CGIAR Advisory Services

# CGIAR Research Program 2020 Reviews: Agriculture for Nutrition and Health (A4NH)

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Date: 30 June 2020

Recommended citation: CAS Secretariat (CGIAR Advisory Services Shared Secretariat). (2020). *CGIAR Research Program 2020 reviews: Agriculture for Nutrition and Health*. Rome: CAS Secretariat Evaluation Function. https://cas.cgiar.org/

Cover image: Farmer tending beans, Rwanda (CIAT/N.Palmer)

Design and layout: Luca Pierotti and Macaroni Bros

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# Acknowledgments

This evaluation was prepared by a team led by Laurian Unnevehr, providing subject matter expertise, and the evaluation techniques implemented under the authority of Karen McHugh. The two-person team worked under the overall direction of Allison Grove Smith, director, CGIAR Advisory Services Shared Secretariat. Ravi Ram, evaluation consultant to CAS Secretariat, coordinated and managed the effort. Paolo Sarfatti served as senior advisor to the evaluative reviews project in 2020. Angela Gimenez Barrera, Gaia Gullotta, and Max Runzel provided analytical support before and during the reviews. Much data were obtained from the System Organization results dashboard, managed by Julien Colomer.

CAS/Evaluation and the evaluation team gratefully acknowledge the assistance and cooperation of the Agriculture for Nutrition and Health (A4NH) Program Management Unit and A4NH staff. Special thanks go to Amanda Wyatt, A4NH program manager, for providing much timely assistance and answers to many questions.

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# Abbreviations

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|---|---|
| A4NH | Agriculture for Nutrition and Health |
| ACIAR | Australian Center for International Agricultural Research |
| AMR | Antimicrobial resistance |
| ANH | Agriculture, nutrition, and health |
| ARI | Advanced research institution |
| ATTC | Aflasafe Technology Transfer and Commercialization project |
| AU | African Union |
| AUC | African Union Commission |
| Bioversity | Bioversity International |
| BMGF | Bill and Melinda Gates Foundation |
| BPI | Biofortification Prioritization Index |
| CAADP | Comprehensive Africa Agriculture Development Program |
| CapDev | Capacity development |
| CAS | CGIAR Advisory Services Shared Secretariat |
| CCAFS | Climate Change, Agriculture and Food Security |
| CCE | Country coordination and engagement |
| CCEE | CRP-Commissioned External Evaluation |
| CDI | Centre for Development Innovation at Wageningen UR |
| CIAT | International Center for Tropical Agriculture |
| CIMMYT | International Maize and Wheat Improvement Center |
| CIP | International Potato Center |
| CFS | Committee on World Food Security |
| CoA | Cluster of activity |
| CoP | Community of practice |
| COVID-19 | Disease caused by novel coronavirus SARS-CoV-2 |
| CRP | CGIAR Research Program |
| CSA | Climate-smart Aagriculture |
| DFID | Department for International Development, UK |
| DG | Director general |
| EAC | East African Community |
| ECOWAS | Economic Community of West African States |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FBD | Foodborne disease |
| FP | Flagship program |

| | |
|---|---|
| FTE | Full-time equivalent staff year |
| GAAP2 | Second phase of the Gender, Assets, and Agriculture Program |
| GAIN | Global Alliance for Improved Nutrition |
| GAP | Good agricultural practice |
| GEE | Gender, Equity, and Empowerment |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit |
| GMO | Genetically modified organism |
| GPG | Global public good |
| HFPP | Homestead food production program |
| HKI | Helen Keller International |
| IAC | Independent Advisory Committee |
| ICRP | Integrated CRP |
| IDO | Intermediate Development Outcome |
| 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 |
| ILRI | International Livestock Research Institute |
| IMMANA | Innovative Methods and Metrics for Agriculture and Nutrition Actions |
| INGO | International nongovernmental organization |
| IPG | International public good |
| IPM | Integrated pest management |
| ISC | Independent Steering Committee |
| ISPC | Independent Science and Partnership Council |
| IWMI | International Water Management Institute |
| JCR | Journal citation report |
| KM | Knowledge management |
| LANEA | Leveraging Agriculture for Nutrition in East Africa |
| LANSA | Leveraging Agriculture for Nutrition in South Asia |
| LCIRAH | Leverhulme Centre for Integrative Research on Agriculture and Health |
| LMIC | Low- and middle-income countries |
| LSHTM | London School of Hygiene and Tropical Medicine |
| LSMS | Living Standards Measurement Survey |
| MARLO | Managing Agricultural Research for Learning and Outcomes |
| M&E | Monitoring and evaluation |
| MEL | Monitoring, evaluation, and learning |

| | |
|---|---|
| MELIA | Monitoring, evaluation, learning, and impact assessment |
| MLA | Monitoring, Learning and Assessment (HarvestPlus) |
| MoU | Memorandum of understanding |
| NARS | National agricultural research system |
| NGO | Nongovernmental organization |
| NSAP | Nutrition-sensitive agricultural program |
| OA | Open access |
| OADMP | Open Access and Data Management Policy |
| OICR | Outcome Impact Case Report |
| PACA | Partnership for Aflatoxin Control in Africa |
| PIM | Policies, Institutions and Markets CRP |
| PMC | Planning and Management Committee |
| PMU | Program Management Unit |
| POSHAN | Partnerships and Opportunities for Strengthening and Harmonizing Actions on Nutrition in India |
| POWB | Plan of work and budget |
| PPA | Program Participant Agreement |
| PPP | Public-private platform |
| Pro-WEAI | Project-level Women's Empowerment in Agriculture Index |
| RBA | Rome-based agencies |
| RBE | Reach Benefit Empower |
| RBM | Results-based management |
| SDG | Sustainable Development Goal |
| SLO | System-Level Outcome |
| SME | Small and medium-sized enterprises |
| SPEAR | Supporting Policies, Programs, and Enabling Action through Research |
| SRF | Strategy and Results Framework |
| SUN | Scaling Up Nutrition |
| ToC | Theory of change |
| ToR | Terms of reference |
| UNSCN | United Nations System Standing Committee on Nutrition |
| USAID | United States Agency for International Development |
| USDA | United States Department of Agriculture |
| VC | Value chain |
| VCN | Value chain for enhanced nutrition |
| W1 | Window 1 |
| W2 | Window 2 |
| W3 | Window 3 |

| | |
|---|---|
| WUR | Wageningen University and Research Centre |
| WEAI | Women's Empowerment in Agriculture Index |
| WEAI4VC | Women's Empowerment in Agriculture Index for Value Chains |
| WINGS | Women Improving Nutrition through Group-based Strategies |
| WFP | World Food Programme |
| WHO | World Health Organization |

# Executive Summary

## Background and Context

A4NH is one of four cross-cutting Global Integrating Programs within the CGIAR portfolio. A4NH focuses on the potential for agriculture to significantly improve nutrition and health. It began Phase I in 2012, led by IFPRI with nine other participating CGIAR Centers. In Phase II (2017–2021), A4NH continues to be led by IFPRI and is now managed by a group of four other CGIAR Centers (CIAT, Bioversity, ILRI, IITA) and two academic institutions (WUR, LSHTM). Research activities are carried out through five flagship programs (FPs): FP1–Food Systems for Healthier Diets; FP2–Biofortification; FP3–Food Safety; FP4–Supporting Policies, Programs, and Enabling Action through Research (SPEAR); and FP5–Improving Human Health. Two of these flagships, FP1 and FP5, are new in Phase II.

## Purpose and Scope of the A4NH 2020 Review

In 2020 the CGIAR CAS Secretariat is conducting independent reviews of the 12 CGIAR Research Programs (CRPs), including this one of A4NH. The reviews will provide information on quality of science and effectiveness in each CRP. This review covers the Phase II years of 2017 through 2019, with a view to identifying lessons for future research modalities.

## Review Questions

1. To what extent does the CRP deliver quality of science, based on its work from 2017 through 2019?
2. What outputs and outcomes have been achieved, and what is the importance of those identified results?
3. To what extent is the CRP positioned to be effective in the future, seen from the perspectives of scientists and of the end users of agricultural research (such as policymakers, practitioners, or market actors)?

## Methods for the Review

Sources of data and information for the review include A4NH program documents; interviews with A4NH leaders, donors, and partners; staffing and financial resources; and annual reporting data (2017–2019) related to the CGIAR common results reporting indicators (CRRIs), including outcome impact case reports (OICRs), plus bibliometric studies of the 528 reported peer-reviewed journal articles. Details of analysis methods are provided within the report.

## Important Findings and Conclusions

### *Quality of Science*

The A4NH program has a strong footprint in the scientific literature. A4NH publications appear in high-impact journals across a broad set of disciplines, indicating the subject matter reach of this global integrating program. The vast majority of this published research is relevant to the core program objectives. There are high-impact contributions from all flagships. Most published research demonstrates international collaborations with both advanced research institutions (ARIs) and country partners. A4NH researchers are productive in terms of journal article publication and impact, and diverse in terms of disciplinary affiliation and gender. New external institutional partnerships have broadened the scope of research in A4NH and have brought about new and meaningful program collaborations.

### *Achievement and Importance of Planned Outcomes*

A4NH set out ambitious numeric 2022 targets for adoption of improved varieties and crop production practices, as well as reducing the number of people suffering from micronutrient deficiencies or

consuming limited diets. Substantial progress has been made in farm households' adoption of biofortified varieties (and associated reductions in micronutrient deficiencies). By the end of 2019, the number of farm households growing biofortified crops had reached 8.5 million—double the number from three years earlier—and 95,000 households had adopted aflatoxin controls. No progress has been reported on improving dietary diversity. Proposed system-level outcome (SLO) targets will not be achieved (e.g., 20 million farm households), in spite of good progress. However, A4NH innovations at the delivery stage appear to have further potential for scaling up and out.

A4NH is producing important global public goods with health and nutrition benefits. In many cases, A4NH impact comes through tools or methods applied by next-stage users to improve programs or policies. It is clear that A4NH has succeeded in influencing nutrition and health policies and investments at global, regional, and national levels. The newer portions of the A4NH program in FP1 and FP5 are just getting underway and will need more time to demonstrate impact. There are missed opportunities for sharing lessons across FPs and countries, including in the use of gender tools.

### *Management and Governance*

A4NH management has successfully leveraged modest Window 1/Window 2 (W1/W2) funding toward program growth by making strategic investments, including in the new external managing partners (LSHTM and WUR). The Country Coordination and Engagement (CCE) unit, composed of five focus country teams, is one of those investments, and this has proved to be a useful approach that might warrant further investment. Many resources are utilized to meet reporting requirements that are confusing, expanding, and frequently changing. Research programs are unable to use the reporting system for their own internal management, monitoring, and learning. Thus the CGIAR mandated reporting system is not just burdensome but wasteful. The report provides guidance on improvement.

### *Cross-Cutting Dimensions*

A4NH's Gender, Equity, and Empowerment (GEE) unit is making significant scientific and policy contributions, but the unit's efforts are not well utilized in most FPs owing to resource constraints. Capacity development takes place at all levels but has been enhanced at the CRP level by the ANH Academy, which convenes researchers annually for training seminars across disciplines and sectors. It is a useful model for global integrating programs. External partnerships are a strength of the A4NH program. A4NH benefits from over 240 external partnerships, which include ARIs, governments, nongovernmental organizations (NGOs), and the private sector.

### *Assessment of the Theory of Change*

A4NH is clearly influencing policies and programs and providing innovations that are being taken up along value chains. But a lack of coherence in the use of a theory of change makes progress difficult to assess. Rethinking the theory of change to link desired outcomes to measurable indicators of progress will be useful in future research modalities, and detailed examples are given in the report.

### *Future Orientation*

A4NH has made real progress in bringing a nutrition and health focus to the CGIAR and building out from legacy programs. As a result of the A4NH CRP, the CGIAR is now engaged with and recognized by a wider audience in nutrition and in health. COVID-19 has delayed progress but also brought a new spotlight to A4NH research in One Health and demonstrated why One Health will be an important part of CGIAR research moving forward. The food systems approach in nutrition is gaining momentum worldwide, and A4NH is well positioned to contribute. The creation of a CGIAR Gender Platform is also promising, and the innovative work in the A4NH GEE unit may find a broader audience there. The inclusion of external partners (WUR and LSHTM) in A4NH has now been consolidated and is paying dividends in terms of connectivity, interdisciplinary approach, expertise, and stakeholder engagement. Future research modalities should seek to reduce the economic inefficiencies (increased costs) of a CRP-type structure but maintain the added value from program integration.

## Recommendations for A4NH Plan of Work and Budget 2021

Recommendation #1: Carry out a separate strategic analysis of highest-return areas in agriculture for health to direct the research in what is now FP3 and FP5 beyond 2021.

Recommendation #2: Design a comparative study of delivery models in FP2 and FP3 in order to glean the lessons learned from comparisons of these public-private efforts for cost-effectiveness, sustainability, and scalability.

Recommendation #3: Prioritize the policy engagement and cross-country learning exercise (on processes and approaches) planned for FP1 for completion.

Recommendation #4: Carry out a scoping study to consider where and how to apply gender tools in FPs where they have not been previously used but are clearly relevant.

Recommendation #5: Complete the synthesis report on what has been accomplished in the five focus countries across flagships and through the investment in the focus country approach.

## Recommendations at the CGIAR System Level

Recommendation #1: Maintain a deliberate focus on nutrition and health in new research modalities.

Recommendation #2: Develop a plan for the future of the external partnerships supporting the two new programs in FP1 and FP5, including criteria for their continuation.

Recommendation #3: Align programs, outputs, and milestones with desired impacts by using theories of change more effectively.

Recommendation #4: Redesign and streamline the programming, monitoring, and reporting systems.

Recommendation #5: Use an incremental approach to achieving longer-term goals and longer funding cycles to facilitate measuring progress toward SLOs.

# 1 Background to the CRP 2020 Review

## 1.1 Purpose and Audience of the Review

In 2020 the CGIAR Advisory Services Shared Secretariat (CAS Secretariat) is conducting independent reviews of the 12 CGIAR Research Programs (CRPs). The reviews, commissioned by the CGIAR System, will provide information on quality of science and effectiveness in each CRP. The CAS Secretariat has been mandated to undertake this work as part of its role in providing independent evaluation and assessments to the CGIAR System. This review of the CRP on Agriculture for Nutrition and Health (A4NH) is part of this set of CRP reviews.

The primary purpose of this review is to assess the extent to which the A4NH research program is delivering quality of science and demonstrating effectiveness in relation to its theory of change. Within that primary purpose, the objectives of this independent review are as follows:

1. To fulfill CGIAR's obligations around accountability regarding the use of public funds and donor support for international agricultural research;
2. To assess the effectiveness and evolution of A4NH in its second phase, 2017–2021; and
3. To provide an opportunity to generate insights about A4NH's research contexts and programs of work, including lessons for future CGIAR research modalities.

The primary users of the reviews will be the CGIAR System Council, with insights and lessons developed from the review for use by the A4NH program. Further, the review may provide lessons that inform the transition to One CGIAR in 2022. The findings, conclusions, and recommendations may be of use in refining the CRP's 2021 Plans of Work and Budget (POWB) to the extent feasible in the remaining program year or in drawing lessons to inform future research modalities.

## 1.2 Overview of the CRP and Its Context in Research for Development

A4NH is one of four cross-cutting Global Integrating Programs (ICRPs) within the CGIAR portfolio. It focuses on the enormous potential for agriculture to significantly improve the nutrition and health of people around the world. Hunger, malnutrition, and poor health are widespread and stubborn development challenges. 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 Development and in the CGIAR Strategy and Results Framework (SRF). In its Full Proposal for Phase II (2017–2022), A4NH said it would contribute to system-level outcome (SLO) #2—Improved food and nutrition security for health, within the CGIAR Strategy and Results Framework (SRF).

A4NH begins with consumption—of healthy, affordable, and safe foods—rather than supply, offering an innovative perspective on the relationship between agriculture, nutrition, and health. A4NH began Phase I in 2012, led by IFPRI with contributions from 9 other CGIAR Centers and the World Vegetable Center, as building blocks toward this innovative approach.[1] In Phase II (2017–2021), A4NH continues to be led by IFPRI and is now managed by a group of four other CGIAR Centers (CIAT, Bioversity, ILRI, IITA)[2] and two academic institutions (WUR, LSHTM). These seven institutes are known as A4NH's managing partners. Research activities are carried out through five flagship programs in at least 30 countries and supported by three cross-cutting units.

The five flagship programs are as follows:

[1] The participating centers in Phase I were Bioversity International, CIAT, CIP, ICRAF, ICRISAT, ICARDA, IFPRI (HarvestPlus, plus mainly the Markets, Trade, and Institutions Division and the Poverty, Health, and Nutrition Division), IITA, ILRI, and WorldFish, plus the World Vegetable Center.

[2] Starting in 2020, Bioversity International and the International Center for Tropical Agriculture (CIAT) joined and are now known as The Alliance of Bioversity International and CIAT or The Alliance. For the purposes of this report, they are still referred to as separate institutions.

