexes). Our Phase II portfolio addresses demands from target countries for solutions that are not yet identified, but urgently needed. Given the complexity of the challenges, the solutions will likely lie outside the traditional areas of CGIAR expertise, requiring new partnerships and investment to build capacity and networks among researchers and other stakeholders. Countries are looking for comprehensive food system solutions, including options for leveraging private sector investments that not only combat undernutrition, but also address food safety concerns in domestic markets and mitigate the growing problem of overweight and obesity. FP1: Food Systems will engage directly with these issues. Countries and donors are also placing high priority on preventing and treating infectious disease, an area with minimal effective collaboration between public health and agricultural researchers to date. LSHTM in FP5: Improving Human Health will convene a platform of public health and agriculture researchers to collaborate in research areas such as EcoHealth and AMR in which collaboration is essential, but has been limited.

CAPACITY DEVELOPMENT

1. CapDev role in impact pathway

Capacity development is a critical part of the overall A4NH impact pathway and the impact pathways of individual FPs. The A4NH Capacity Development Strategy (Annex 3.2) is based on the A4NH results framework and places particular emphasis on building capacity among researchers to develop and use the innovative methods and metrics necessary for the multi-sectoral nature of ANH research; among actors in value chains, including farmers, to test and use technologies and other innovations that improve the nutritional quality and safety of crops and food; among development program implementers to apply evaluation results, including technologies, practices, and programming modalities, in the design of more effective ANH programs; and among policymakers, including research leaders and policy analysts in national institutions, to build and sustain enabling environments that support country performance for improving nutrition and health through agriculture.

A4NH cannot achieve these results alone. In Phase II, we will invest in working with partners, other CRPs, and those outside CGIAR, through a variety of mechanisms, which are described more fully in Annexes 3.1, 3.2, and 3.6. As an ICRP, A4NH has a role to play in strengthening capacity across CGIAR and adding value to other CRPs to enhance contributions and reduce risk of unintended negative consequences to the SLOs. Our commitment to strengthening capacity is demonstrated by the CoPs and learning platforms we will host and our co-investments in the ANH Academy. A sample of the strategic capacity development actions A4NH will prioritize in Phase II are summarized below and described in more detail in Annex 3.2.

2. Strategic CapDev actions (see CapDev Framework)
<table>
<thead>
<tr>
<th>3. <strong>Intensity of implementation of chosen elements (Please indicate High, Medium, Low)</strong></th>
<th>Give an indication of how chosen elements will be implemented</th>
<th>Indicators that can be used to track progress and contribute to CapDev Sub-IDOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capacity needs assessment and intervention strategy design</td>
<td>Medium</td>
<td>Provide more focused response to countries and networking between countries on essential capacities that will allow key nutrition champions to participate more actively in strategy design (FP4: SPEAR); inform activities of learning platforms and CoPs.</td>
</tr>
<tr>
<td>2. Design and delivery of innovative learning materials and approaches</td>
<td>High</td>
<td>Working groups (TBD) on metrics and methods through the ANH Academy (all FPs)</td>
</tr>
<tr>
<td>3. Develop CRPs and Centers’ partnering capacities</td>
<td>Medium</td>
<td>Identify and build the capacity of partners at the national, regional, and global levels to work across sectors to increase the effectiveness of research and development partnerships (all)</td>
</tr>
<tr>
<td>4. Developing future research leaders through fellowships</td>
<td>Medium</td>
<td>Support future multi-disciplinary research leaders, in partnerships with regional academic institutes and programs and form a community of practice across this broad research area through the ANH Academy (all)</td>
</tr>
<tr>
<td>5. Gender-sensitive approaches throughout capacity development</td>
<td>Medium</td>
<td>Expand gender and nutrition CoP to help evaluation and gender staff in other CRPs apply state-of-the-art methods and tools (all)</td>
</tr>
</tbody>
</table>
| 6. Institutional strengthening | High | Convene annual global and regional events to look at both innovation and on development outcome demands between agriculture research and nutrition and health policy and advocacy communities with European Union-UN Children’s Fund (EU-UNICEF), SUN Civil Society and other networks (FP5: Improving Human Health).
As part of new Phase of CAADP, work with selected countries in developing the National Agricultural strategies part of country strategy support programs |
|---|---|---|
| # of countries who have developed or are developing evidence generation and use cycles/systems by collaborative engagement involving two or more stakeholders.
CRPs and CGIAR Centers reporting enhanced nutrition sensitivity of programs.
# of national agriculture strategies that include nutrition as specific development outcome and integrate nutrition goals in agriculture. |

