

Mainstreaming of biofortification in the African Union: Evaluation of CGIAR contributions to a policy outcome trajectory

Boru Douthwaite

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August 2020

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Acronyms and abbreviations

A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
ALN	African Leaders for Nutrition
ATFFND	African Task Force on Food and Nutrition Development AU African Union
AUC	African Union Commission
AUDA	African Union Development Agency
BMGF	Bill & Melinda Gates Foundation
BNFB	Building Nutritious Food Baskets
CAADP	Comprehensive Africa Agriculture Development Programme
CGIAR	Global research partnership for a food secure future
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
CIP	Spanish acronym for the International Potato Center
Codex	Codex Alimentarius
CRP	CGIAR research program
Danida	Term used for Denmark's development cooperation DFID
	Department for International Development
DREA	Department of Rural Economy and Agriculture DSA
	Department of Social Affairs
ECOWAS	Economic Community of West African States EQ Evaluation questions
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agriculture Research for Africa
GAIN	Global Alliance for Improved Nutrition
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
Global Panel	Global Panel on Agriculture and Food Systems for Nutrition GMOs
	Genetically modified organisms
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
NAIP	National Agricultural Investment Plan NARS
	National Agricultural Research Systems
NEPAD	New Partnership for Africa's Development
OAU	Organization of African Unity
OFSP	Orange fleshed sweetpotato
PANI	Pan African Nutrition Initiative
R4D	Research for development
RAC	Reaching Agents of Change
RCT	Randomized controlled trial
REC	Regional Economic Community
ReSAKSS	Regional Strategic Analysis and Knowledge Support System REU
	Reaching End Users (project)
RTB	CGIAR Research Program on Roots, Tubers and Bananas
SADC	Southern African Development Community
SASHA	Sweetpotato Action for Security and Health in Africa

Sida	Swedish International Development Cooperation
SPHI	Sweetpotato for Profit and Health Initiative
SRF	Strategy and Results Framework
STC-ARDWE	Specialized Technical Committee on Agriculture, Rural Development, Water and Environment
STC-HPDC	Specialized Technical Committee on Health, Population and Drug Control
	SUN
	Scaling Up Nutrition
SUSTAIN	Scaling Up Sweetpotato Through Agriculture and Nutrition
TAAT	Technologies for the African Agricultural Transformation
	TSNI
	Towards Sustainable Nutrition Improvement
UNICEF	The United Nations Children's Fund
USAID	United States Agency for International Development
VITAA	Vitamin A for Africa
WFP	World Food Program
WHO	World Health Organization

Glossary

Biofortification: A process of increasing the density of vitamins and minerals in a crop through plant breeding or agronomic practices so that the biofortified crops, when consumed regularly, will generate measurable improvement in vitamin and mineral nutritional status.

Champion: Someone who sees value in an outcome trajectory and engages with decision makers to strengthen it.

Generic (policy) theory of change: A theory of change that describes, from the peer-reviewed literature, in a general sense how the policy change process works.

Initiative: Coherent sets of activities such as breeding, dissemination, policy engagement and technical support that may or may not be project-related.

Mainstreaming: In the context of this case, it means the inclusion of biofortification into AUC and AU member policies, strategies and plans as a solution to micronutrient malnutrition to the point that biofortification is seen as a normal or regular response.

Outcome: A change in behavior (practices, relationships) or policies (that influence behavior) of individuals, groups, organizations or institutions.

Outcome evidencing approach: An adaptation of outcome harvesting in which a case is built and challenged as to whether a program has contributed to one or more outcome trajectories.

Outcome trajectory: The pattern of interactions and causal links between actors, technologies and institutions that maintain and scale a coherent set of outcomes over time, e.g., the mainstreaming of biofortification in the AU.

Specified (policy) theory of change: The generic theory of change which is made specific to the instance of policy change being studied.

Executive summary

Background and context. Since their inception in 2012, the CGIAR research programs (CRPs) on Roots, Tubers and Bananas (RTB) and Agriculture for Nutrition and Health (A4NH) have been generating innovations, testing interventions, and providing science-based evidence and advice to policy and decision makers at local, national and supra-national levels with the expectation that this advice will contribute to policy changes that in turn helps create an enabling environment for agri- food systems innovations. In 2019, the two CRP leadership teams commissioned a systematic assessment to validate a significant policy outcome claimed by both programs. This outcome relates to the integration of biofortification in African Union (AU) policy processes to the point that a continent-wide declaration on scaling-up food fortification and biofortification in Africa is ready to be tabled to heads of state and government at an AU Summit within 2020. The outcome is the result of multi-year research carried out by the International Potato Center (CIP), which leads RTB, and HarvestPlus, which leads A4NH's work on biofortification.