- **FP1: Food Systems for Healthier Diets**. FP1 seeks to contribute to healthier diets for poor and vulnerable populations by better understanding food system–diet dynamics and by identifying and enabling innovations in value chains and polices. FP1 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 subnational food systems in four target countries (Bangladesh, Ethiopia, Nigeria, and Vietnam). FP1 is led by Wageningen University and Research (WUR) with support from the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT), the International Food Policy Research Institute (IFPRI), and the International Institute for Tropical Agriculture (IITA).
- **FP2: Biofortification**. FP2 seeks to contribute to reducing micronutrient malnutrition by reaching 20 million households with biofortified crops, as well as by doing research on how delivery can be scaled and sustained and on how biofortification can be mainstreamed into public policy and crop breeding. FP2 is led by HarvestPlus.
- **FP3: Food Safety**. FP3 seeks to address the growing foodborne disease 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 safe and that poor people have access to it. FP3 focuses on mitigating aflatoxin contamination in key staples and on managing risks in informal markets for nutrient-rich perishables like meat, milk, fish, and vegetables. FP3 is led by ILRI with support from IITA and IFPRI.
- **FP4: Supporting Policies, Programs, and Enabling Action through Research (SPEAR)**. FP4 seeks to 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 cultivating and sustaining enabling environments for nutrition in South and Southeast Asia and Africa. FP4 is led by IFPRI with support from Bioversity International and the Institute of Development Studies (IDS).
- **FP5: Improving Human Health**. FP5 is an innovative collaboration between public health and agriculture researchers to mitigate risks and optimize benefits for human health from agricultural systems. FP5 focuses on managing diseases in intensifying agricultural landscapes, emerging and neglected zoonotic diseases, and emerging global challenges such as antimicrobial resistance. FP5 is co-led by the London School of Hygiene and Tropical Medicine (LSHTM) and ILRI, with support from IITA.

In the Phase II proposal, A4NH 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.

## 1.3 Scope of the Review

The review includes the work of A4NH and its flagship programs, guided by the CGIAR's quality of science and effectiveness criteria (see Annex 1) and the theories of change for A4NH and its flagship programs. The emphasis is on the CRP's sphere of control—that is, the quality of inputs, activities and outputs, and influence, that is, short-term and intermediate outcomes that are expected to lead to a development impact.

The CGIAR System defines outcome-level changes as intermediate development outcomes (IDOs) and system-level outcomes (SLOs). Expectations of documented outcomes will be informed by (a) the amount of time the research has been conducted by the CRP and its managing partners, including research prior to A4NH in the case of legacy programs, and (b) whether the A4NH's targeted first users of research outputs are within the research community or closer to market adoption. It is not expected that all planned outcomes will have been achieved at this time, because this review is conducted after three years of operation on a five-year research program (originally planned for six years). To the extent feasible, this review will assess the likelihood of achieving IDOs and/or sub-IDOs based on the documented performance of the CRP and its Flagship Programs in relation to their theories of change.

## 1.4 Review Questions

Questions for the review were provided by the CGIAR CAS. These questions were developed based on the definitions of the two review criteria (quality of science and effectiveness), existing self-reported program data, and internally funded studies by external experts (a more extended version of these questions is found in Annex 1).

1. Quality of science: To what extent does the CRP deliver quality of science, based on its work from 2017 through 2019?

2. Effectiveness: What outputs and outcomes have been achieved, and what is the importance of those identified results?

3. Future orientation: To what extent is the CRP positioned to be effective in the future, seen from the perspectives of scientists and of the end users of agricultural research (such as policy-makers, practitioners or market actors)?

## 1.5 Review Methodology

This review utilizes A4NH documentation and structured interviews with program leaders and external groups including research partners and donors (see Annexes 2, 3, and 4). The primary sources of data and information for the reviews are documents from A4NH; interviews with A4NH leaders, donors, and partners; staffing and financial resources; and annual reporting data (2017–2019) related to the CGIAR common results reporting indicators (CRRI), including outcome impact case reports (OICRs) and reported peer-reviewed journal articles as recorded in the CGIAR Results Dashboard and the online information management system known as MARLO, plus bibliometric studies by CAS of the 528 reported peer-reviewed journal articles.[3] All interviews were carried out using a common set of questions (Annex 3).

In section 2.1 ("Quality of Science"), the quality of inputs is assessed by looking at the depth and breadth of research staff skills and diversity. The quality of processes is examined through A4NH documentation of managing institution contracts. The quality of outputs is examined through the CAS-commissioned bibliometric analysis of 528 journal articles, including impact factor rankings for journals, collaborations, and keywords in order to assess the breadth and impact of publications. Additional analysis of the quality of science in selected publications is found in Annex 5. In section 2.2, analysis of progress, ToC, and impact uses A4NH documents and reports to the CGIAR to assess progress toward planned goals, the logic of the ToC, and impact in the cross-cutting dimensions. Additional analysis of the ToC is found in Annex 7. Further insights into the program's impact and use of ToC are found through a deep-dive analysis of three selected OICRs, which included review of related publications and project outputs, as well as interviews with program partners. Additional information on the OICRs is found in Annex 6. Management and governance are assessed through a review of financial reports, especially use of W1/W2 funds; memos from the Independent Steering Committee (ISC) meetings; and interviews with A4NH leaders and selected CCE units. Direct use of data from MARLO and the CGIAR Dashboard, as well as interviews with flagship program managers, informed the assessment of the reporting system.

## 1.6 Quality Assurance

CAS provided oversight for this review through regular check-ins and collection of quality assurance metrics regarding progress. A draft report was shared with both CAS and the A4NH Program Management Unit (PMU) for feedback and factual corrections.

## 1.7 Organization of the Review Team

The review team is composed of Laurian Unnevehr, the senior subject matter expert and team leader, and Karen McHugh, a senior evaluator with experience in agriculture and food security. Laurian Unnevehr is professor emerita of agricultural and consumer economics at the University of Illinois Urbana–

[3] Methods used in the bibliometric analysis follow those laid out in M. Aria and C. Curriccullo, "Bibliometrix: An R-tool for Comprehensive Science Mapping Analysis," *Journal of Infometrics* 11 (2017): 959–975, http://dx.doi.org/10.1016/j.joi.2017.08.007.

Champaign and has also held positions at IRRI, USDA, and IFPRI. During the past three decades, she has published extensively on the economics of food policy issues, including food safety in international trade, the role of new food technologies, and the role of food demand in shaping food value chains. Trained as an engineer and economist, Karen McHugh has worked in overseas cooperation for over 30 years, mainly with the European Union (EU) but also with the World Bank, the Council of Europe, the Secretariat of the Association of Southeast Asian Nations (ASEAN), and the Food and Agriculture Organization of the United Nations (FAO). She has extensive experience in the fields of rural development and natural resources management, food and nutrition security, trade and investment, private sector development, employment, and governance and institution/capacity development. She has a particularly strong background in monitoring and evaluation (M&E), having been team leader for the EU's results-oriented monitoring service in Latin America between 2003 and 2008 and in Asia and Central Asia between 2009 and 2014.

## 1.8 Limitations

This review is limited to a desk review of documents and interviews with key actors. No travel was carried out to A4NH institutions, to research field sites, or to collaborating partners by the review team. Limitations are imposed by the need to focus on a few program elements represented by the selected OICRs. Given the breadth of subject matter covered in the A4NH program, focusing on only three program elements clearly cannot be representative of the breadth of program impact. The review is also limited by the short time frame allotted to carry out the review between April 20, 2020, and June 30, 2020.

# 2 Findings and Conclusions

## 2.1 Quality of Science

### *2.1.1 Quality of Research Inputs*

It is useful to begin a review of inputs by examining the financial resources available to A4NH during Phase II. Table 1 shows actual expenditures for 2017–2019. The overall size of the program fluctuated from around $79M in 2017, to $86M in 2018, and to $83M in 2019. Total W3/bilateral funding remained fairly constant at around $63 to $66M, while W1/W2 funding increased from $15M to $20M. Funding is planned to be $86M in 2020.

- FP1 grew from $8.8M in 2017 to $13.9M in 2019, as W3/bilateral funding increased dramatically and W1 funding increased from around $3M to around $4M. The food systems concept is new to CGIAR in Phase II, and this approach has received substantial donor support, as well as investments from the A4NH W1/W2 funding.
- FP2 total funding is the largest among the flagships, and it represents a well-established legacy program in the HarvestPlus organization. Funding declined from $36 to $31.5M between 2017 and 2019, with a decline in W3/bilateral support. W1/W2 funding for FP2 has remained fairly constant for this program.
- FP3 funding increased from $12.5M in 2017 to $13.8M in 2018 and $13.6M in 2019. Variations in funding levels have followed changes in W3/bilateral funding, and W1/W2 funding increased from $2.8M in 2017 to $3.7M in 2018.
- FP4 is the second-largest flagship, reflecting its status as a well-established legacy program in IFPRI. Funding for FP4 declined from $18M in 2017 to $15M in 2019, reflecting declines in W3/bilateral funding.
- FP5, the smallest flagship, represents a new effort for CGIAR in Phase II. Funding for FP5 increased steadily from $2.4M in 2017 to $3.9M in 2019, reflecting increases in both W1/W2 and W3/bilateral funding.

These differences in resources available to the different flagship programs are useful background to the discussion of staffing and outputs below.

This review of research inputs focuses on the research staff as the most important input into science for development. This findings section uses information shared by the A4NH PMU regarding the full-time equivalent (FTE) staff and research staff mapped to the CRP in 2019, including how staff were funded (W1/W2 or W3/bilateral), institution, and gender.[4] The focus is on research leaders and key research staff. PMU staff, program managers, and administrative support staff are not included. For the purposes of this analysis and in the subsequent tables, "research leaders" are defined as flagship leaders, cluster of activity leaders, and those assigned as principal investigators on funding sources. "Research staff" are those listed as responsible for deliverables in annual work planning, other individuals self-reported by the flagship, and those listed as research staff in the roster. Additional information is found in Annex 5.

First, the total number of FTE staff funded by flagship, which includes part-time appointments across many individuals, shows the resources invested in research personnel. Total research FTE staff charged to A4NH in each flagship in 2019 showed widely varying amounts of personnel, from 64 total FTE in FP1 to only 14 in FP2 (Table 2). W1/W2 covers 41 percent of the total FTE staff and is more important for FP1, FP2, and FP5 staff.[5]

Another way of looking at staffing is to examine the individuals who are mapped to A4NH and their degree of commitment. Many research staff mapped to A4NH have only a modest time commitment or

[4] Research FTEs are based on the list of research leaders and staff and time charged by source of funding reported by managing partners to the Program Management Unit (PMU) with their annual financial reports ("Roster"). Information on FTEs is only provided for individuals from A4NH's seven managing partner institutions.
[5] FP1, through collaboration with WUR, has a relatively large number of PhD students attached to the program. Those who are fully paid by A4NH through PhD fellowships enter the program as one FTE staff person.

work on A4NH topics but do not report time for funding through the CRP. Table 3 shows the number of staff by flagship and institution who are mapped to A4NH in some way. There are large differences in the total number of staff across flagships, but in all flagships more than half of individuals mapped to A4NH are either research leaders or research staff reporting more than 50 percent time to A4NH. This indicates there is a strong core group of researchers dedicated to the program in every flagship.

Taken together, the staff numbers in Tables 2 and 3 show that A4NH research staff support is strongest in FP1 and FP4 (food systems and nutrition), with more modest numbers in FP3 and FP5 (food safety and human health). FP2 (biofortification) is a unique case, as it is a very large program, but A4NH primarily supports staff only in the Impact and Strategy unit of HarvestPlus. Setting aside FP2, it can be seen that most research staff are engaged in nutrition-related research (diet, child stunting, food systems, micronutrient deficiencies); health-related research (zoonoses, infectious disease, foodborne disease) is a much smaller share of the A4NH effort.

The institutions represented show the alliances forged in Phase II with new institutional partners, the LSHTM and the WUR. In addition to the institutional partnership with WUR, FP1 draws on research staff from four CGIAR centers and 1 other university. In FP5, LSHTM has greatly expanded the modest base of research personnel.

The 2019 staffing data for researchers reporting more than 50 percent time is tabulated in Table 4 and shows the gender representation by flagship. The gender representation is at least 30 percent in all flagships and greater than 50 percent in two flagships. Gender representation appears to be robust within the research staff.

### *2.1.2 Quality of Process (including Partnerships)*

In Phase II a select number of managing partner institutions were identified who are directly engaged in the research program. Managing partners, advanced research institutions (ARIs) outside of the CGIAR, were recruited to expand the scope of the research program.[6] Research leadership and research planning involve representation from both flagships and managing partner institutions, leading to integration of efforts across institutions.

To manage this complexity, managing partner institution representatives are part of the governance structure, and partnership agreements are crafted with each institution. These agreements address issues raised in a quality of science audit carried out for A4NH at the end of Phase I. In response, A4NH management recognized that the program relies on the quality of science management within managing partner institutions. Partner agreements and annual audits are used in Phase II to ensure that partner institutions meet CGIAR standards.

Examination of partner agreements, annual audit memos, and compliance matrix checklists show continuous attention to numerous details associated with the wide-ranging and complex program of research in A4NH. These include research ethics (e.g., institutional review board approvals for human or animal subjects), intellectual property, data sharing (e.g., open data access), research quality (e.g., peer review), financial reporting, and, where relevant, management of focus country teams and A4NH representation.

Managing partner interviews confirm that partner institutions have their own strong internal cultures to foster science quality and research ethics, so these agreements often document and confirm existing practices. The high productivity of researchers discussed below demonstrates that this culture exists.

### *2.1.3 Quality of Outputs*

The review of quality of outputs focuses on peer-reviewed journal articles, which are reported annually as part of the common results reporting indicator (CRRI) on publications from A4NH. Information about publications was obtained from a CAS-commissioned bibliometric analysis, the CGIAR Dashboard, and the A4NH program. Additional information is found in Annex 5.

[6] These managing partners play a different role from the many external partners discussed in section 2.4 because they serve as part of the management of the CRP.

The bibliometric analysis provides insights into research collaborations, research audiences, and topics.[7] It includes 528 articles (out of a total of 645 reported by A4NH) for the years 2017–2019.[8] The bibliometric analysis includes fewer articles than A4NH reported to the CGIAR Dashboard because the bibliometrics relied on Web of Science for its statistics, and only Institute for Scientific Information (ISI) publications that were found in the WoS database were included. Of these, most articles involve collaborations that span national boundaries (Table 5). In other words, most articles have authors at institutions in different countries. For example, 161 articles (out of 528) had a corresponding author from the U.S. (reflecting the location of IFPRI), but 65 percent of those articles had authors from other countries. The locations of managing partner institutions (e.g., Kenya) or significant country programs (e.g., Vietnam) were also well represented by corresponding authors. The vast majority of articles had authors from more than one country. This further demonstrates the broad international collaborations involved in A4NH research.

According to the bibliometric analysis, the 528 publications appeared in 196 different journals, representing many disciplines and reaching regional to global audiences. Table 6 shows the journals where 7 or more articles appeared, as well as journal field and impact factor rankings for the top 15 journal outlets for A4NH publications. These include high-impact journals (top quartile) in the fields of nutrition, food science, parasitology, agricultural economics, and veterinary sciences. A4NH publications span a wide range of disciplines, and many are published in journals with high impact within their field.

The bibliometric analysis analyzed the article keywords by frequency. Another dimension of relevance is found in article keywords in all 528 publications. Table 7 shows that the most frequently occurring author keywords relate to nutrition, and those relating to food safety or food systems are farther down the list. Specific countries where A4NH works, such as Vietnam, Bangladesh, Kenya, and India, also appear frequently. Keywords plus, based on words occurring in citations, show the overwhelming importance of health as a focus for A4NH research. The keywords plus also tend to emphasize policy-related terms (e.g., impact, intervention).

This bibliometric analysis is a snapshot of research content, productivity, and impact. It does not consider how the progress of research leads toward policies and innovations, which is examined in section 2.2.2.

The review of quality of outputs next focuses on innovations, including whether they demonstrate CGIAR comparative advantage and/or global public goods. The discussion here draws on the review of selected OICRs in section 2.2.2 and thus focuses on particular kinds of innovations.

New varieties were primarily biofortified crops released by national governments through HarvestPlus's work with national agricultural research systems (NARSs) and CGIAR breeding programs. As discussed below, these represent a unique contribution from CGIAR breeding toward improved nutrition. It was beyond the scope of any one NARS to develop the evaluation tools to assess whether, where, and how biofortified crops could contribute to micronutrient intake. This proof of concept through two decades of breeding and studies of efficacy represents an important global public good, which is embodied in the varieties released for specific crop-nutrient combinations.

Improved management practices include many Aflasafe products released by IITA. As discussed below, adaptation of this biocontrol approach to reducing aflatoxins in African environments represents a significant global public good. The CGIAR had the comparative advantage to do applied research to identify adapted local atoxigenic strains, ensure the efficacy of the approach, and promote the sustainability of the control. The release of specific Aflasafe products for different countries is the embodiment of this global public good.

The Reach, Benefit, Empower (RBE) framework for assessing gender impacts is a different kind of global public good. A4NH gender work plays a unique role as an interface between research and agricultural development. While implementing agencies are focused on their own portfolio of operations, A4NH can cut across project and geographical boundaries to identify gaps in research that ultimately serve the purposes of a broad spectrum of users such as project developers, funders, partner governments, and evaluators. The development of tools (RBE, Women's Empowerment in Agriculture Index [WEAI]) is a

[8] The actual number of total reported publications for 2017–2019 will be lower as some were removed during the CGIAR System Office's quality assurance process, which occurred at the same time as this review.

global public good serving multiple stakeholders, none of which could have developed them independently.