<table>
<thead>
<tr>
<th>7. M&amp;E of capacity development</th>
<th>Medium</th>
<th>A4NH will monitor its capacity contribution using the indicators identified in this table as part of its M&amp;E</th>
</tr>
</thead>
<tbody>
<tr>
<td>We will keep track of participation in and conduct evaluations of CapDev events. In some FPs, like FP3 and FP4, the effectiveness of alternative means of building capacity is actually a research issue and will be tracked and assessed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 8. Organizational development | Low | Strengthen national level nutrition taskforces and committees to better integrate nutrition in the national agricultural investment plans in selected countries (e.g. through CAADP)
Collaborate with NARS in select countries to change knowledge, attitudes and practices as they relate to mainstreaming biofortification (FP2: Biofortification) and managing food safety risks (FP3: Food Safety) |
|---|---|---|
| # of CAADP investment plans that incorporate A4NH research results in selected country programs
National systems with better organizational capacity for biofortification
National systems with improved organizational capacity for food safety research |

<table>
<thead>
<tr>
<th>9. Research on capacity development</th>
<th>Low</th>
<th>Learn from current capacity building approaches (in Evidence Informed Decision-making in Health &amp; Nutrition (EVIDENT) and African Nutrition Leadership Programme (ANLP), for example) and apply to approaches in this FP and across CGIAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review methods used for strengthening capacity in A4NH to improve their effectiveness and scalability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Capacity to innovate</td>
<td>Medium</td>
<td>Innovation opportunities to strengthen nutrition policy process will be explored as part of FP4: SPEAR; food system innovation in FP1: Food Systems.</td>
</tr>
</tbody>
</table>
PROGRAM MANAGEMENT AND GOVERNANCE

The **Lead Center** for A4NH will continue to be IFPRI. This choice reflects IFPRI’s research excellence and global leadership in nutrition and its demonstrated capacity to govern and manage A4NH in Phase I. A4NH’s governance arrangements will follow **CGIAR principles**, including the CRP governance and reporting structure described, and practices recommended by the A4NH external evaluation. IFPRI will continue to have overall fiduciary and operational responsibility for the implementation of A4NH. The Board of Trustees and Director General (DG) of IFPRI will be accountable for the overall execution and for the effective engagement of the different partners in A4NH. IFPRI will be responsible for the overall CGIAR reporting requirements. Along with the other six managing partners (Bioversity, CIAT, IITA, ILRI, LSHTM, and Wageningen UR), IFPRI will have responsibilities for FP management and country coordination. All the managing partners will have members on the A4NH PMC and agree upon responsibilities and budgets with IFPRI through program participant agreements.

The member composition of A4NH’s current **Independent Advisory Committee (IAC)** fits CGIAR’s requirements of an **Independent Steering Committee (ISC)**. In Phase II, the IAC will be reconstituted as the ISC to enable it to take on a more active governance role. The ISC will not only provide advice on strategic direction and priority-setting for the overall program as the IAC did, but it will undertake a formal review and approval of A4NH’s annual plan of work and budget, plans for program evaluations, and strategies. Per the CGIAR principles, the ISC will take part in assessing the performance of the CRP Director by providing advice to the IFPRI DG, who is responsible for the CRP Director’s review. As in Phase I, there will be eight independent members of the ISC. There will be three ex-officio members: the IFPRI DG, one Director from among the six managing partners, and the CRP Director. The ISC will report to the IFPRI Board annually with recommendations and proposed management responses. Potential conflicts between the governance role of the ISPC and the IFPRI Board will be managed and documented based on CGIAR principles.

In Phase II, a larger **PMC** for A4NH is proposed. We plan to enhance the role of CGIAR managing partners by having the five CGIAR managing partners represented on the PMC at the Deputy DG (DDG) or Program Director level. The two external managing partners—Wageningen UR and LSHTM—will also have high-level institutional representatives on the PMC. Each managing partner’s representative will report on the managing partner’s responsibilities, which would include FP/CoA and country coordination leadership to the PMC. The five FP leaders, plus the A4NH Director, as well as one member of the GEE unit and one member of the MEL unit, will be members. The 15 members of the PMC will meet face-to-face twice annually and virtually on a monthly basis.