Purpose and scope. The purpose of this case study is to generate evidence and lessons learned on the contributions of CGIAR in stimulating policy changes that created an enabling environment for agri-food systems innovation. The objectives are:

1. To determine and document how and in what ways CGIAR interventions contributed to the mainstreaming of biofortification in the AU;
2. To identify other major actions/factors that contributed to the AU biofortification trajectory;
3. To generate findings to strengthen CGIAR contributions to the AU biofortification trajectory;
4. To contribute to a synthesis document that compares and contrasts the ways in which CGIAR actions have influenced policy in four cases.

Methods for the review. This case study is carried out as a CRP-commissioned independent evaluation using a version of outcome harvesting called outcome evidencing. Outcome harvesting is 'backward looking' in that it starts with an outcome and works backwards to identify and understand the patterns of interactions between people, institutions and technology that contributed to it, over time. The result is an 'outcome trajectory.' This approach then seeks to identify the contribution made by the programs to the outcome trajectory. Three methods were used to develop the outputs: a document review, interviews, and a verification workshop.

Evaluation questions.

The evaluation questions are:

1. How can the chosen generic theory of change be made more specific to the AU biofortification trajectory?
2. What are the main outcomes resulting from the AU biofortification trajectory and how did CGIAR contribute to them?
3. Has CGIAR contributed to integration/consideration of gender in the AU biofortification trajectory and, if so, how?
4. Is the AU biofortification trajectory likely to be sustained and scaled over the long term?
5. What worked well, what did not work so well, and what is needed in the future?

Findings

Findings relevant to Evaluation Question #1

Finding 1: The ‘shift in social norms’ is evident in a shift in the African Union Commission (AUC) and among AU stakeholders to see biofortification as an important strategy to combat micronutrient malnutrition.

HarvestPlus/A4NH and CIP/RTB have taken care to frame biofortification as complementary to other ways of tackling micronutrient malnutrition, i.e., fortification, diverse diets and supplementation, which likely has helped with the acceptability of the message in the AU.

Finding 2: The shift in social norms occurred by HarvestPlus/A4NH and CIP/RTB working together, through: 1) providing hard ‘gold standard’ evidence that biofortification works; and 2) leading projects and programs to introduce biofortified crops to millions of African households thus demonstrating that biofortification is possible at scale. HarvestPlus/A4NH worked to support the shift in norms by engaging with the indicators used in biennial Comprehensive Africa Agriculture Development Programme (CAADP) reviews.

Finding 3: The most important functional capacity that helped achieve the mainstreaming of biofortification in the AU was the capacity to advocate. Both CIP/RTB and HarvestPlus/A4NH supported and worked with networks of biofortification champions. The champions saw high-level meetings and conferences on nutrition, in particular, as windows of opportunity for advocating for biofortification. What also worked well was supporting the champions to develop and implement their own action plans for how they would mainstream biofortification in their respective organizations. This work represented an important departure for CGIAR, traditionally reluctant to engage in advocacy.

Finding 4: A strengthened support base for biofortification is manifest in the large amounts of funding available for work on biofortification and funding for large-scale initiatives to strengthen the agricultural sector that include it. It is also manifest in the existence and actions of high-level panels of African leaders including the Global Panel on Agriculture and Food Systems for Nutrition (the Global Panel) and the African Leaders for Nutrition (ALN) initiative. The sustained support for biofortification from donors, in particular the Bill & Melinda Gates Foundation (BMGF), Department for International Development (DFID) of the United Kingdom, the United States Agency for International Development (USAID) and the McKnight Foundation, has been crucial to providing a support base. Awards of the World Food Prize to individuals who have worked on and championed biofortification have likely strengthened positive global sentiment toward biofortification.

Finding 5: The generic policy window theory of change was made more specific and relevant by identifying and describing what activities and events contributed in practice to the model’s three main outcomes – shift in social norms, change in capacity and strengthened support base. The main structural change is to recognize that the three main outcomes are linked to each other and form a self-reinforcing loop that drives the outcome trajectory.

Findings relevant to Evaluation Question #2

Finding 6: The main AU biofortification trajectory outcome is a continental declaration and road map to be submitted by the AUC to the next AU Summit. Both are the culmination of other mainstreaming outcomes including endorsement of the declaration by African ministers and inclusion of biofortification in CAADP and African Union Development Agency (AUDA-NEPAD) implementation plans. The perceived value of the declaration is that it will add impetus and permanency to biofortification within African governments’ policies, programs and budgets, as well as sending a signal to the private sector to increase investments.