### 2.1.4 Quality of Science Conclusions

A4NH draws on a large number of productive research staff who are fully engaged in the research program. Most staff who report their time against A4NH funding devote more than 50 percent time to A4NH research, demonstrating a core of devoted expertise. W1/W2 funding provides roughly 40 percent of the FTE research staff, indicating the critical role this funding plays in retaining staff who are core to the program and who work to build out new initiatives. It has been particularly important in supporting FP1 and FP5, which are the newer areas of research expansion in Phase II.

Several different disciplines are represented in the broad scope of activity across A4NH. Most A4NH staff are engaged in nutrition-related research, and fewer in one health/food safety. New external managing partners have added significant capacity to A4NH, especially in FP1 and FP5. The Phase II structure, with managing partner institutions and new external partners (WUR and LSHTM), has provided an expanded scope of research activity. It has allowed CGIAR to become part of a broader research discussion on nutrition and health as they relate to food systems and One Health approaches. Specific contracts outlining managing partner institution responsibilities and annual audits of performance have strengthened and supported quality of science.

Though challenging at the outset, these partnerships have now been consolidated and are paying dividends in the form of expanded networks, often with stakeholders with whom CGIAR had had limited interaction (e.g., the private sector and public health entities), an interdisciplinary approach, and access to complementary expertise. The two-headed cluster leadership model, whereby one WUR and one CGIAR representative jointly manage each cluster, is perceived as having been successful in stimulating collaboration in FP1.

It will be important to consider how to foster existing external managing institution partnerships after 2021 in order to fully reap the benefits of these relatively new collaborations. For the CGIAR, one lesson from A4NH is that managing partner contracts may provide a useful model for external partnerships in terms of ensuring consistency and accountability in how quality of science is managed, as discussed above.

A4NH researchers are highly productive and produce high-quality, relevant research that is recognized for its applied scientific contributions. A4NH has produced a large number (528) of peer-reviewed research publications over only three years during Phase II. A4NH publishes in high-impact journals across a wide range of disciplines, showing the multidisciplinary strength of the research program. Author collaborations that span national borders are the norm. Publications tend to fall into topic matter clusters reflecting the divide between nutrition/food systems research on one hand and food safety/one health research on the other. The relative number of publications is much higher in the former area, reflecting resource allocations of funding and staff, as well as legacy program history.

The innovations coming from A4NH in Phase II represent different kinds of global public good contributions. New biofortified varieties released through HarvestPlus's efforts and new biocontrol products from IITA represent the results of long-term investments in unique research by the CGIAR. As discussed below, both programs are also testing new kinds of public-private partnerships for delivery that may yield models that can be useful for other innovations. The nutrition and gender policy tools represent a different kind of innovation that results more directly from the creation of A4NH. Impact and uptake of all of these innovations is discussed below in 2.2.2

# 2.2 Effectiveness

## 2.2.1 Achievement of Planned Outputs and Outcomes

### 2.2.1.1 Progress toward SLOs

During Phase II A4NH set three high-level numeric targets for its contribution to the second CGIAR SLO on improved food and nutrition security for health. These targets for 2022 are:

- 20 million more farm households in at least 12 countries will have adopted improved varieties, breeds, or trees and/or adopted improved management practices (FP2 and FP3);
- 150 million more people, of which 50 percent 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 and FP4); and
- 10 percent fewer women of reproductive age in Bangladesh, Ethiopia, Nigeria, and Vietnam will be consuming less than the adequate number of food groups (FP1).

Reported progress through 2019 (from annual reports) toward these 2022 targets is as follows:

- 8.5 million households are growing biofortified crops (up from 3.2 million in 2017) and another 95,000 farmers are using Aflasafe (up from 67,000 in 2017), for a total of roughly 8.6 million households toward the goal of 20 million farm households.
- An estimated 42.4 million people are benefiting from biofortified crops, which will contribute to reducing micronutrient deficiencies, compared with the goal of 150 million people.
- No evidence has been presented to date of progress toward improving diet diversity.

The speed of delivery for biofortified crops, more than doubling over three years, is impressive. Aflasafe started from a low level in limited distribution, and its adoption might have been expected to pick up speed with commercialization in several new countries in 2018 and 2019. However, the 2019 annual report notes that COVID-19 has halted or slowed delivery efforts for both biofortified crops and for Aflasafe in many countries in 2020. It is unclear whether renewed momentum will occur in time to achieve the 2022 targets.[9]

The third target, diet diversity improvement, is difficult to achieve and to measure. As FP1 is a relatively new program, this target was unrealistic from the outset—i.e., measurable progress over only three years was never going to be feasible, though it is certainly moving in this direction.[10] Of note is the fact that FP5 is not identified as contributing to any of the stated goals, in part because the SLOs do not include relevant human health outcomes. Both of these newer flagship programs need more time to demonstrate impact of this kind.

### 2.2.1.2 Overview of Policies and Innovations from A4NH[11]

A4NH has produced a large number of innovations (206) and policies (63), according to information from CAS and the CGIAR Dashboard. Summary statistics on the characteristics of these contributions are found in Figures 1 and 2. Data were not available to easily assign these contributions to flagship programs.

[9] An interview with one Aflasafe manufacturer in Tanzania shows that COVID-19 has delayed the start of marketing this technology by at least a year.
[10] According to A4NH, when the targets were established, the idea was to monitor diet diversity through indirect means (country data on changes rather than more rigorous evaluations). In 2018 the CGIAR System Management Office (SMO) decided to change the assessment of indicators and not allow for indirect measures. This change was not a problem for biofortification and aflasafe adoption data, which could be assessed in more standard ways, but it made it unfeasible to measure progress on diet diversity within the scope of Phase II.
[11] In this report "policies" refers to research that supports policies or programs in the public and the private sector, and "innovations" refers to specific tools, products, or crop varieties. Only a few examples of A4NH innovations or policy contributions are discussed in this report. A complete list for 2017 and 2018 can be found on the CGIAR Dashboard (https://www.cgiar.org/impact/results-dashboard/).

Most innovations have been either crop varieties (80) or production practices (37), primarily reflecting the release of biofortified varieties through FP2's efforts or Aflasafe products by FP3. Another significant category is research and communication methods or tools (37) and social science (52). Examples of the former include the Agrobiodiversity Index from FP1, which communicates to policymakers how to make food systems biodiverse and sustainable. Examples of social science innovations include the gender tools such as the Reach, Benefit, Empower framework discussed in section 2.2.3. These "soft" innovations—i.e., not embodied in a physical product—are an important part of A4NH contributions and impact.

Innovations are mostly at stage 3 (available/ready for uptake [128]), which dovetails with the progress reported above toward reaching farm households. And most innovations are national in scope (124), again reflecting the adaptation of varieties or aflatoxin controls to local environments. On the other hand, many of the social science or communication tools have global relevance, including both examples mentioned above.

Most of A4NH's 63 policy contributions are to a policy or strategy (36), and far fewer are for investments (10) or curricula (2). Some have an unidentified type in the data provided by CAS. Examples of notable policy or strategy contributions include "Ethiopia's Productive Safety Net Program is redesigned to address maternal and child nutrition explicitly" and "Government of Bangladesh with support from UNICEF implemented recommendations to strengthen frontline delivery through District Nutrition Officers." Examples of investments include "Bill and Melinda Gates Foundation and UK Department for International Development make major joint investment in food safety research for development." As can be seen by the nature of these contributions, the role of A4NH research in contributing evidence to inform these policies will vary widely and be highly context specific.

Most policy contributions are at level 1 (research taken up by next user [46]); fewer were at level 2 (policy enacted [17]). Data were incomplete for geographic scope (26 with no data), but where reported, most policies were national (21) in scope, and fewer were regional (8) or global (9). But the sheer breadth of contributions over different organizations, countries, and types of policies is notable. Again, these are "soft" contributions, where impact clearly occurs but is difficult to quantify in most cases.

#### *2.2.1.3 Milestones Reported and Their Limitations*

Overall, A4NH completed 59 out of 96 milestones within the year for the period 2017–2019. Of the 32 milestones that were extended, 5 were completed and 12 were changed or further extended.[12] An analysis of annual planned versus achieved milestones by flagship program was carried out to better assess progress in each flagship program toward specific goals. However, the exercise revealed deficiencies in the system of reporting: planned milestones in the POWB were not the same as those reported against in the annual report, milestones were extremely specific and could not easily be related to program goals, and important achievements that were highlighted in the annual report introduction did not appear in the milestones. As the evaluation team now understands it, these deficiencies arise from continuing changes in how milestones are defined for planning and reporting purposes. Actual planning and monitoring occurs in a parallel system. Thus, the reported milestones have limited value as indicators of progress along the program ToC. In section 2.4, we analyze the CGIAR reporting system and provide recommendations for future improvements.

#### *2.2.1.4 Progress by Flagship*

A qualitative assessment of progress within each flagship program is provided below, based on an analysis of annual milestone achievements and other achievements reported in the annual reports. Examples of significant achievements for each of the flagship programs are found in Table 8.

*Flagship Program 1*

FP1 is a newly constituted flagship for Phase II, so progress needs to be assessed in this light. In this regard, some of the planned milestones and outputs, particularly for the first two years of operation, seem to have been overly ambitious. In terms of achievement of planned milestones, the single milestone planned for 2017 was achieved (at least two partners, including value chain actors, participate in the identification and design of at least two gender-sensitive interventions aligned with findings from cluster of activity [CoA] 1 to improve diets in Ethiopia and Vietnam). However, there were slippages in

[12] Numbers do not add to totals owing to milestone status that was unknown.

both 2018 and 2019, with only two of the six planned milestones achieved in 2018 and three of the five in 2019.

*Flagship Program 2*

FP2 consists of the large legacy program in HarvestPlus, which has its own strategic planning cycle that differs from the CRP cycle. In reporting progress to the CGIAR through the A4NH program, milestones have been defined either very broadly in terms of biofortification delivery or more specifically in terms of the M&E and policy/advocacy work directly supported by A4NH W1/W2 funding.

As noted, FP2 continued to make substantial progress in scaling up biofortification delivery in 2017–2019. Biofortification efforts expanded to more countries, more crop-nutrient combinations, more varieties released, and crop adoption by more households. The results (8.5 million farm households and 42.4 million people) reported above show that FP2 is making a substantial contribution toward the SLOs.

FP2 has also made progress in the milestones defined for mainstreaming efforts, policy advocacy, and M&E. By their nature, these milestones are more difficult to define and quantify, and in the case of policy, they are controlled by external events and actors. Nevertheless, completed milestones indicate significant progress in making biofortification part of national nutrition plans and international financial institution (IFI) lending. M&E studies of delivery have been carried out but seem to be somewhat delayed in publication. M&E evidence from Phase I was used to refine the HarvestPlus delivery strategy for Phase II, and presumably the evidence generated from current M&E will be used to refine future delivery strategies. Progress in mainstreaming biofortification into CGIAR breeding programs is more difficult to measure and assess.

*Flagship Program 3*

This flagship consists of two distinct programs: one at ILRI focused on informal markets (and primarily on microbial hazards) and one at IITA focused on aflatoxin control. Both programs carry out policy advocacy, and there has been clear progress toward bringing food safety into national and global policy, planning, and investments. Research from both parts of the FP3 programs appears to be having an influence on policymakers, donors, and IFIs, as reported both in milestones and in several OICRs.

FP3 set a goal of bringing improved food safety to millions of consumers who use informal markets in four countries. It is difficult to assess progress, which may be implicit from capacity-building efforts in the four countries, but new projects to test interventions were initiated only in 2019.

The program to address aflatoxins has a longer history and is much further along with a deliverable technology. During Phase II, this program made substantial progress in delivery of biocontrol products for aflatoxin, as discussed above and in detail in section 2.2.2.

*Flagship Program 4*

FP4 is a well-established program that has been able to build on its achievements in Phase 1 to deliver a series of high-quality results in Phase II. In terms of planned milestones, of the total 12 milestones set over the period under review, 10 were delivered as planned while two of the five planned for 2019 were canceled: i.e., regional and international organizations, influenced by new knowledge, demonstrate changes in discourse, attitudes, behaviors, and practices related to cross-sectoral nutrition-sensitive agriculture, and engagement of national stakeholders in policy analysis in three more focal countries. As noted above, the lack of consistency between the structure and content of POWBs and reported results makes it difficult to ascertain the degree of progress.

*Flagship Program 5*

FP5 is one of two new areas of research in A4NH Phase II and involves collaboration with an external partner, the London School of Hygiene and Tropical Medicine (LSHTM). There has been turnover in the leadership, with a different FP leader in every year of Phase II. The progress along milestones shows a program that is just getting underway. New collaborations are being established, capacity-building events for the multisectoral One Health approach have been held, and a new Antimicrobial Resistance (AMR) Hub has been established. Policy engagement (e.g., brucellosis planning) and specific research on interventions (e.g., cysticercosis) build on legacy research in ILRI and are far from being taken to scale. No numeric targets were set for 2022, which was reasonable given the newness of this effort.

#### *2.2.1.5 Conclusions Regarding Achievement of Planned Outputs and Outcomes*

A4NH will not achieve its ambitious targets for contributing to the SLOs, as detailed above. However, progress has been significant as regards adoption of biofortified varieties released through FP2 and aflatoxin control technologies delivered through FP3. Both technologies have potential for further expansions of both scope and scale. In both cases, delivery is underway using new and innovative partnerships and models, but it is not clear that donor support will sustain delivery to its full scale and scope (see section 2.2.2). Both cases raise questions about the limits of CRP programs in carrying out delivery that are beyond the scope of this review but will be important to consider in setting post-2022 targets.

Progress by flagship reflects the different maturity levels among the programs. In FP1 there has been good progress with regard to CoA1.1 (diagnosis and foresight), some progress with regard to CoA1.2 (food system innovations), though this work remains in the early stages, and limited results in the case of CoA1.3 (upscaling and anchoring of food system transformation). Also, there is concern that the impact assessments of food system innovations and the cross-country learning framework to be used by national stakeholders, which would allow them to systematically include research results and lessons into ongoing decision-making, will not be completed owing to the reduced timeline.

In FP2 HarvestPlus is making significant progress in delivering biofortified varieties while at the same time making a shift toward mainstreaming biofortification through policy advocacy and new forms of collaboration with CGIAR breeding programs. The latter reflect a delicate process of handing off responsibility for nutritional goals in breeding, and this process warrants continued attention at the CGIAR System level, as it cuts across multiple CRPs.

FP3 has two independent programs, and both are making progress toward delivering improved food safety to consumers, albeit at different rates and through very different pathways. The increased policy attention to food safety, arising out of efforts in both programs, is a notable achievement of Phase II, in addition to the delivery of aflatoxin controls.

The progress achieved by FP4 in influencing programs and policies is highly significant. However, given the nature of the work carried out by this FP (development of tools and methods, impact assessments, capacity development and convening, etc.), there is a significant gap between its results and its eventual impact on CGIAR higher-level goals.

FP5 made progress in getting set up as a program during the past three years. Certain legacy research programs made progress, but the flagship's most notable achievements were the establishment of the AMR Hub, the partnerships for rice/malaria research, and procurement of W3/bilateral funding.

### *2.2.2 Demonstrated Importance of Outcomes (Deep Dive on Selected OICRs)*

In this section, three selected OICRs are analyzed to see how specific policies and innovations contribute to the SRF, including SLOs and IDOs, and how the activities reflect CGIAR's comparative advantage in delivering research for development (R4D). Complete OICR analyses are found in Annex 6.

#### *2.2.2.1 Review of OICR 3293: "Innovative Delivery Models for Iron Beans Resulted in Adoption by an Estimated 442,000 Households in Rwanda"*

*Why This OICR Was Selected*

The selected OICR (#3293: "Innovative Delivery Models for Iron Beans Resulted in Adoption by an Estimated 442,000 Households in Rwanda," from the 2019 annual report) represents a specific country case where a biofortified crop appears to have been widely adopted. This case was chosen to represent program impact closest to the SLO Goal 2: Improved Food Security and Nutrition for Health.

*Overview of Case*

High-iron beans were developed based on research by CIAT on improved bean varieties, including enhanced iron content. Local adaptive breeding in cooperation with the Rwanda Agricultural Board (RAB) began in 2010 in partnership with CIAT. Crosses with local varieties led to iron-biofortified bean varieties with genetically stable iron levels and superior agronomic characteristics. HarvestPlus invested in equipment and RAB staff training to speed the process of cultivar evaluation and selection.

Beans account for a high percentage of calories in Rwanda (over 30 percent), and iron deficiency is widespread. Thus, HarvestPlus identified this biofortification target as having the potential to improve

iron intake and alleviate iron deficiency. A series of controlled nutritional studies verified that consumption of high-iron beans resulted in improved iron status in women, as well as improved cognitive and physical functions and work efficiency.

This OICR reports on successful delivery and education efforts to promote adoption, marketing, and consumption. Several iron bean varieties were released between 2010 and 2014 in Rwanda, but there were challenges in the existing bean seed delivery system that required intervention. A variety of seed distribution systems were used, including a seed payback program; a seed swap program; distribution through NGOs; and sales through agro-dealers. The latter required the establishment of seed standards for beans, as well as programs to educate farmers and agricultural input suppliers about the benefits of iron-biofortified beans. At the same time, HarvestPlus carried out public information campaigns with consumers and bean vendors. HarvestPlus worked with policymakers at the national level to support these efforts through nutrition messaging provided by the Ministry of Health and through a "farmer promoter" program with the Ministry of Local Governments.