Individual FPs will be encouraged to have their own management groups. For the three FPs with continuing leadership from Phase I, management will build on past systems. For the two FPs with external leaders (Wageningen UR) or co-leaders (LSHTM), the FP leader will have a reporting relationship to the lead institution(s) and the CRP Director. The A4NH external evaluation found that in Phase I most FP leaders had limited authority and incentive to manage aspects of their FP that fell outside their own institution or research program. To address this in Phase II, FP and CoA leaders will have more control over budgets and over which projects are mapped to the FP than they did in Phase I. Phase II RBM and MEL systems will help and support them to manage programmatically, based on FP and CoA ToCs. FP leaders will have the support of research coordinator.

John McDermott will continue as A4NH Director and leader of the PMU. The PMU has two main functions: to support FP leaders, the ISC, and the PMC in all aspects of program implementation, and to coordinate CRP-level programming for monitoring, evaluation, reporting, and learning; strategic partnerships; capacity development; knowledge management; and communications. Following advice from the A4NH external
evaluation, we plan to specifically strengthen MEL to support our RBM approach and our internal CRP communications in Phase II. Key members of the PMU will continue in their positions, specifically senior staff Nancy Johnson, Hazel Malapit, and Agnes Quisumbing (see CVs in Annex 3.7).

Two of the five FP leaders who are currently leading existing programs will continue as leaders: Delia Grace, and Stuart Gillespie. Both are outstanding research leaders with demonstrated capacity for leading multi-institutional research for development partnerships. In November 2015, Howdy Bouis announced his retirement as director of HarvestPlus. The search for his replacement is ongoing, but his successor will be hired before or soon after Phase II begins, and will lead FP2: Biofortification. For FP5: Improving Human Health, the co-leads, ILRI and LSHTM, have proposed Eric Fèvre, who currently holds a joint appointment with ILRI and the University of Liverpool, as the FP leader. For FP1: Food Systems, we have proposed new partnership arrangements across multiple institutions and will recruit a new FP leader (see draft Terms of Reference (ToRs) in Annex 3.7).

INTELLECTUAL ASSET MANAGEMENT
IFPRI is in compliance with the CGIAR Principles on the Management of Intellectual Assets, which deal with the dissemination of intellectual assets for maximizing global accessibility and impact. The majority of A4NH intellectual assets include knowledge, databases, publications, and other information products. All FPs may produce intellectual assets that include improved germplasm, plant variety rights, trademarks, diagnostic tests and other technologies. Management of those intellectual assets takes place at the managing or strategic partner level, in compliance with CGIAR Principles. All information products produced by A4NH are, wherever possible, disseminated using open access principles, with clear branding to recognize those responsible for producing the intellectual asset. In the cases where particular copyrights apply (e.g., in the case of some high impact journal articles), A4NH abides by the copyright rules of the publishing party. When working with private sector entities, A4NH will clarify that it is committed to open access on knowledge products and will abide by any rules that are placed on the partnership. Final products will be made public in accordance with the agreements.

For FP2: Biofortification, intellectual assets are managed through the Centers contracting with HarvestPlus. For FP3: Food Safety, intellectual assets related to food safety technologies and innovations (e.g. aflasafe™) are managed by IITA and ILRI. For FP1: Food Systems and FP5: Improving Human Health, intellectual asset management would be through the managing partners, Wageningen UR, ILRI, LSHTM, and their partners. ILRI’s intellectual assets policy and guidelines provide a good model for managing partner responsibility and compliance with CGIAR principles. More details are in Annex 3.9.

OPEN ACCESS MANAGEMENT
A4NH seeks to ensure that all research data and other information products produced by A4NH are managed to enable further research, development, and innovation, leading to the best possible impact on target beneficiaries in accordance with our mission. Our approach is consistent with the CGIAR Open Access and Data Management Policy (OADMP), meaning that information products generated under A4NH will be made available for indexing and interlinking, so that research outputs are open via FAIR (Findable, Accessible, Interoperable, Re-usable) principles. More details are in Annex 3.8.

At the CRP-level, open access management will include making partners aware of policies and providing systems and structures for partners to follow the policies. This will be operationalized through FPs and CoAs where research outputs will follow CGIAR requirements and primarily be hosted on existing platforms that CGIAR, IFPRI, or other partners manage (e.g. CGSpace, Dataverse, etc.). A4NH will continue to rely on IFPRI, as the Lead Center, and their dedicated resources and capacities through the Knowledge Management team, and
will work more closely with technical experts from our participating Centers in Phase II to overcome some of the Phase I challenges described in Annex 3.8. Of particular importance is strengthening partner data collection and archiving to facilitate the rapid availability of high-quality data.