Finding 7: CGIAR contributed to eleven tangible mainstreaming outcomes by supporting biofortification champions and advocacy and by providing support to the AUC Department of Rural Economy and Agriculture (DREA) in writing key documents. The eleven outcomes are indicators of a policy window process that CGIAR contributed to, described in the theory of change. The policy window process is driven by a positive feedback loop involving shifting social norms, capacity development and strengthening the support base. Advocacy is key to keeping the process going, in particular the ability to collectively and consistently recognize and respond to identify and engage with policy windows as they emerge over time.

Finding 8: HarvestPlus/A4NH and CIP/RTB have contributed significantly to measures that have supported and driven the policy window process described in the theory of change. For some measures, both entities made equally important contributions, e.g., carrying out and publishing high-quality research to show biofortification works. For other measures, one entity did more than the other, e.g. HarvestPlus, with additional support from A4NH, has led the effort to ensure biofortification can be defined and measured by African countries, whereas CIP has led the effort to build and support a network of biofortification champions. The process has been non-linear, in the sense that sometimes small interventions have had a large effect. Many other organizations have also contributed, not least CGIAR Centers such as the International Maize and Wheat Improvement Center (CIMMYT), the International Institute of Tropical Agriculture (IITA), and the International Center for Tropical Agriculture (CIAT).

Finding 9: CGIAR has implemented the main measures in support of ‘shifting social norms’ and ‘capacity development’ while donors and African leaders have made the main contributions to ‘strengthening the support base.’ The latter have likely been influenced by global processes that have raised and maintained the importance of nutrition over time.

Finding 10: BMGF and DFID work with entities at different scales in the biofortification outcome trajectories and as such have a unique vantage point from which to integrate this work. Such integration would be very useful to help avoid territoriality and tensions that can arise when funded entities are uncertain of future support and compete with each other as a result.

Finding relevant to Evaluation Question #3

Finding 11: Gender and social inclusion are part of CGIAR’s framing of the problem that the AU biofortification trajectory seeks to address – micronutrient malnutrition in women of reproductive age and children under five years of age. This may have contributed to a successful effort led by AUDA-NEPAD, supported by HarvestPlus/A4NH, the World Food Program (WFP) and the Food and Agriculture Organization of the United Nations (FAO), to include biofortified crops in AUDA-NEPAD’s long-running homegrown school feeding flagship program, targeting children. The contribution of CGIAR has been in framing the problem in the first place and supporting initiatives that have responded to it.

Finding relevant to Evaluation Question #4

Finding 12: The COVID-19 pandemic is making the approval of the declaration in the next AU Summit in 2020 less likely. If the declaration is not passed, then the AU biofortification trajectory will lose momentum but not necessarily stop. Whether it is approved in the next summit or not, the future of the trajectory involves implementing the road map. Momentum exists in that biofortified crops are in testing or have been released in 38 countries, and biofortification’s endorsement by the African Task Force on Food and Nutrition for Development (ATFFND) and agriculture ministers. The biofortification network of champions has an important role to play which has been endangered by the removal of support after the end of the Building Nutritious Food Baskets (BNFB) project in 2018.

Finding relevant to Evaluation Question #5

Finding 13: Respondents identified CIP/RTB and HarvestPlus/A4NH support to a network of regional champions as working particularly well. They identified a number of strategies and tactics that proved effective, including well-run side events to large conferences. Champions themselves call for continued support to their network to mainstream biofortification in the AU and Africa-wide

Finding 14: One area that respondents identified for improvement was in following- up on actions necessary to take advantage of a window of opportunity, such as making sure that decisions made in important meetings are recorded in meeting minutes and acted upon. A second area that caused concern for CGIAR respondents was the sometimes-territorial behavior over mandates to work on advocacy and on different crops in different countries. However, non-CGIAR interviewees said it had not adversely affected the process of mainstreaming biofortification in the AU.

Finding 15: Future scaling of biofortification in Africa will require much more funding from national governments to increase the production and consumption of biofortified crops in more African countries. This funding should be directed to the implementation of parts of existing AU strategies and plans that already commit African countries to improve nutrition in their respective populations.

Conclusions

Conclusion 1: Over the past five years, there has been a clear process of mainstreaming biofortification in the AUC and AU, culminating in a continental declaration and road map that is due for presentation at the next AU Summit in 2020.

Conclusion 2: The policy window theory of change helped understand how CGIAR contributed to the mainstreaming of biofortification in the AU. CGIAR contributed by 1) framing the problem and 2) developing and framing the solution in tune with political will, while 3) advocating for change during windows of opportunity. Windows of opportunity included regional- and global-level conferences and other events as part of nutrition-related processes.