HarvestPlus carried out a number of rigorous M&E studies to document the impact of these efforts. The many complementary activities in seed dissemination and promotion led to successful adoption by over 442,000 farm households. Furthermore, iron-biofortified beans account for 15 to 20 percent of total consumption, and most consumers are aware of their nutritional benefits. Most consumption is in farm households, although there is also a premium market for sales of iron-rich beans and a processed product for urban consumers.

HarvestPlus carried out a series of monitoring and evaluation studies beginning in 2015. These have documented the extent of adoption, determinants of adoption and disadoption, and the impact on iron bean supply and consumption, all based on sound survey methods and rigorous methodologies. HarvestPlus has estimated the benefits arising from higher yields and increased farm incomes, as well as the impact on improved iron status and corresponding improvements in health (measured as a reduction in disability-adjusted life years). The results show that every dollar invested produced benefits worth US$6–8.

The entire iron-rich bean program has been turned over to the Rwanda Bean Alliance, established during a 2019 transition year. This group is coordinated by CIAT and RAB, includes representation from value chain actors, and engages in activities from research through consumer education. During the rollout and promotion of iron-rich beans, HarvestPlus was the main actor facilitating coordination among value chain actors, and this role has been taken over by the Alliance, which provides a "platform" so the various partners can continue to work together. The goal is for this to become a privately driven effort. Private sector incentives arise from Rwanda's role as a production hub and supplier of both bean seed and grain for neighboring countries: Burundi, the DRC, and Tanzania.

Although it is not directly part of the Rwanda effort, HarvestPlus has forged a new partnership with GAIN to work together on commercializing biofortified foods in six countries. This new partnership is part of a larger pivot toward working further down the value chain and placing biofortification within a food systems context.

*Contribution to SRF and IDOs, including Policies and Innovations*

The outcome described in this OICR contributes to SLO 2 (Improved Food Security and Nutrition) and to two sub-IDOs (Increased access to diverse nutrient-rich food; Conducive agricultural policy environment). It contributes to the following SRF 2022/2030 targets, which are mirrored in the high-level goals for A4NH Phase II (see section 2.2.1):

- # of more people, of which 50 percent are women, without deficiencies of one or more of the following essential micronutrients: iron, zinc, iodine, vitamin A, folate, and vitamin B12; and
- # of more farm households have adopted improved varieties, breeds, or trees.

The outcomes reported in this OICR contribute directly to these SRF targets and to the A4NH goals. The adoption of iron-biofortified beans led to increased micronutrient intake among either farm households or purchasing consumers. Because iron-biofortified beans are higher yielding and drought resistant, they provide higher incomes to adopters. The process of development and dissemination brought about a conducive policy environment for future biofortification efforts.

#### 2.2.2.2 *Review of OICR 2782: "Aflasafe Biocontrol Products to Reduce Aflatoxin Contamination Are Now Registered in Nine African Countries and Available at More Than 30 Distribution Points in Seven Countries"*

*Why This OICR Was Selected*

This OICR (#2782: "Aflasafe Biocontrol Products to Reduce Aflatoxin Contamination Are Now Registered in Nine African Countries and Available at More Than 30 Distribution Points in Seven Countries," from the 2019 annual report) was chosen because it shows work that is closest to impact in terms of achieving SLO target 1 (adoption of improved practices).[13] It may be mischaracterized as level 1, given the maturity of scaling efforts.

*Overview of Case*

Starting in the 1990s, researchers at IITA began adapting a natural control method for aflatoxins on maize that had been developed by the US Department of Agriculture's Agricultural Research Service (ARS).[14] In simple lay terms, the Aflasafe technology uses nontoxic strains of the fungus to crowd out the toxic strains. Basic research to identify strains in Africa that are nontoxic and to characterize the genetic determinants of atoxigenicity was carried out at IITA. Adapting this knowledge to create a product that could be used in farmers' fields required further applied research on the efficacy of products, the sustainability of the approach, its impact on postharvest emergence of aflatoxins, and its role in integrated management. IITA began manufacturing Aflasafe in Nigeria in a demonstration plant and now uses that plant as a facility for training Aflasafe manufacturers in West African countrie. Starting in A4NH Phase I and continuing through 2019, a major World Bank project in Nigeria subsidized marketing and adoption of Aflasafe for use in maize production (reported in OICR #3351).

This OICR reports on the more recent evolution of this technology toward adoption and scale under Phase II. There are two major elements required to move the technology forward in new environments across Africa. As Aflasafe is introduced into new countries and/or for use on different crops (e.g., groundnuts, sorghum, millet), new adaptive research is required to identify atoxigenic strains and to test the efficacy of products constituted with selected strains. IITA has carried out this research, including capacity development of local scientists, in cooperation with national systems. Data are developed to support registration of the product for use as a biological control. This process takes three to five years. As the OICR reports, Aflasafe is now registered for use in nine countries and is distributed in seven countries.

Once a product is registered, the second phase is commercialization. A strategic decision was made to promote commercialization through a country partner who would manufacture and market Aflasafe, while at the same time pursuing complementary efforts to promote policy awareness through the Partnership for Aflatoxin Control in Africa (PACA). (The alternatives would have been subsidized distribution through public extension or commercialization through a multinational input supplier.) The Aflasafe Technology Transfer and Commercialization (ATTC) project carried out a complex process in seven countries to design and implement a commercialization strategy, usually by focusing on the elements of the market where there is aflatoxin awareness (e.g., poultry feed, brewing inputs).[15] Manufacturing licenses were awarded based on a competitive process. The ATTC project provided technical support for business development and creation of manufacturing plants in the initial years. At the same time, policy dialogue and public education take place to develop awareness. As the OICR reports, manufacturing and/or distribution is now underway in seven countries.

[13] This OICR was originally reported in 2018 under the same ID but titled "Aflasafe Products to Reduce Aflatoxin Crop Contamination Are Now Registered in Eight Countries—Three New Countries in 2018" and then updated with the new title in 2019 to describe progress in registration and commercialization.
[14] Aflatoxins are a naturally occurring food safety hazard on many crops and occur more frequently in the tropics. High levels of aflatoxin can be deadly, but the more important health impacts come through long-term exposure that has been linked to liver cancer and possibly to child stunting. Aflatoxins on animal feedstuffs are known to reduce animal growth and productivity.
[15] One licensee in Tanzania shared perspective on developing this entirely new market. Based on the market analysis provided by the ATTC project, they will first focus on high-end processors (e.g., breweries) that contract with farmers for maize. After two to three years, they will attempt to develop the market among smallholders, where they already sell storage bags. They are also expecting greater government intervention to promote aflatoxin reduction during this time frame.

The collaboration with PACA played an important role in policy advocacy. This organization was initiated in 2012 with funding from the Bill and Melinda Gate Foundation (BMGF). A4NH has played a critical role in providing technical support for PACA. IITA was a founding member and has representation on the steering committee. IITA provides technical support for the country action plans that are a primary outcome from PACA. PACA advises the ATTC Aflasafe commercialization efforts and can promote Aflasafe as part of an integrated approach to aflatoxins. Another policy contribution is partnership with the East Africa Commission to produce nine policy briefs for use in the region to inform aflatoxin policy (reported in OICR #2780).

*Contribution to SRF and IDOs, including Policies and Innovations*

This research contributes to SLO Outcome 1 (reduced poverty) and the 2022 target of 100 million households adopt improved management practices, which is directly reflected in the A4NH Phase II targets (see section 2.2.1). This research for development effort contributes to two sub-IDOs (reduced biological and chemical hazards in the food system; reduced market barrier). Increased incomes (reduced poverty) can result from market access or price premiums associated with reduced aflatoxins, higher yields, and/or reduced storage losses. All of these outcomes are associated with Aflasafe. Reduction of aflatoxins improves human and animal health and improves food safety, both of which are sub-IDOs under SLO 2 (improved food and nutrition security for health).

According the A4NH 2019 annual report, approximately 95,000 farmers treated more than 120,000 hectares with Aflasafe in 2019, supporting production of maize and groundnut with safe aflatoxin levels across nine countries in sub-Saharan Africa.[16] This fairly modest uptake reflects the very recent opening of manufacturing in most of the countries listed in the OICR. There is preliminary evidence based on Nigeria's experience that higher crop yields, increased farm incomes, and consumption of safer food might be outcomes that could be expected in the future as a result of using an integrated aflatoxin management system, but to track this would require greater M&E efforts than currently envisioned.

#### *2.2.2.3 Review of OICR 2734: "Reach, Benefit, Empower (RBE) Framework of Indicators for Monitoring Programs and Policies Incorporated into Trainings Conducted by Partners"*

*Why This OICR Was Selected*

This OICR from the 2018 annual report was chosen because of its relevance to gender, which is a priority cross-cutting issue for A4NH, and the potential scope for applying this tool across both FPs and CRPs as well as other organizations. In addition, it relates to three separate yet interrelated tools that aim to improve the design of projects (through RBE) as well as the capacity to measure the impact of projects on women's empowerment (through the use of the Women's Empowerment in Agriculture Index for Value Chains [WEAI4VC] and pro-WEAI) in order to better identify what works and what doesn't.

*Overview of Case*

Increasing numbers of development agencies and individual projects include objectives on women's empowerment, and there is a growing body of conceptual and empirical work on how to define and measure empowerment. What is missing is an evidence base on how, and how much, agricultural development projects can contribute to empowerment. What activities or combinations of activities contribute to empowerment, through what mechanisms, and in what contexts? While it will take time to fill that gap, research work carried out by FP4 and the Gender, Equity, and Empowerment (GEE) unit, within the framework of the Gender, Agriculture, and Assets Project Phase 2 (GAAP2), has led to the development of a framework for clarifying the objectives of development projects that differentiates between projects that seek to Reach, Benefit, or Empower women (the RBE framework), where

- reaching women means including women in program activities;
- benefiting women means increasing their well-being in specific ways, like improving their income, diets, health outcomes; and
- empowering women means strengthening their ability to make and act on important decisions related to three dimensions: resources (defined to include not only access but also future claims to

[16] The final report of the ATTC project shows 350,000 ha treated. It is not clear why this number differs from the 2019 annual report.

material, human, and social resources), agency (including processes of decision-making, negotiation, and even deception and manipulation), and achievements (well-being outcomes).[17]

A key finding of the research is that projects often lack clarity about what they are aiming to achieve; simply reaching women does not ensure that women will benefit from a project, and even if women benefit (e.g., from increased income or better nutrition), that does not ensure that they will be empowered (e.g., through control over that income or greater participation in decision-making). Similarly, empowerment may not necessarily require reach and benefit approaches. To be effective, projects need be clear about their objectives related to women and make sure that their planned strategies and activities are consistent with those objectives. In theory, therefore, the RBE framework will allow them to do this, thus leading to improved project quality. The researchers then went on to analyze the empowerment strategies of 13 projects that are part of the GAAP2 project. To quantitatively measure women's empowerment, GAAP2 is developing a project-level Women's Empowerment in Agriculture Index, or pro-WEAI. This index builds on the WEAI, which was developed by IFPRI, the Oxford Poverty and Human Development Initiative, and the US Agency for International Development (USAID) to monitor progress toward women's empowerment in the US government's Feed the Future Initiative.[18] To measure women's empowerment in agriculture at the level of a project, pro-WEAI expands on the five domains of the original WEAI—input into production, access to resources, control over income, leadership, and time use—to include additional aspects of empowerment that projects with explicit empowerment objectives identified as important, namely physical mobility or freedom of movement, intrahousehold relationships, self-efficacy, and attitudes toward intimate partner violence toward women. Including these additional indicators and reframing the index to make it more consistent with theories of agency have resulted in an index with three domains and 12 indicators. Revisions have also been made to some of the questions in the original WEAI survey to make them more sensitive to the types of changes that projects seek to make. To test pro-WEAI, the draft modules are being integrated into the impact assessment plans of each of the 13 projects; all projects in the GAAP2 portfolio will have rigorous, mixed-methods impact evaluations to quantify and understand their contributions to a range of outcomes including women's empowerment. Of the 13 projects in the portfolio, 10 have now completed their evaluations. The pilot exercises being conducted on the Agricultural Technical Vocational Education and Training (ATVET) for Women projects in Malawi and Benin developing the WEAI4VC index are also now completed.

*Contribution to SRF and IDOs, including Policies and Innovations*

As reported in the OICR, this research for development effort is expected to contribute to two sub-IDOs:

- Improved capacity of women and young people to participate in decision-making (i.e., empowerment); and
- Enhanced institutional capacity of partner research organizations.

The RBE framework is expected to contribute to these two objectives by encouraging projects to be clearer about their objectives related to women's empowerment and to make sure that their activities and indicators of success are consistent with those objectives. Without this clarity there is a real risk that projects will nominally espouse empowerment objectives but not implement strategies to empower women or measure whether they are achieving these stated objectives, thus contributing to the evidence base and learning. First, by using the RBE framework, projects are expected to be in a position to better address women's empowerment. This is reported to have been the case for the GAAP2 projects as well as GIZ/NEPAD, who, on the basis of the insights derived from the application of the tool, redesigned their initial project to better address empowerment. Second, by better matching interventions to expected outcomes, the RBE framework will support more rigorous evaluation design and synthesis. The better projects can articulate their objectives, design strategies that align with them, and measure the outcomes with suitable indicators, the more they will be able to add to the evidence base about what works to empower women. In the case of GIZ, they have been able to draw on the findings from the application of the WEAI4VC to their two pilot projects in Benin and Malawi to improve the design of

[17] N. Kabeer, "Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment," *Development and Change* 30, no. 3 (1999): 435–464, doi:10.1111/1467-7660.00125.
[18] S. Alkire, R. Meinzen-Dick, A. Peterman, A. Quisumbing, G. Seymour, and A. Vaz, "The Women's Empowerment in Agriculture Index," *World Development* 52 (2013): 71–91, doi:10.1016/j.worlddev.2013.06.007.

subsequent phases of those projects as well as applying the acquired learning to the other four projects making up this program. The same will happen with the 13 GAAP2 projects, which will have the results of their impact evaluations shortly. Third, through its development of the pro-WEAI and the assessment of GAAP2 contributions to a range of outcomes including women's empowerment, this research work will provide a better understanding of what works and what doesn't in terms of increasing women's empowerment, thus facilitating further work in this area by other concerned research organizations. And finally, through its partnership with various external partners such as the African Union Development Agency–New Partnership for Africa's Development (AUDA NEPAD) and the GAAP2 partners, relevant research has been brought to the attention of key stakeholders in developing countries, thus facilitating the uptake of this research by numerous other organizations. In summary, the combination of these tools can help improve both the quality of project design as well as effectiveness and impact.

The OICR lists one associated level 4 "innovation" (589)—i.e., uptake by next user—and this is confirmed by the evidence that the framework has been published in a journal article and has been used by GIZ and IDRC in presentations. It is reported to have since been taken up by other donors such as USAID and the World Bank. This OICR does not report any policies.

#### *2.2.2.4 Conclusions regarding Demonstrated Importance of Outcomes*

All three of these OICRs demonstrate important outcomes and significant impacts. Below we summarize the lessons learned and future prospects for each.

The Rwanda high-iron bean OICR shows that many different elements—public to private, farmer to consumer—are needed for success in delivering biofortification to the consumers who will benefit from it. FP2 (HarvestPlus) has developed the capacity to bring those elements together. It will be useful to continue to monitor the progress of iron-biofortified beans in Rwanda and the activities of the Rwanda Bean Alliance to understand the sustainability of this success.

FP2 (HarvestPlus) is in the midst of a pivot away from breeding and delivery toward policy advocacy, partnerships to mainstream biofortification into breeding programs, and partnerships to place delivery efforts within a food systems context. New partnerships support this pivot, such as the one with GAIN on how to better utilize value chains and the private sector. Funding for biofortification now goes directly to the CGIAR Centers, and it is envisioned that HarvestPlus will assist in target setting/work plan development and monitoring and evaluation as the centers mainstream nutrient breeding goals into breeding programs. The Rwanda effort can be seen as strong proof of concept for biofortification approaches. For similar success in the future, HarvestPlus must succeed in persuading others to continue the momentum from past biofortification efforts.

For the Aflasafe technology, as adoption evolves, it would be valuable to monitor how Aflasafe influences farm household income and the safety of the food supply. Understanding this final step toward the outcomes envisioned in the ToC should be a high priority. At the same time, there is a clear need to carry out an evaluation of the commercialization effort in order to better inform future delivery strategies.

Funding for the ATTC project is coming to an end, and new funding sources and partnerships are under development. This research has always been at the intersection of crop productivity enhancement and food/feed safety. Participation in A4NH has strengthened connections to health economics and policy, but more could be done to bring a One Health dimension to future work on aflatoxins.