COMMUNICATION STRATEGY
Strategic communication is central to A4NH and CGIAR as a whole. Rigorous, high-quality research and evidence must first be accessible, then shared, discussed, adapted, and used to achieve outcomes outlined in the SRF. The A4NH communication strategy plays a key role in achieving this, not only by raising visibility and demonstrating accountability, but also by making evidence, tools, and resources available to those who can use them to design more nutrition-sensitive policies and programs and to create enabling environments for nutrition and health.

Four communications objectives developed during Phase I with input from the PMC and IAC help guide the A4NH: 1) Influence food and agriculture development agenda; 2) support decisionmakers with the information, evidence, and tools they need to make change; 3) generate and promote high quality evidence on nutrition-sensitive agriculture; and 4) increase visibility and demonstrate accountability of A4NH and CGIAR.

A4NH employs a combination of six communication elements in its communication strategy: engaging in policy dialogue to scale up results; engaging with actors on the ground to scale out technologies and practices; communicating the program, the science, results, and progress towards targets; communicating and engaging with partners for effective development impact; promoting learning and sharing of information to improve collaboration within and across CRPs; and making CRP information and resources open and accessible. Within these elements and others, A4NH implements the following types of activities: participating in high-level policy engagement platforms (e.g. policy briefings, discussions, webinars, and research dissemination events); translating A4NH knowledge and findings into useful formats (e.g. briefs, slides, posters, blogs, and videos) tailored for specific audiences; making A4NH evidence, tools, and resources open and accessible; and ensuring consistent and accurate CRP visibility, among others.

RISK MANAGEMENT
Based on Phase I experience and Phase II expectations, three main risk classes are expected in A4NH: partnerships, funding, and operational practices and procedures.

Partnerships are both a great opportunity and a large source of risk. In Phase II, there will be more emphasis on country-level engagement, which will complement the broader CGIAR Site Integration effort. A key factor in country coordination success will be the presence of in-country A4NH team members who can work effectively with national partners and within the overall CGIAR Site Integration effort. This will require A4NH to align better with CGIAR Centers in specific countries and to manage partnership expectations through a clear plan that appropriately manages expectations and provides sufficient human and financial resources. Engagement plans for our five focus countries will be developed with partners, in the context of the finalizing the CGIAR Site Implementation plans during 2016 and early 2017. More detail is in Annex 3.6.

Several important new research partnerships have been proposed for Phase II. Wageningen UR will lead a new area of research on food systems. For agriculture and human health, there will be a new partnership with public health research institutes, coordinated by LSHTM. The new partners are high-performing and create comparative advantage for A4NH in newer research areas. Beyond their research quality, Wageningen UR and LSHTM have excellent experience leading and participating in research consortia, but, as with any new partnership, considerable care will be required to clarify roles, responsibilities, and joint working relations.
In Phase I, the importance of aligning participating Centers to agreed objectives, outcomes, and operations was a critical challenge. More recently, A4NH has made considerable investment in documenting Center performance and key facets of participation in A4NH for such alignment discussions. Given the importance of effectively mobilizing partners to manage for results, we will engage a smaller group of partners to be actively engaged in A4NH management (managing partners). This arrangement should strengthen partners’ commitment to plan, effectively manage human and financial resources, enhance research quality and monitor, evaluate and learn more effectively together.

From Phase I, a major risk in 2015 and 2016 was the volatility of funding. Funding from Window 3 (W3)/bilateral sources was consistently obtained for more mature research areas, but this comes from considerable effort and organization. However, funds for newer research areas have been much more difficult to obtain and thus planning is more difficult. A number of actions have been put in place to increase fundraising success, most importantly improving A4NH’s comparative advantage with new external partners. CGIAR funding, particularly Window 1 (W1) funding, has been extremely volatile, particularly in 2016. Despite consistently effective resource mobilization from W3 and bilateral grants and relatively consistent support from Window 2 (W2) donors in Phase I, A4NH funding has been volatile, particularly for new research areas in 2016, due to much greater cuts in W1 funding. The practice of blending W1 and W2 funding is a disincentive for donors and researchers and a major constraint to more predictable funding. We can expect this will be resolved in Phase II.
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