The RBE framework is an example of the innovative work being carried out on gender in A4NH. The framework is reported to be gaining ground and is already being used by other organizations even though no active measures to increase uptake are being undertaken. In the case of the WEAI adaptations, a key issue to be addressed will be the cost of the use of WEAI4VC or pro-WEAI on the project level. Although there is no doubt as to the usefulness of these indexes to measure empowerment and to feed into better-designed projects, the cost of the exercise as well as the technical capacity to do this systematically is questionable. Options being considered are to build in-house capacity, reserving IFPRI input for the more technical aspects such as design of baseline and data analysis, or to apply an "abbreviated" version of the index with, for example, fewer indicators. Aware of this potential constraint, IFPRI is currently developing a leaner/shorter version of pro-WEAI and a distance-learning platform for pro-WEAI to address the demand for training and technical capacity.

### 2.2.3 CRP Management and Governance

The following discussion focuses on some of the more qualitative elements of A4NH management and how they influence the direction of the program. Considerable attention is given to the reporting system and the lessons there for future CGIAR research modalities.

#### 2.2.3.1 Use of W1/W2 Funding

A4NH has seen an increase in W1/W2 actual expenditures from about $15 million in 2017 to $20 million in 2018 and 2019. Between 80 and 87 percent of W1/W2 funding has gone toward the research programs in the flagships, which indicates that "overhead," broadly defined, has been a modest portion of the total. Higher amounts (as a proportion of the total flagship budget) have been allocated to the newer programs in FP1 and FP5, and the increase between 2017 and 2018 was allocated more than proportionally to these programs as well. This strategy is explicitly noted in the 2017 POWB as an investment in building out the newer portions of the A4NH program, and it is also implicitly revealed through continued higher proportional allocations to these flagships. One measure of the success of this investment is the recent W3/bilateral funding secured by FP5 (not reflected yet in past budgets). A three-year horizon is a fairly short time for making such an investment in building capacity.

A variety of strategic investments using W1/W2 funds are noted in the annual reports. Recurring investments have been made in the focus countries to build partnerships and engage collaborators. Research on gender, and more broadly equity, has received support in every year, including a scoping review of equity research in 2019. Policy engagement for FP3 and FP5 has also seen strategic investment. These investments would seem to be either foundational (as in the scoping assessment) or complementary activities (as in the policy engagement) that would not necessarily receive W3/bilateral support.

#### 2.2.3.2 Program Planning and the ISC

Program planning in Phase II is designed to be more focused, with only selected CGIAR Centers and external partners involved in the Planning and Management Committee (PMC). Managing partners have the authority to map staff and W3/bilateral funding sources to A4NH. Flagship leaders and the A4NH director have final approval of the mapping of these W3/bilateral funding sources to the flagship. Presumably the goal is to have a more coherent program focused on specific goals for each flagship. Each flagship has a planning meeting with cluster leaders annually to review progress and goals for the coming year. Cluster leaders report that planning can sometimes be stymied by budget uncertainty for the coming year. Nevertheless, priorities and plans are set out within each flagship separately.

Reports and plans from all flagships are reviewed at the fall ISC meeting. Plans for the coming year for A4NH as a whole are finalized after input from the ISC. Even though the ISC meeting provides an opportunity for flagship leaders to view A4NH programming holistically, in practice the current structure supports the operation of each flagship as an independent program, siloed from the other flagships.

The ISC has raised several overarching issues in their three annual reviews, including repeated questions about (1) integration between FP1 and FP4; and (2) use of the focus country strategy and how to capitalize on results from that strategy. In addition, they have provided advice about the program pivot in HarvestPlus (discussed elsewhere in this report) and the prospective role of A4NH in the new CGIAR research modalities. Interviews with the ISC reveal a deeply committed group of senior professionals who understand the A4NH mission and are dedicated to its success. They are very troubled by the early end declared for Phase II research.

#### 2.2.3.3 Country Focus and Country Coordinating Offices

For Phase II, A4NH selected five focus countries (Bangladesh, Ethiopia, India, Nigeria, Vietnam) and established and staffed A4NH country coordinators to coordinate outreach. The country coordinators, along with members of the country teams, comprise the Country Coordination and Engagement (CCE) unit. This A4NH effort to establish country teams builds on the CGIAR site integration guidance provided for Phase II proposals. As reported above, these countries have also been the focus on specific W1/W2 investments to develop partnerships.

This country-level engagement has been utilized in a piecemeal way by most flagships, given that many already had reasons to carry out programs in different countries. However, the five countries do overlap entirely with the four countries where FP1 is carrying out food systems research, and FPs 2, 3, 4, and 5

all have activities in at least two of these countries. In the case of some centers, such as Bioversity, of the five identified priority countries, Vietnam was the only one where they were carrying out related research. However, Bioversity researchers do not perceive this as having constituted a constraint, as it has allowed them to expand their work in the A4NH priority countries, in particular Ethiopia. At the same time this allows Bioversity to bring some of the learning from this work to their own priority countries—e.g., Benin, Brazil, Kenya, and Uganda—while lessons learned in their priority countries were also taken to Ethiopia, Nigeria, and Vietnam.

Overall assessment of the focus country approach introduced in Phase 2 is very positive, though the level of success of this approach varies significantly between countries, with Ethiopia cited as the country where it has worked best and India as the country where it has been least effective. There is also a commonly held opinion that this work lacked sufficient human and financial resources, and had more funding and staff been made available, the additional gains would have been significant. The main benefits perceived from the focus country approach include the potential for early engagement with downstream partners—e.g., policymakers—which allows for better tailoring of research work to actual needs; the scope for influencing key processes at national and regional/ continental level, providing A4NH with a "seat at the table" in key processes through which entry points can be identified and nurtured; and the ability to keep relevant flagships informed and alerted. A point raised by various FP staff was the acknowledgement that researchers may not be the best placed to undertake the outreach tasks required to ensure engagement of practitioners in research agendas and work, and hence the different skills brought to the CRP through the country coordinators have added value. These country focal points are well placed to identify discernible opportunities or entry points for further engagement for the different FPs and to support FPs by linking evidence to national and regional/international processes, such as the CAADP Biennial Review (BR) inclusion of a biofortification declaration and roadmap as well as the African food safety index, or the Committee on World Food Security (CFS) regional consultation processes. In the case of Ethiopia, the fact that the country coordinator was also a cluster leader of Capacity, Collaboration, and Convening (or 3C) in FP4 was considered fortuitous given the clear complementarity between the two roles. On the other hand, although the lead center in Ethiopia is ILRI, the country coordinator is an IFPRI employee, which complicated things somewhat. The ISC has requested summaries of research activities in the focus countries as a way of understanding how this programmatic investment has resulted in more focused or integrated impact and will provide an opportunity for cross-learning between the target countries. A4NH has promised to consider whether to deliver this report during 2020.

#### *2.2.3.4 Observations on the Reporting of Results*

The reporting of results by A4NH is described as burdensome and ineffective by the majority of staff consulted. The CGIAR imposed system of reporting, as noted in detail elsewhere in this report, changes frequently, is very cumbersome, and requires a great deal of personnel support. One of the main factors contributing to this situation is the lack of indicators (and targets) attached to the ToC results (see section 2.2.4), which means that a series of alternative metrics have been developed to measure progress, which are often not directly attributable to planned results, which overlap, and which ultimately fail to give a comprehensive overview of FP progress. Results are also presented in different formats and by means of various tools, constituting a duplication of effort and contributing further to the reporting burden. In some instances, FPs have resorted to hiring staff specifically to manage the reporting function, which is not considered an efficient use of resources. This complexity is reflected in the recently developed management information system, MARLO, which is deemed overly complex and ineffectual as a learning tool in its current format. It was originally designed as a reporting and learning tool, but the quantity of data it stores has expanded exponentially over the years, rendering it largely unworkable, and most FP staff currently choose not to use it. This is further exacerbated by the frequent presence of bugs in the system, which compromise the reliability of data sourced from the system. For example, MARLO-generated summaries do not always include all inputted data, so a painstaking exercise to identify what has been saved and what has not has to be carried out, clearly undermining faith in the system.

Each November the results achieved in the preceding year and the plans for the subsequent year are presented at the annual ISC meeting. Results are reported according to major achievements per CoA and milestones. Given that the CoAs are not specifically identified as part of the ToC, the contributions of these major achievements to the FP theory of change are difficult to gauge. Similarly, the absence of targets for each of the stated outcomes also makes progress with regard to the achievement of milestones somewhat meaningless; if we do not know the end destination—i.e., the final target—then we cannot know how far we are along the planned trajectory thanks to the achievement of a given

milestone. In the absence of targets, the use of milestones as a means of assessing progress with regard to the achievement of outcomes is therefore not considered valid.

Also, as noted in section 2.2.1, the linkages between FPs and the broader-level (CGIAR) results they aim to contribute to are not always clear—i.e., the distance between an FP's stated overall objective and outcomes, and the broader SLO and IDO goals they are supposedly contributing to is not always evident. This is especially the case for less mature programs such as FP1 and FP5, which are less likely to be able to contribute in any tangible, measurable way to higher-level goals after a four- to five-year period.

Another means of measuring progress toward the achievement of outcomes that has been developed by CGIAR are the OICRs. These are short reports describing the contribution of CGIAR research to development outcomes and impact. Although these OICRs can serve a useful purpose by highlighting some key achievements of flagships and as communication material for A4NH, in and of themselves they are not capable of providing a comprehensive or accurate overview of progress toward achievement of outcomes. OICRs are perceived by many FP staff as a necessary evil, an artificial gauge of what they are doing and not a good measure of what FPs are actually achieving. The whole basis of selecting topics to be covered by OICRs is also questionable. A good example in this regard is one of the OICRs selected for analysis in this evaluation, namely OICR 2734: "Reach, Benefit, Empower Framework of Indicators for Monitoring Programs and Policies Incorporated into Trainings Conducted by Partners." The RBE framework was selected as material for an OICR because it met the criteria for selection—i.e., it was a level 4 innovation (that had been taken up by a user). What is missing from the OICR is information on the very valuable work being carried out by FP4 and the GEE on adapting the WEAI—i.e., the development of pro-WEAI and WEAI4VC—because this work was still ongoing, thus not meeting OICR criteria. The irony here is that the RBE framework (though useful in and of itself as explained in section 2.2.2) was an unintended by-product of the larger body of work on pro-WEAI, and yet it is the RBE framework that is highlighted in the OICR and not the WEAI work. In other words, OICRs run the risk of not presenting an accurate and complete picture of results achieved.

In addition to major achievements, milestones, and OICRs, FPs are expected to report back on other results such as those related to the seven common results reporting indicators[19] (CRRIs), which include a mix of output- and outcome-related results: (1) innovations; (2) peer-reviewed articles; (3) number of formal partnerships; (4) number of policies/strategies/laws/regulations/budgets/investments/curricula modified in design or implementation, informed by CGIAR research; (5) Altmetric scores; (6) people trained by CGIAR; and (7) projected number of people/hectares benefiting from CGIAR research innovations. Although data on the first five CRRI are adequately recorded and stored, they provide only an indirect means of measuring progress given the lack of direct relation with the stated ToC.

A further complication is added by the discrepancies between the results identified in the planning exercise (the POWB) and the results recorded in the annual report. Not all of the results identified in the POWB are reported on in the annual report; there is no information provided on whether they were achieved, postponed, or canceled, and in some instances, a number of reported results, although valid, do not appear in the POWB. All of the above make an overall assessment of FP and CRP progress with regard to outputs and outcomes—i.e., the theory of change—extremely challenging.

#### *2.2.3.5 Conclusions Regarding CRP Management and Governance*

Overall, the management and governance of A4NH provides strong support for research programs. The stability and transparency in the A4NH PMU provide a buffer against the many uncertainties and bureaucratic demands from CGIAR for research programs. The planning process has made good use of the annual review and input from a dedicated ISC. A4NH management has made strategic use of W1/W2 funds toward program growth into new areas, toward establishing new partnerships, and toward facilitating policy impact. This strategy is commendable for building out new areas in nutrition and health, as discussed elsewhere in this report. The return on investment for the focus teams and coordinators is unclear, but it represents a useful experiment, and it would be good to know what lessons have been learned. This experiment is particularly relevant to any future attempts to forge a more integrated food systems approach across A4NH program elements. The reporting exercise could be significantly simplified

[19] As identified in the CGIAR Results Management Guide.

and streamlined and is very much dependent on the improved use of the ToC and its corresponding framework of results as discussed in section 2.2.4.

### 2.2.4 Progress along ToC (CRP and Flagships)

Measuring progress along the respective theories of change (ToCs) of each of the flagships and their combined contribution to the change process described in the overall ToC for A4NH is challenging owing to a number of factors.

- the existence of various versions of these ToCs, which are not always consistent and which are interpreted differently by different stakeholders;
- weaknesses in the formulation of the original ToCs; and
- a lack of indicators to measure progress along the ToC results chain.

As a result, the respective ToCs underpinning the different flagships (and in some cases, the CoAs) are not being used appropriately by FP staff for planning, management, and reporting purposes. Note that the analysis presented in this section draws on the detailed analysis of FPs 1 and 4, which are included in Annex 7 to this report.

#### *2.2.4.1 Various Versions of the ToC and Different Interpretations*

In the recently updated "Reference Document for Phase II Theories of Change" (updated in January 2019), ToCs are presented in various formats: as a narrative under the heading "Objectives and Targets"; as a "Results Framework" with different versions of outcomes and outputs; and as "Research Outcomes" that will be achieved through various impact pathways such as the "agri-food value chains" pathway, the "policies" pathway, and the "development programs" pathway. In some instances this can lead to a situation where the same type of result is presented as an outcome in one version of the ToC ("stakeholders from different sectors, governments, UN institutions, 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") and as an output in another version ("**Enhanced capacity**, leadership, and engagement at country level with key stakeholders in the design, implementation and evaluation of IAN programs and policies"). Note that different levels of results are also included in the same result statement—i.e., enhanced capacity and enhanced leadership are not on the same level of results. An added complication is that the FPs are structured around clearly defined CoAs rather than these impact pathways, which further undermines their operational value. A related problem is the difference in focus applied to the ToC by operational staff and management staff, with the former focusing on deliverables and milestones and the latter focusing on higher-level results such as outcomes and impact, which compromises dialogue between the two.

#### *2.2.4.2 Poorly Formulated ToC*

In the case of the overarching ToC for A4NH, this CRP is expected to make significant contributions to three of the Strategic Results Framework's SLO targets for 2022:

- 20 million more farm households in at least 12 countries will have adopted improved varieties, breeds, trees, and/or improved management practices (FP2: Biofortification; and FP3: Food Safety);
- 150 million more people, of which 50 percent 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 FP4: Supporting Policies, Programs and Enabling Action through Research); and
- 10 percent fewer women of reproductive age in Bangladesh, Ethiopia, Nigeria, and Vietnam will be consuming less than the adequate number of food groups (FP1: Food Systems for Healthier Diets).

As already noted, FP5 is not identified as contributing to any of the stated goals of A4NH, while FP1 (a new program in Phase II) is the only FP identified as contributing to the target "10 percent fewer women of reproductive age in Bangladesh, Ethiopia, Nigeria, and Vietnam will be consuming less than the adequate number of food groups."

How the different FPs will contribute to these goals is summarized in Table 1 of the above-referenced document entitled "A4NH Contributions, by Flagship, to the 2030 Agenda for Sustainable Development

and the CGIAR Strategy and Results Framework," with each FP mapped to a series of SDGs, SLOs, IDOs, and sub-IDOs. No further detail is provided as to how, specifically, each FP, according to its stated ToC, will make its contribution to these various goals, and as noted below, in some cases these links are somewhat tenuous. Furthermore, the links made between the different FPs and the cross-cutting issues lacks logic. For example, only FPs 3 and 4 will contribute to "increased capacity of beneficiaries to adopt research outputs," and while FPs 1 and 5 will contribute to "enhanced adaptive capacity to climate risks," only FP4 will contribute to an "enabled environment for climate resilience."

The formulation of results is not always clear, and the logical hierarchy between result levels (output – outcome – impact) is often missing. As an example of the former, we can cite the following impact statement: "research partner outputs are more likely to generate understanding, evidence, and leverage points for improving diets through a food system approach." In the first place, this is not an impact-level result (high-level goal) but rather a means to an end (outputs leading to understanding, evidence, and leverage points), and in the second place, it is not clear what is meant by "more likely" (more likely than what or whom?). As an example of the lack of logical hierarchy between result levels, we have an overall or main objective stated as: "the main objective is to understand and enhance agriculture's contribution to improving nutrition at scale" while an outcome is presented as "development program implementers and investors (governments, non-governmental organizations [NGOs], United Nations [UN] institutions) use evidence, tools, and methods to design and implement cost-effective nutrition-sensitive agricultural programs at scale." The actual implementation of programs at scale is a higher-level result than understanding "agriculture's contribution to improving nutrition at scale." Similarly, we have the following output: "improving the performance of multiple nutrient-rich agri-food value chains," which is a higher-level result than some of the corresponding outcomes, such as "partners, including value chain actors, use evidence from impact evaluations when making operational and investment decisions." The linkages between FPs and the broader-level (CGIAR) results they aim to contribute to are not always evident either. That is, the distance between the FP's stated overall objective and outcomes, and the broader SLO and IDO goals is not always evident. For example, in what way will "understanding how changes in food systems can lead to healthier diets, and identifying and testing entry points for interventions to make those changes" (OO), contribute to a "10 percent reduction in consumption of less than the adequate number of food groups among women of reproductive age and their children in the four target countries." The distance between these two results is huge. Also, the link between identified outputs, outcomes, and overall objective on the one hand and SLOs on the other is not always clearly presented—i.e., there are no explicit outputs or outcomes identified that would address these issues.

#### *2.2.4.3 Lack of Indicators*

Another major weakness is that no indicators are identified to measure progress along the ToCs. Each of the result statements in the ToC—i.e., impact, outcomes, and outputs—should have included at least one indicator to measure progress. The lack of associated indicators means that tracking progress toward achievement of goals is not possible, compromising effective project monitoring and learning as well as reporting. This situation would also appear to have led to the development of several other metrics (OICRs, innovations, policies, partnerships, etc.) to fill the gap.

#### *2.2.4.4 Conclusions regarding Progress along ToC (CRP and Flagships)*

Lessons learned should be drawn from the CRP experience with a view to improving the future generation of ToCs for CGIAR research programs. A detailed recommendation for establishing an appropriate ToC and linking it to reporting outcomes is outlined in section 4.4, and examples are given in Annex 7.

## 2.3 Future Orientation

The A4NH CRP has made real progress in bringing a nutrition and health focus to CGIAR and building out from legacy programs. As a result of the A4NH CRP, CGIAR is now engaged with and recognized by a wider audience in nutrition and in health. A number of elements point to strong prospects for the future of A4NH research within CGIAR.

- COVID-19 has delayed progress this year in research projects, but it has also brought a new spotlight to A4NH research in One Health and demonstrated why One Health will be an important part of CGIAR research moving forward.

- A4NH is perceived as having been transformational in moving CGIAR toward a more holistic, integrated food systems approach that is gaining momentum worldwide. To remain relevant, CGIAR needs to draw on, and extend, the positive gains made to date by A4NH in this key area.
- Overall assessment of the focus country approach introduced in Phase II is very positive though the level of success of this approach varies across countries and has lacked sufficient human and financial resources. The main benefits perceived from the focus country approach include the potential for early engagement with downstream partners, such as policymakers, which allows for better tailoring of research work to actual needs; offers scope for influencing key processes at the national and regional/continental level, providing A4NH with a "seat at the table" in key processes through which entry points can be identified and nurtured; and keeping relevant flagships informed and alerted. The planned assessment of these country strategies should provide useful insights to guide future country-based work.
- The creation of a well-resourced CGIAR Gender Platform is also promising, and the innovative and cost-effective work in the A4NH GEE unit may find a broader audience there (see section 2.4 below).
- A4NH has demonstrated the usefulness of expanding, more diversified partnerships. The inclusion of external partners (WUR and LSHTM) in Phase II has now been consolidated and is paying dividends in terms of increased connectivity, a more interdisciplinary approach, expanded expertise, and stakeholder engagement.
- A4NH's potential as a platform for learning represents a significant opportunity going forward. Positive experiences such as the development of dietary guidelines for Ethiopia or food safety in Vietnam constitute very relevant learning opportunities for other countries in terms of both processes and products. The ANH Academy and blogs such as the Food Systems Idea Exchange as well as the Gender-Nutrition Idea Exchange also represent good opportunities for expanded outreach and learning.

However, there are a number of risks that can be foreseen for A4NH and for important elements within the program.

- Some consider the ongoing CGIAR reform process too rushed, especially given the constraints imposed by COVID-19; more time is required for conceptual discussions and reflection on the structure and content of One CGIAR.
- Administrative risks include continued high overhead from multiple administrative structures and a high reporting burden. This situation can also reduce responsiveness or opportunities to realign programs to different needs. Maintaining the benefits from program integration in a CRP-like structure, while reducing the administrative burden, will be necessary. Results reporting needs to be simplified and aligned with ToC-based programming to allow for a more systematic and comprehensive tracking of results and potential for learning, as well as to reduce the current reporting burden.
- Bringing agriculture into nutrition and health in order to solve challenges in all three arenas requires involvement of two kinds of public health communities—one in nutrition (diet diversity, overnutrition, stunting, micronutrient deficiencies) and one in infectious diseases (zoonoses, emerging diseases such as COVID, changes in the human-landscape interface). Maintaining these lines of communication and collaboration across sectors will continue to be a challenge.
- The scope for synergies both within CRPs and between CRPs has remained a challenge and leads to overlap and duplication of efforts; better streamlining and integration will be required.
- Extension of the mandate of the GEE to include broader equity issues was not matched with additional resources. Concrete work on equity has been slow to materialize, while human and financial resources have limited the potential impact of work on gender and women's empowerment.
- Certain program elements face risks in terms of defining their future role. In particular, FP2 faces the challenge of ensuring that biofortification is "mainstreamed" into CGIAR breeding programs in order to fully capture the gains from two decades of research investments. FP5, on the other hand, is a new program that will need to build out capacity quickly to respond to emerging One Health challenges.

- Lack of predictability in terms of the programming cycle and funding are not conducive to the long-term, ambitious goals of research program. Moving to a nine-year programming horizon with realistic target setting for three-year intervals, combined with more predictable funding, will be crucial for diminishing the impact of this uncertainty.
- Although the focus country approach has contributed to increased engagement of national and regional stakeholders in the research agenda, the potential for co-funding from these partners remains largely untapped. Increased investment into research areas by partner governments would indicate a clear commitment to identified research areas and hence relevance and ownership.

## 2.4 Cross-Cutting Issues (Capacity Development, Gender, Partnerships, Youth)

### *2.4.1 Capacity Development*

Each flagship incorporates a capacity development component into its work plan in line with its specific goals, and its focus and format is clearly contingent on the longevity of a given FP or area of research; e.g., in the case of FP4, capacity development is a key component of Cluster 4.3 (Capacity, Collaboration, Convening, or CCC). Capacity development in A4NH takes two tracks: one that focuses on the capacity to undertake research, and the other on the capacity to use and apply research outputs in decision-making. Examples of both are found in Table 9. If we consider the research–solutions–capacity-building spectrum, then clearly "older" FPs (2, 3, and 4) will be more engaged in capacity development of research users, such as decision makers, than the newer ones (FP1 and FP5). The fact that these newer FPs are profoundly interdisciplinary in nature complicates the capacity development aspect.

A key achievement in the area of capacity development which is frequently referred to relates to the work of the Agriculture, Nutrition, and Health Academy (ANH Academy), which was the subject of an OICR in 2018 (2775). Founded in 2015 with help from A4NH and LSHTM, the Academy, which is housed in LSHTM, has grown to more than 1,500 members from 95 countries, over 60 percent of whom live and work in Africa and South Asia. The ANH Academy Week conference fills a previously unmet need to convene people around agriculture, nutrition, and health challenges. It includes two days of learning labs—face-to-face training sessions on methods and metrics in ANH research—and a three-day scientific conference. The week provides a platform for research programs, like A4NH, to share and learn and connects early career researchers with global experts, building their capacity to work across agriculture, nutrition, and health problems (food systems approach) and influence the agenda moving forward. A 2017 mid-term review of the Academy surveyed members participating in ANH Academy Week and found that 85 percent strongly agreed that membership had benefited their research. Thirty percent of respondents reported that they did not belong to other scientific networks. As the only fully global, interdisciplinary network principally focused on research and capacity strengthening of future leaders in this domain, the Academy and the ANH Academy Week are filling an important niche and providing benefits that will be measurable over the longer term. The conference alternates between Africa and Asia and strategically targets countries where support to researchers to influence policymakers is deemed promising; for example, the case of Ethiopia is considered to have been highly successful in this regard. Also of note is the gender training provided by the GEE unit via the Academy.

### *2.4.2 Gender*

Notwithstanding the fact that gender is identified as one of the priority areas of work for A4NH and that working on nutrition inevitably involves a strong gender focus, a surprisingly limited number of reported results include a gender dimension. Of the 208 innovations reported for the period, more than half—141—stated that gender was "not applicable," with a further 38 reporting it was "too early to tell." Only 29 innovations, 14 percent, reported a gender dimension. Similarly, in the case of the 63 policy-related results, 37 reported gender as nonapplicable while a further 17 reported gender as not targeted. Only 7 (11 percent) identify gender as being of significance. The same occurs with the OICRs, where a majority reported gender as nonapplicable. This certainly does not indicate a lack of gender relevance but does show the difficulty of assessing it based on reported indicators.

The integration of gender across flagships also varies considerably. Some such as FP4 clearly identify it as a priority area, carrying out specific work in this area and working closely with the GEE unit on specific projects (GAAP2, WINGs, and WEAI4VC), while others such as FP1 are still at the stage of assessing how

to better address gender in their activities. Examples of significant achievements from the GEE group are found in Table 9.

The dedicated work carried out by the GEE unit, which aims to help the integration of gender across A4NH, for example, through in-kind support and small grants to flagships (on an FP demand-driven basis), is cited as being very beneficial by several FP staff, though the results of these schemes are not yet available, so it is not possible to comment on their achievements. Through the GAAP2 program, the GEE also has interactions with some of the other FPs such as FP3 and FP5. Furthermore, the work of the GEE needs to be assessed against the backdrop of the very limited budget available to them ($958,227 between 2017 and 2019) and the limited human resources. Also of note was the extension of the unit's scope of work to include broader equity issues based on recommendations made by the Institute for Development Studies (IDS) in its 2017 external review, leading to a shift away from gender toward other equity issues in Phase II.

### *2.4.3 Partnerships*

In addition to some of the longer-established partnerships such as those of FP4, the CRP model, which entails cross-center collaboration, the inclusion of external partners such as WUR and LSHTM, and the focus country approach, have all meant that A4NH has been very strong in the formation of new partnerships and engagement with stakeholder groups such as researchers, policymakers, and the private sector. Examples of significant new partnerships in Phase II are found in Table 9.

In addition to the core group of managing partner institutions, the A4NH program engages with at least 245 external partners to carry out research, capacity development, policy engagement, or innovation delivery. Table 10 shows external partner type by flagship, with many partners having engagement with multiple flagships. Universities are the most dominant partner type, indicating the many research collaborations that support A4NH. Other prominent partners are governments, NGOs, and the private sector. In addition to these external partners, seven CGIAR centers partner with A4NH in addition to the core managing institutions, which include five CGIAR centers.[20] Of note is the high number of external partners engaging with FP1—46 in total—notwithstanding the limited amount of time it has been in operation. The high number of governments (8), national/local research institutes (9), and universities is an indication of the high level of interest in the work of this FP by a broad range of stakeholders.

A good example of effective outreach and engagement with external partners is the work being carried out by FP4 with the Rome-based agencies (RBAs): FAO, the International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP), as well as the United Nations System Standing Committee on Nutrition (UNSCN), and CFS. As global leaders in terms of thinking and action on food, agriculture, and nutrition and given their presence and influence on these issues at global, regional, and national levels, strong partnerships with the RBAs are a very effective means of leveraging A4NH's impact. The designated staff member carries out various functions with a view to increasing the dissemination and uptake of A4NH research and expertise, facilitating the creation of links between the RBAs and A4NH, as well as representing CGIAR/A4NH on global mechanisms and carrying out collaborative research. The staff member's work supports the integrative mandate of A4NH by working across centers and flagships and linking cross-A4NH initiatives, such as the gender and equity work and country coordination and engagement, with the RBAs. One tangible result of this engagement is the participation of CGIAR as the only non-UN organization in the UNSCN as an associate member, which provides opportunities to learn about nutrition activities across the UN System and identify ways to support them and link with CGIAR activities. Another is the study of how to improve the evidence base and evidence-based decision-making in the nutrition-sensitive work of international development organizations, using the RBAs as case studies. The study, which examines the factors affecting knowledge flows (access, uptake, and use) in the work of FAO, IFAD, WFP, and UNSCN, will now be complemented by process and impact studies using IFAD-funded projects to look at how agriculture contributes to improving nutrition among rural, smallholder producer households.

[20] One of these seven external partner centers, IWMI, does not have staff mapped to A4NH in 2019. This may be due to the relatively recent development of this collaboration with FP5.

### 2.4.4 Youth

As was the case for gender, the number of reported results (innovations, policies, and OICRs) identifying youth as a significant area of relevance, is very low. Of the 208 innovations reported for the period, more than half—141—stated that youth was not applicable, with a further 39 reporting it was too early to tell. Only 29 innovations—14 percent—reported youth as being of relevance. Similarly, in the case of 63 policies, 37 report youth as nonapplicable while a further 19 report it as not targeted. Only 4 (6 percent) identify youth as a significant goal. The same occurs with the OICRs, with none reporting youth as a principal or even significant goal. As with gender, this finding does not indicate a lack of relevance, but rather the difficulty of assessing relevance in reported indicators. Progress with regard to the incorporation of youth as a priority area has been slow; studies, including a framing paper about how to engage with youth-specific aspects of food systems change, are still ongoing.

### 2.4.5 Conclusions Regarding Cross-Cutting Issues

A4NH has a strong record in establishing external partnerships and in carrying out capacity development. The development of the ANH Academy is a significant contribution. In the case of collaboration across flagships and with other CRPs, the overall conclusion is that progress is being made, but could be improved.

The gender group is carrying out innovative research that is having an impact (see section 2.2.2). Weaknesses arise from the lack of resources to the gender group and its expanding scope of work. More could be done to integrate gender into the research programs of the flagships outside of FP4.

# 3 Recommendations

## 3.1 Recommendations for A4NH POWB 2021

The A4NH CRP has made real progress in bringing a nutrition and health focus to the CGIAR and building out from legacy programs. As a result of the A4NH CRP, the CGIAR is now engaged with and recognized by a wider audience in nutrition and in health. COVID-19 has delayed progress this year in research projects, but it has also brought a new spotlight to A4NH research in One Health and demonstrated why One Health will be an important part of CGIAR research moving forward. Furthermore, A4NH is perceived as having been transformational in moving CGIAR toward a more holistic, integrated food systems approach that is gaining momentum worldwide. To remain relevant, CGIAR needs to draw on, and extend, the positive gains made to date by A4NH in this key area.

In developing recommendations to consider for the POWB 2021, it is recognized that time is limited before the formal end of A4NH. The recommendations below focus on ways to capitalize on what has already been achieved under A4NH, and more importantly, to position the program for the future. These are designed to support greater effectiveness and the future sustainability of the program. We did not have specific recommendations related to quality of science.

**Recommendation #1: Carry out a separate strategic analysis of the highest-return areas in agriculture for health to direct the research in what is now FP3 and FP5 for beyond 2021.** The COVID-19 pandemic has educated research stakeholders about the value of a One Health approach. In looking to use this teachable moment to build out the One Health research in the CGIAR, it would be useful to understand where the highest returns in agriculture for human health might be achieved. Much of FP5 builds on legacy programs and may or may not be focused on the most important One Health opportunities. A strategic analysis would be timely to inform the emerging program (see sections 2.2.1 and 2.3 for background).

**Recommendation #2: Design a comparative study of delivery models in FP2 and FP3 in order to glean the lessons learned from comparisons of these public-private efforts for cost-effectiveness, sustainability, and scalability.** Both FP2 and FP3 have utilized public-private partnerships for delivery of innovations to farm households. Both are delivering innovations where benefits may not be fully rewarded in the marketplace. Both are testing the limits of whether CGIAR delivery should extend to the "last mile" and whether the costs of delivery can be sustained through CRPs. Although it will be too soon to glean lessons in 2021, a study in the next three years could usefully draw lessons from comparisons across these programs, which might inform other delivery efforts of A4NH innovations in the future. The existing capacity for M&E in FP2 could support such a study (see section 2.2.2 for background).

**Recommendation #3: Prioritize the policy engagement and cross-country learning exercise planned for FP1 (on processes and approaches) for completion.**

There is concern that the reduced timeframe for the CRPs will result in some work not being carried out as planned. For example, this is the case for activities related to policy engagement foreseen under CoA1.3 in FP1 and for the impact assessments of food system innovations. Given the importance of this component, and in particular the scope for cross-country learning by national (and regional) stakeholders in terms of processes and approaches, it is recommended that all opportunities to facilitate this cross-learning be taken advantage of (see section 2.2.1 for background).

**Recommendation #4: Carry out a scoping study to consider where and how to apply gender tools in FPs where they have not been previously used but are clearly relevant.** Progress with gender mainstreaming has varied across FPs, and there is substantial potential for more systematic application of gender tools. The work carried out by the GEE to date with a view to supporting FPs to better mainstream gender should be adequately resourced so that it can be applied more systematically to all programs.

**Recommendation #5: Complete the synthesis report on what has been accomplished in the five focus countries across flagships and through the investment in this focus country approach.** In November 2019, the ISC recommended that country coordinators in the five focus countries prepare a report synthesizing what all flagships have contributed to food systems approaches in the five focus countries. We agree that this report would be very timely to draw lessons for future country engagement. This report will help to support a food systems framework that might include more

of the A4NH program and will also help to demonstrate the value from investments in CCE (see section 2.2.3 for background).

## 3.2 CGIAR System-Level Recommendations

The following recommendations are made for CGIAR-level consideration. They refer to elements of our evaluation that would seem to be common across CRPs and thus provide opportunities to improve performance at the system level.

**Recommendation #1: Maintain deliberate focus on nutrition and health in new research modalities.** A4NH has made real progress in bringing a nutrition and health focus to the CGIAR and building out from legacy programs. As a result of the A4NH CRP, the CGIAR is now engaged with and recognized by a wider audience in nutrition and in health. That achievement would be lost if nutrition and health are not recognized at a high level in the anticipated new research programs. Subsuming nutrition and health under traditional productivity goals, as often happened in the past, will eliminate the gains that have been made in moving CGIAR research forward in this arena.

**Recommendation #2: Develop a plan for the future of the external partnerships supporting the two new programs in FP1 and FP5, including criteria for their continuation.** A4NH has developed external managing institution partnerships during the relatively brief Phase II that have provided notable benefits, as discussed above. Initial challenges arising from differences in institutional approaches have now been largely overcome. These partnerships have been consolidated and are now paying dividends in terms of broader connectivity and interdisciplinary approaches. A4NH has codified these relationships through management agreements and annual audits. Although there are clear benefits to continuing these partnerships, it is useful to develop explicit criteria for the continuation of partnerships into the future, in order to continue to provide transparency. It is a useful moment to adjust how these partnerships are structured. Such criteria might also inform decisions about external partners in future research modalities (see sections 2.1.2 and 2.1.3 for background).

**Recommendation #3: Align programs, outputs, and milestones with desired impacts by using theories of change more effectively.** As discussed in section 2.2.4, it is difficult to track progress toward higher-level outcomes when the theory of change does not follow a logical hierarchy between result levels—that is, outputs leading to outcomes which in turn contribute to impact. There are five agreed CGIAR impact areas: (1) nutrition and food security; (2) poverty reduction, livelihoods, and jobs; (3) gender equality, youth, and social inclusion; (4) climate adaptation and greenhouse gas reduction; and (5) environmental health and biodiversity. In the future each CGIAR research program should be aligned with at least one of these broader impact areas—i.e., the overall objective of each program should reflect at least one of these impact areas. This alignment will ensure that all approved programs are clearly linked to at least one of the organization's priorities and are therefore relevant. Outcomes should then be identified that describe how a given program is going to contribute to that overall objective/impact, bearing in mind that an outcome should be achieved by the end of the program cycle. Areas of work (or clusters of activities) can then be grouped around these outcomes instead of creating alternative structures. Outputs are then decided on. These represent the key results actually delivered by the program in order to achieve the planned outcomes. The assumptions that need to hold for each result area to deliver are then identified. This is the theory of change for the program, and there should only be one version of it (per program), though this ToC should evolve over time to reflect changes in the context. Once the ToC is agreed upon, at least one indicator should be identified for each result (outputs, outcomes, and impact). Targets (final goals) and milestones (intermediate goals along the program's trajectory) are then agreed upon, and these are monitored by management to ensure that programs are on track and that remedial action can be taken in the event that milestones and targets are not being achieved as planned. The ToC can be adapted over time with learning. Examples of how to construct an effective ToC are given in Annex 7.

**Recommendation #4: Redesign and streamline the programming, monitoring, and reporting systems.** As discussed in section 2.2.3, the reporting system has become burdensome, wasteful, and not useful for learning and management purposes. The reporting exercise, including the MARLO system, could be significantly simplified and streamlined. This would reduce the administrative burden and, more importantly, improve the use of information for management and learning purposes.

**Recommendation #5: Use an incremental approach to achieving longer-term goals and longer funding cycles will facilitate measuring progress toward SLOs.** It is clear that most desired impacts are unlikely to be achieved with one-year cycles and that progress toward SLOs requires

sustained investments. This report endorses the stated change in the CGIAR funding structure to move toward nine-year funding cycles with three-year phases for reporting results.

# Tables and Figures

***Table 1. Actual Expenditures by A4NH, 2017–19 (1,000 $)***

| | 2017 Actual | | | 2018 Actual | | | 2019 Actual | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flagship** | **W1/W2** | **W3** | **Total** | **W1/W2** | **W3** | **Total** | **W1/W2** | **W3** | **Total** |
| **FP1** | $3,063 | $5,750 | $8,813 | $4,156 | $12,802 | $16,957 | $4,017 | $9,935 | $13,952 |
| **FP2** | $3,145 | $32,913 | $36,060 | $4,045 | $30,403 | $34,449 | $3,378 | $28,167 | $31,546 |
| **FP3** | $2,857 | $9,615 | $12,471 | $3,719 | $10,067 | $13,786 | $3,736 | $9,885 | $13,621 |
| **FP4** | $3,051 | $15,060 | $18,112 | $4,092 | $10,880 | $14,973 | $3,640 | $11,664 | $15,304 |
| **FP5** | $1,431 | $945 | $2,376 | $2,036 | $1,660 | $3,696 | $2,350 | $1,540 | $3,890 |
| **CRP mgmt & support*** | $1,899 | $105 | $2,004 | $2,473 | $444 | $2,917 | $3,056 | $1,898 | $4,954 |
| **TOTAL** | **$15,446** | **$64,389** | **$79,836** | **$20,553** | **$66,255** | **$86,778** | **$20,177** | **$63,090** | **$83,267** |

Sources: POWB, A4NH.

*Includes $503,206 in strategic grants awarded through PMU in 2019.

***Table 2. Total Research FTEs (2019) charged to A4NH Funding Sources by Flagship, Funding Window***

| Flagship | Total Research FTE | W1/W2 FTE | W1/W2 FTE % of total | W3/bilateral FTE | W3/bilateral FTE % of total |
|---|---|---|---|---|---|
| **FP1** | 64 | 28 | 44 | 36 | 56 |
| **FP2** | 14 | 8 | 57 | 6 | 43 |
| **FP3** | 30 | 10 | 33 | 20 | 67 |
| **FP4** | 28 | 6 | 21 | 22 | 79 |
| **FP5** | 15 | 10 | 67 | 5 | 33 |
| **TOTAL** | **151** | **62** | **41** | **89** | **59** |

Source: A4NH Staff List with Time from A4NH PMU. This staff list is compiled by the PMU. It includes flagship leaders, Cluster of Activity leaders, those assigned as principal investigators on funding sources, those listed as responsible for deliverables in annual work planning, and other individuals self-reported by the flagship, along with those listed as research staff in the Roster.

Note: All numbers rounded to nearest whole. Research FTEs are based on the list of research leaders and staff and time charged by source of funding reported by managing partners to the PMU with their annual financial reports ("Roster"). The members of the PMU, program managers, and program support FTEs are not included.

***Table 3. Research Leaders and Staff by Flagship, Institution, and Degree of Commitment***

| Flagship/Institution | Research Leaders/ Project PIs | Research Staff with >50% | Research Staff with <50% | Research Staff with 0% | Total by Institution |
|---|---|---|---|---|---|
| **FP1 total: 156** | **58** | **40** | **34** | **24** | |
| WUR | 32 | 27 | 4 | 15 | 78 |
| CIAT | 5 | 7 | 13 | 5 | 30 |
| Bioversity | 12 | 6 | 8 | 3 | 29 |
| IFPRI-MTID | 1 | 0 | 6 | 0 | 7 |
| IFPRI-DSGD | 2 | 0 | 2 | 0 | 4 |
| CIP | 1 | 0 | 0 | 0 | 1 |
| IITA | 3 | 0 | 1 | 1 | 5 |
| CIMMYT | 1 | 0 | 0 | 0 | 1 |
| IDS | 1 | 0 | 0 | 0 | 1 |
| **FP2 total: 38** | **12** | **8** | **11** | **7** | |
| IFPRI-HarvestPlus | 5 | 7 | 7 | 0 | 19 |
| CIAT | 7 | 0 | 0 | 0 | 7 |
| Bioversity | 0 | 0 | 0 | 3 | 3 |
| CIP | 0 | 0 | 0 | 2 | 2 |
| IITA | 0 | 1 | 4 | 2 | 7 |
| **FP3 total: 41** | **16** | **17** | **4** | **4** | |
| ILRI | 7 | 9 | 0 | 2 | 18 |
| IITA | 8 | 8 | 2 | 1 | 19 |
| IFPRI-MTID | 1 | 0 | 2 | 1 | 4 |
| **FP 4 total: 58** | **19** | **18** | **12** | **9** | |
| IFPRI-PHND | 14 | 18 | 4 | 6 | 42 |
| IFPRI-EPTD | 1 | | 5 | | 6 |
| IFPRI-DSDG | | | 2 | | 2 |
| IFPRI-DGO | 1 | | | 1 | 2 |
| IFPRI-MTID | | | 1 | | 1 |
| Bioversity | 1 | | | 1 | 2 |
| IDS | 2 | | | 1 | 3 |
| **FP5 total: 23** | **7** | **11** | **2** | **3** | |
| ILRI | 3 | 8 | | 2 | 13 |
| LSHTM | 2 | 3 | 2 | 1 | 8 |
| IITA | 1 | | | | 1 |
| WorldFish | 1 | | | 1 | 1 |

Source: A4NH Staff List with Time from A4NH PMU.

Notes: Research leaders include individuals in roles as leaders of flagship programs and Clusters of Activities (CoAs) and those listed as principal investigators on funding sources, regardless of the percentage of time reported by the managing partners in the Roster provided to the PMU with their annual financial reports. Total research staff includes those listed as responsible for deliverables in annual work planning, other individuals self-reported by the flagship, and those listed as research staff in the Roster. A group of research assistant staff reported as 6.54 FTE in FP4 IFPRI-PHND added as 7 individuals.

***Table 4. Research Staff with > 50% Time Reported through A4NH and Research Leaders by Gender and Flagship***

| Flagship | Male | Female | % Female |
|---|---|---|---|
| **FP1** | 43 | 55 | 56% |
| **FP2** | | | |
| **FP3** | 13 | 7 | 35% |
| **FP4** | | | |
| **FP5** | 23 | 10 | 30% |
| **TOTAL** | **103** | **95** | **48%** |

Source: A4NH Staff List with Time from A4NH PMU.

Note: Research staff includes those listed as responsible for deliverables in annual work planning, other individuals self-reported by the flagship, and those listed as research staff in the Roster with >50 percent time reported in the Roster. A group of research assistant staff reported as 6.54 FTE in FP4 IFPRI-PHND (or 7 individuals in Table 3) were excluded because gender was not identified. Count includes the 199 individuals who are either research leaders/project PIs or key research staff with > 50 percent time reported through A4NH. Total does not equal the 206 staff in that category in Table 3, as this table excludes the 7 research assistant staff in FP4 for whom gender is not identified.

***Table 5. Top Country Locations of Corresponding Authors of A4NH Journal Articles published in 2017–2019***

| Country | Articles | Freq | SCP | MCP | MCP Ratio |
|---|---|---|---|---|---|
| **Usa** | 161 | 0.30667 | 56 | 105 | 0.652 |
| **Kenya** | 55 | 0.10476 | 10 | 45 | 0.818 |
| **United kingdom** | 54 | 0.10286 | 3 | 51 | 0.944 |
| **Netherlands** | 37 | 0.07048 | 11 | 26 | 0.703 |
| **Vietnam** | 26 | 0.04952 | 3 | 23 | 0.885 |
| **India** | 24 | 0.04571 | 8 | 16 | 0.667 |
| **Nigeria** | 14 | 0.02667 | 2 | 12 | 0.857 |
| **Mexico** | 12 | 0.02286 | 4 | 8 | 0.667 |
| **Ethiopia** | 11 | 0.02095 | 0 | 11 | 1 |
| **Germany** | 10 | 0.01905 | 3 | 7 | 0.7 |
| **Australia** | 9 | 0.01714 | 2 | 7 | 0.778 |
| **Uganda** | 9 | 0.01714 | 0 | 9 | 1 |
| **Belgium** | 8 | 0.01524 | 0 | 8 | 1 |
| **South africa** | 8 | 0.01524 | 0 | 8 | 1 |
| **Brazil** | 7 | 0.01333 | 7 | 0 | 0 |
| **France** | 7 | 0.01333 | 0 | 7 | 1 |
| **Japan** | 7 | 0.01333 | 1 | 6 | 0.857 |
| **Canada** | 6 | 0.01143 | 0 | 6 | 1 |
| **Philippines** | 6 | 0.01143 | 3 | 3 | 0.5 |
| **Switzerland** | 6 | 0.01143 | 0 | 6 | 1 |

Source: Bibliometric analysis, based on information in the Web of Science, of the peer-reviewed publications A4NH reported for the common results reporting indicator on publications from 2017 to 2019.

Notes: SCP indicates that only one country represented in authorship. MCP indicates multiple country locations for authors. MCP ratio indicates the proportion of total articles with authors from multiple countries.

*Table 6. Top Journal Publication Outlets for A4NH Publications in 2017–2019*

| Sources | Articles | Impact Factor 2018 | Rank within JCR Category | JCR Category | Quartile in Category |
|---|---|---|---|---|---|
| **Journal of nutrition** | 35 | 4.416 | 15 of 87 | Nutrition & Dietetics | 1 |
| **Global food security-agriculture policy economics and environment** | 32 | 5.456 | 6 of 135 | Food Science & Technology | 1 |
| **Plos one** | 25 | 2.776 | 24 of 69 | Multidisciplinary Sciences | 2 |
| **Maternal and child nutrition** | 22 | 3.305 | 35 of 87; 14 of 125 | Nutrition & Dietetics; Pediatrics | 2; 1 |
| **Plos neglected tropical diseases** | 13 | 4.487 | 5 of 37; 1 of 21 | Parasitology; Tropical Medicine | 1; 1 |
| **Food policy** | 12 | 3.788 | 1 of 18; 29 of 363; 21 of 135; 24 of 87 | Agricultural Economics & Policy; Economics; Food Science & Technology; Nutrition & Dietetics | 1; 1; 1; 2 |
| **Food security** | 12 | 2.153 | 55 of 135 | FOOD SCIENCE & TECHNOLOGY | 2 |
| **Tropical animal health and production** | 11 | 1.089 | 33 of 61; 64 of 141 | Agriculture, dairy & animal science; Veterinary sciences | 3; 2 |
| **Bmc public health** | 9 | 2.567 | 59 of 186 | Public, Environmental & Occupational Health in SSCI edition | 2 |
| **Preventive veterinary medicine** | 9 | 2.302 | 10 of 141 | Veterinary Sciences | 1 |
| **Food and nutrition bulletin** | 8 | 1.523 | 78 of 135; 67 of 87 | Food Science & Technology; Nutrition & dietetics | 3; 4 |
| **International journal of public health** | 8 | 2.373 | 42 of 164; 69 of 186 | Public, Environmental & Occupational Health in SSCI edition; Public, Environmental & Occupational Health in SCIE edition | 2; 2 |
| **Nutrients** | 8 | 4.171 | 16 of 87 | Nutrition & Dietetics | 1 |
| **Annals of the new york academy of sciences** | 7 | 4.295 | 14 of 69 | Multidisciplinary Sciences | 1 |
| **Sustainability** | 7 | 2.592 | 105 of 251; 44 of 116; 3 of 6; 20 of 35 | Environmental sciences; Environmental studies; Green & sustainable science & technology; Green & sustainable science & technology | 2; 2; 2; 3 |

Sources: CAS Bibliometric analysis of 528 A4NH journal articles, based on information in the Web of Science.

***Table 7. Keyword Frequencies for 30 Most Frequently Used Keywords in A4NH Journal Articles, 2017–2019***

| Author Keywords (DE) | Articles | Keywords-Plus (ID) | Articles |
|---|---|---|---|
| **Nutrition** | 49 | Health | 68 |
| **Biofortification** | 47 | Nutrition | 51 |
| **Vietnam** | 28 | Prevalence | 36 |
| **Bangladesh** | 20 | Impact | 35 |
| **Iron** | 19 | Interventions | 33 |
| **Kenya** | 19 | Women | 33 |
| **Food.safety** | 18 | Children | 32 |
| **India** | 18 | Food | 32 |
| **Stunting** | 18 | Undernutrition | 29 |
| **Children** | 17 | Developing.countries | 28 |
| **Zinc** | 17 | Quality | 28 |
| **Agriculture** | 16 | Diversity | 25 |
| **Maize** | 15 | Growth | 25 |
| **Uganda** | 15 | Iron | 23 |
| **Aflatoxin** | 13 | Risk.factors | 23 |
| **Undernutrition** | 12 | Beta.carotene | 22 |
| **Zambia** | 12 | Deficiency | 22 |
| **Food.security** | 11 | Risk | 22 |
| **Complementary.feeding** | 10 | Young.children | 22 |
| **Dietary.diversity** | 10 | Africa | 21 |
| **Ethiopia** | 10 | Agriculture | 21 |
| **Gender** | 10 | Biofortification | 21 |
| **Vitamin.a** | 10 | Countries | 21 |
| **Wheat** | 10 | Maize | 20 |
| **Africa** | 9 | Outbreak | 20 |
| **Micronutrients** | 9 | Consumption | 19 |
| **One.health** | 9 | Infection | 18 |
| **Diet** | 8 | Livestock | 18 |
| **Provitamin.a** | 8 | Disease | 17 |
| **Zoonosis** | 8 | Epidemiology | 17 |

Source: CAS bibliometric analysis of 528 A4NH journal articles using information from the Web of Science.

Notes: Author keywords are those specified by the author. "Keywords plus" are automatically generated by Web of Science based on words that frequently appear in the titles of an article's references but do not appear in the title of the article itself.

### *Table 8. Selected Significant Achievements by A4NH Flagship in Phase II*

| **Flagship 1: Food Systems for Healthier Diets** |
|---|
| A suite of tools and methods to support food systems research were developed and have been applied to varying extents in all four focus countries (Bangladesh, Ethiopia, Nigeria, and Vietnam) including but not limited to a methodology to assess food system policies, insights into dietary gaps at (sub) national level, and benchmarks and guidelines for healthy diets at individual and household levels |
| Several food system innovations focused on consumer-oriented interventions to increase accessibility, affordability and acceptability of nutritious foods such as fruits and vegetables, poultry, and fish in the four focus countries have been designed, but the testing of most of these innovations remains ongoing. |
| The government of Ethiopia and the Ethiopian Public Health Institute (EPHI) adopted the food-based dietary guidelines (FBDG) for Ethiopia. |
| The Agrobiodiversity Index (ABDI), which helps identify concrete actions to achieve diverse, sustainable, and resilient food systems, was developed. |
| **Flagship 2: Biofortification** |
| The Biofortification Prioritization Index and online tool were launched to help stakeholders identify potentially high-impact biofortification interventions for targeting. |
| Twenty-four countries have now included biofortification in their policies and strategies. |
| Biofortification is included in policy documents from FAO and WFP. |
| HarvestPlus entered into a partnership with GAIN to explore how to introduce biofortification through value chains. |
| **Flagship 3: Food Safety** |
| The Bill and Melinda Gates Foundation (BMGF) and UK Department for International Development (DFID) made a $13 million research for development investment in food safety in six countries in Africa and one state in India, informed in part by evidence from a decade of research on informal markets. |
| The African Union (AU) launched its second Comprehensive Africa Agriculture Development Programme Biannual Review, including among its indicators a new index on food safety. The index was developed by a multidisciplinary team of experts led by PACA, in consultation with ILRI, with support from A4NH, and validated by AU country member states. |
| A4NH participated in planning and presenting at the first Global Food Safety Conference, convened by FAO/WHO and the World Bank. |
| Six trials testing the "three-legged stool approach" (enabling, empowering, incentivizing) for improving food safety in informal markets were launched by ILRI researchers and partners. |
| **Flagship 4: SPEAR** |
| A4NH produced "Stories of Change in Nutrition," a series of structured case studies in six countries (Bangladesh, Nepal, Odisha [India], Ethiopia, Senegal, and Zambia) that aim to improve understanding of what drives impact in reducing undernutrition and how enabling environments and pro-nutrition policy and implementation processes can be cultivated and sustained. |
| Evidence was provided to support nutrition-sensitive agriculture programs through several governments and NGOs, including the Governments of Malawi and Bangladesh, the World Food Program, and Alive & Thrive. |
| A4NH developed (and applied) a methodology for measuring the affordability of nutritious foods and diets that will help decisionmakers understand how to better utilize agriculture to improve nutrition. |
| An extensively cited study challenged the thinking around the global focus on lowering the prevalence of stunting, successfully encouraging donors to reconsider their approach to solving nutrition challenges. |
| Several nutrition- and gender-sensitive multisectoral program evaluations were completed on, e.g., how improving women's empowerment through a gender- and nutrition-sensitive agriculture program contributed to reducing child wasting in Burkina Faso, and the effectiveness and cost-effectiveness of food-assisted multisectoral health and nutrition programs targeted to women and children in the first 1,000 days in Burundi and Guatemala. |

| Flagship 5 Improving Human Health |
| --- |
| The CGIAR Antimicrobial Resistance (AMR) Hub was launched, formalizing partnerships with four CGIAR institutions and the International Centre for Antimicrobial Resistance Solutions, Swedish University of Agricultural Sciences, and LSHTM to support activities initially in Bangladesh, Kenya, Uganda, and Vietnam. |
| The Federal Ministry of Economic Cooperation and Development (BMZ) invested multiyear funding in a new One Health Research, Education, and Outreach Centre for Africa, which will develop collaborative research efforts on food safety and the control of zoonoses. |
| A new line of research funded by the Our Planet Our Health scheme of the Wellcome Trust was initiated within the existing collaboration with AfricaRice and expanded to include IRRI. It concerns AWD (alternate wetting and drying) methods. The new work asks whether a modification of AWD can reduce mosquitoes as well as methane emitted from rice fields, while also reducing water usage and maintaining yield. |

### *Table 9. Table 9: Selected A4NH Achievements in Cross-Cutting Dimensions, 2017-19*

| Capacity Development |
| --- |
| MSc Food System Research Grant Scheme to build the capacity of young researchers and their supervisors from local universities in food systems research in Ethiopia and Vietnam (FP1) |
| MSc in One Health, co-led by LSHTM and the Royal Veterinary College - several One Health students were hosted by ILRI in Kenya and Vietnam, and others have contributed research on usage of veterinary and medical antimicrobials in Uganda and training in mixed methods research into insecticide resistance and AMR including digital data collection for junior researchers and students from national research organizations (FP5) |
| Short training courses such as the 'Transforming Nutrition: Ideas, Policies and Outcomes' (FP4) course which is the subject of a 2017 OICR and where it is reported that course participants used knowledge gained to contribute to improved national policies and programs relevant to nutrition in their home countries. |
| Training provided by ILRI to local milk producers and sellers to ensure the safety of non-pasteurised milk in Kenya (FP3) |
| **Gender** |
| The development of the "Reach, Benefit, Empower" framework which is a by- product of GAAP2 and which aims to increase the clarity around development project objectives by differentiating between projects that seek to simply reach women from those that seek to benefit and/or empower them. |
| The joint GEE/FP4 project on adapting and validating a project-level WEAI (or pro-WEAI) that projects can use to identify key areas of women's (and men's) disempowerment thus contributing to better designed strategies to address identified deficiencies, and monitor project outcomes related to women's empowerment. |
| Significant training activities included a joint FP4 and GEE webinar on "Gender and women's empowerment in nutrition-sensitive agriculture: New evidence and implications for programming" which is estimated to have reached 136 researchers, funders, implementers and policymakers. |
| A4NH's Gender Nutrition Idea Exchange (GNIE) blog (launched in Phase I) which continues to expand its readership re 15,078 views in 2017 (a 49 percent increase from 2016), up to 19,000 views in 2018 and 21,700 in 2019. |
| **External Partnerships** |
| CGIAR is recognized as a member of the Committee on World Food Security (CFS) Open-Ended Working Group on Nutrition. It is the only research system to be recognized as a member. Over the course of 2019, A4NH convened various parts of CGIAR in the Voluntary Guidelines for Food Systems and Nutrition consultative process resulting in "the Zero Draft", the first major milestone towards the final Guidelines. |
| A memorandum of understanding to strengthen collaboration in food safety research with the National Institute of Nutrition as well as investment initiatives with the World Bank and its Global Food Safety Partnership initiative |
| The Governments of Togo and Sudan requested assistance from IITA to design management strategies to decrease aflatoxin contamination; in Sudan, this request was accompanied with a $3 million investment from the Agence Française de Développement to develop an Aflasafe product. |

| |
|---|
| A memorandum of understanding with the Ethiopian Public Health Institute (EPHI) to strengthen collaboration across the gamut of A4NH research |
| Collaborations with food companies, such as PRAN in Bangladesh, to generate a market for biofortified harvest, and with the media in developed and developing countries to raise public awareness about hidden hunger and biofortification. |
| Strategic partnership with IDS for the analysis of policy processes and the political economy of agricultural policy, as well as nutrition and health policy. |
| **Cross-CGIAR Partnerships** |
| To improve coordination and avoid duplication, researchers in A4NH and Livestock (the two CRPs that include AMR as a research priority), identified areas of synergies, especially related to research on antimicrobial use. A4NH has aligned its food safety activities to Livestock's value chains, with activities in Burkina Faso, Ethiopia, India, Tanzania, Uganda, and Viet Nam. |
| FP 3 collaborated with MAIZE on the identification of strains for development of Aflasafe products for use in Mali, Zimbabwe, and Cameroon as well as a collaboration to integrate aflatoxin-tolerant maize varieties and hybrids with Aflasafe. |
| FP5 established a partnership with IWMI, linked to existing research on water and malaria, and on urban agriculture and disease and with AfricaRice to build disease management strategies into rice intensification programs in West Africa. |
| FP2 established a new agreement with CIP to harmonize the monitoring and evaluation of scaling-up/commercialization of HarvestPlus varieties and CIP's orange fleshed sweet potato. In 2019, a theory of change for commercializing biofortification and identification of key indicators was completed and in 2020, the partnership will continue to conduct field implementation of the tools developed to measure these indicators and to estimate impact at scale, sustainability, and cost-effectiveness. |
| With the CRP on FISH, FP 1 submitted a joint proposal, conducted national food systems reviews, and co-funded a PhD (hosted by WUR), all around the role of fish in food systems in Bangladesh and Nigeria. FP 1 also partnered with the CRP on WHEAT to conduct a survey of the consumer and retail landscape in Mexico City as part of a broader study on agri-food systems innovation in value chains for processed staples, and with FTA on co-learning activities about the place of trees and tree food products in food systems and how to make restoration exercises nutrition-sensitive. |

### *Table 10. External Partners of A4NH by Type and Flagship Affiliation (including multiple Flagships)*

| Type of Partner | FP1 | FP1; FP2 | FP1; FP2; FP3; FP5 | FP1; FP3 | FP1; FP3, FP5 | FP1; FP4 | FP1; FP5 | FP2 | FP2; FP3 | FP2; FP3; FP4 | FP2; FP4 | FP3 | FP3; FP4 | FP3; FP5 | FP4 | FP5 | Grand Total | FP1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Agricultural advisory and/or extension services** | | | | 1 | | | | 1 | | | | | | | | | 2 | |
| **Associations (other than regional organizations, extension, and farmer/community level)** | 2 | | | | | | | | | | | 1 | | | 1 | | 4 | 2 |
| **Bilateral development agency/bank** | | | | | | | | | | | | 1 | 1 | | | | 2 | |
| **Farmer level/community level organization** | | | | | | | | 1 | | | | | | | | | 1 | |
| **Foundation** | 3 | | | | | | | 1 | | | | | | | | | 4 | 3 |
| **Government** | 8 | | | | | | | 3 | 1 | | | 14 | | | 3 | 5 | 34 | 8 |
| **International NGO** | 1 | 1 | | | | | | 1 | | | 1 | 3 | | | 7 | 1 | 15 | 1 |
| **International Organization (other than financial or research)** | 1 | | 1 | | | | | | | | | 2 | | | 2 | 1 | 7 | 1 |
| **International/regional financial institution** | 1 | | | | | | | | | | | 1 | | | 1 | | 3 | 1 |
| **International/regional research institution** | 2 | | | 3 | | 1 | | | | | | 2 | | | 5 | 4 | 17 | 2 |
| **National/Local NGO** | 3 | | | | | | | | | | | | | | 1 | | 4 | 3 |
| **National/local research Institution** | 9 | 3 | | 1 | | | | 5 | 1 | | | 8 | | | 1 | 5 | 33 | 9 |
| **Other** | 1 | | | | | | | 2 | | | | 5 | | | 2 | | 10 | 1 |
| **Private company (other than financial)** | 3 | | | | | | | 7 | | | | 12 | | | 1 | 3 | 26 | 3 |
| **Regional Organization** | 2 | | | | | | | 1 | | | | 5 | | | | | 8 | 2 |
| **University** | 10 | | | 2 | 1 | | 1 | 5 | | 1 | | 25 | | 6 | 12 | 12 | 75 | 10 |
| **Grand Total** | **46** | **4** | **1** | **7** | **1** | **1** | **1** | **27** | **2** | **1** | **1** | **79** | **1** | **6** | **36** | **31** | **245** | **46** |

Source: External Partners List from A4NH PMU. It includes partners self-reported by flagships, partners listed as contributing to the common results reporting indicators A4NH reports (e.g., OICRs, innovations, policies), and financial contracts.

***Figure 1. A4NH Innovations by Type, 2017-19***

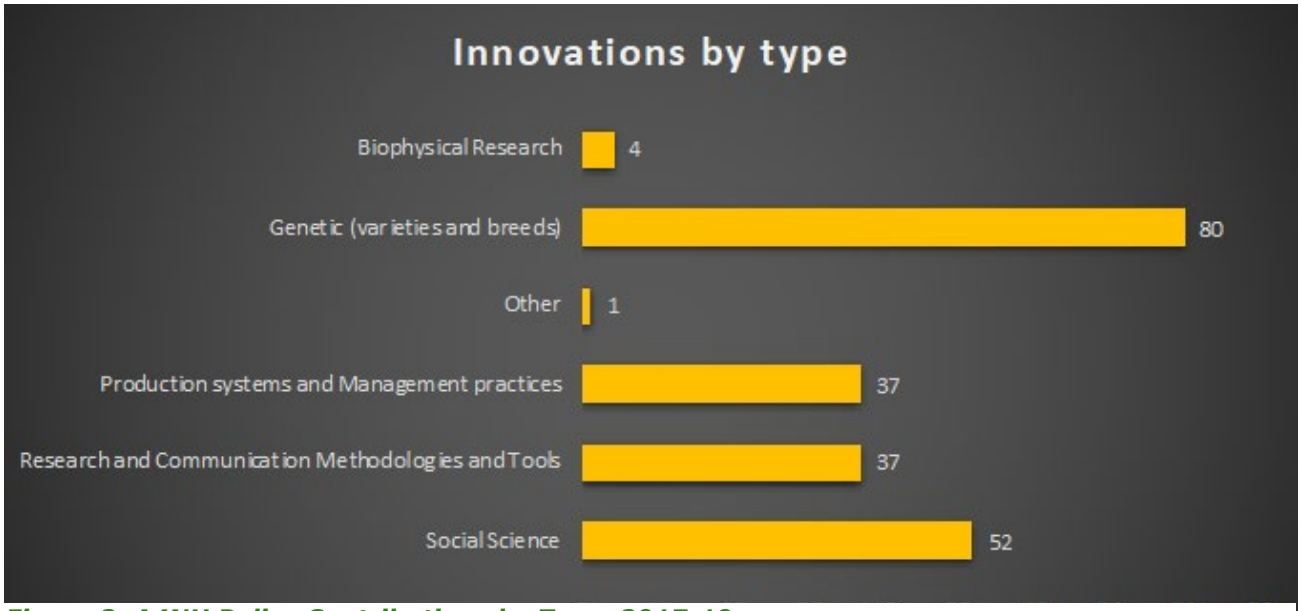
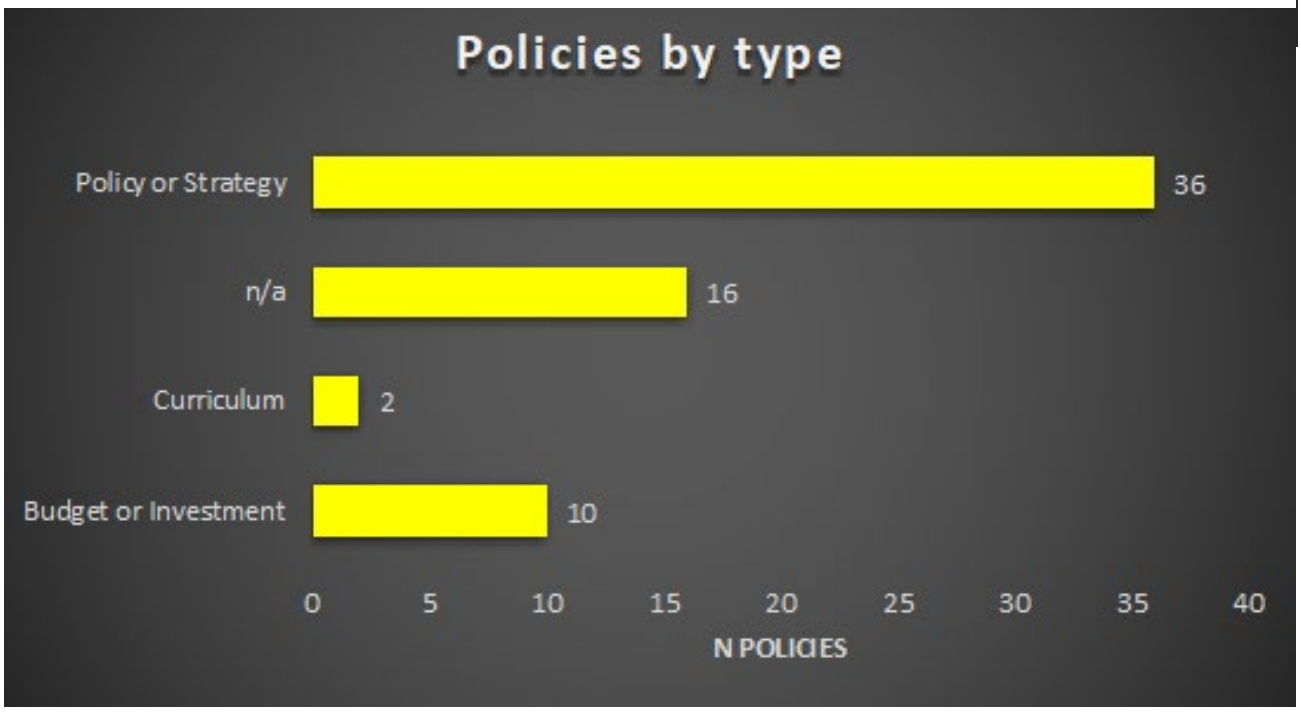



***Figure 2. A4NH Policy Contributions by Type, 2017-19***

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