Conclusion 3: HarvestPlus/A4NH and CIP/RTB separately and together engaged in a number of strategies that clearly made a strong contribution to mainstreaming biofortification in the AU. HarvestPlus brought the idea of a “basket” of biofortified crops bred by a number of CGIAR Centers and partners, while CIP worked in-depth on one crop. CIP/RTB led the effort to build and support a network of biofortification champions that complemented HarvestPlus/A4NH’s own advocacy work. Neither could have achieved the same level of outcomes by themselves.

Conclusion 4: The long-term and multi-level funding provided by BMGF and DFID gives the two donors an overview of and influence over biofortification and nutrition outcome trajectories that HarvestPlus/A4NH and CIP/RTB do not have. This affords both donors a unique opportunity to play an integrative role for CGIAR Centers and Programs working on nutrition, which could help reduce competition and concerns over duplication of efforts.

Conclusion 5: Advocacy, a strategy that CGIAR has traditionally been wary of, played a pivotal part in driving forward the AU biofortification trajectory. HarvestPlus/A4NH and CIP/RTB ran advocacy strategies that complemented each other. This is a rich source of learning to help CGIAR with scaling in the future.

Conclusion 6: The main way in which CGIAR has included gender and social inclusion in the AU biofortification trajectory has been in framing the problem to be addressed as micronutrient malnutrition in women of

reproductive age and children under five years of age. This may have provided impetus to the inclusion of biofortification in AUDA-NEPAD's long-running homegrown school feeding program.

Conclusion 7: A big push is needed to make sure the continental declaration is passed at the next AU Summit. It is important that future investments also build the evidence base for broader nutrition-sensitive investments. Advocacy has a vital role in making this happen.

Introduction to the case study and broader evaluation

Since their inception in 2012, the CGIAR research programs (CRPs) on Roots, Tubers and Bananas (RTB) and Agriculture for Nutrition and Health (A4NH) have been generating innovations, testing interventions, and providing science-based evidence and advice to policy and decision makers at local, national and supra-national levels with the expectation that this advice will contribute to policy change that in turn helps create an enabling environment for agri-food systems innovation.

CGIAR is a global research partnership for a food secure future dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources. Fourteen research centers are part of this global network and work together toward the achievement of a common Strategy and Results Framework (SRF). CGIAR works through CRPs and Research Support Platforms. CRPs are led by CGIAR Centers, some of which have been operating for more than 50 years.

This case study is one of four jointly commissioned by RTB and A4NH to understand how the respective program's research has contributed to policy change. The four cases were chosen in a consultative process prior to the start of the evaluation based on the information, documentation and interest of country teams that the case be documented and analyzed. The four cases are on CIP/RTB contributions to four outcome trajectories; the first is on CIP/RTB and HarvestPlus/A4NH contributions:

- Mainstreaming of Biofortification in the African Union: evaluation of CGIAR contributions to a policy outcome trajectory
- Control of potato purple top in Ecuador: evaluation of CGIAR contributions to a policy outcome trajectory
- Development of a cassava seed certification system in Tanzania: evaluation of CGIAR contributions to a policy outcome trajectory
- Development of a cassava seed certification system in Rwanda: evaluation of CGIAR contributions to a policy outcome trajectory

RTB's contribution to the outcome trajectories is considered together with the Center that leads it – the International Potato Center (CIP – Spanish acronym). Similarly, A4NH's contribution is considered together with the program that works specifically on biofortification – HarvestPlus. For simplicity this evaluation refers to contributions made by both HarvestPlus/A4NH and CIP/RTB as contributions made by CGIAR. In instances where the contributions preceded the CRPs, HarvestPlus and CIP are referred to on their own.

This case study is on the first outcome trajectory, called the AU biofortification trajectory for short. The trajectory has reached the point that the AU Commission (AUC) has drafted a continental declaration and road map in support of growing and consuming biofortified crops across Africa. This outcome is significant because endorsement of biofortification at this level, and subsequent country-level operationalization, is recognized by all partners as a strategic step in accelerating the scale-up and adoption of biofortified crops and products. The claim is that CGIAR contributed to this outcome.

In choosing the AU biofortification case, the two CRP leadership teams, the CGIAR System Office, donors and core stakeholders were interested in conducting an independent systematic assessment to validate a significant policy outcome claim and better understand how CGIAR intervention contributed to it. The outcome, or rather the set of outcomes, to be verified and explained relate to the integration of biofortification

in AU policy processes to the point that a continent-wide declaration on scaling-up food fortification and biofortification in Africa is ready to be tabled to heads of state and government at an AU Summit in 2020.

The purpose of this case study and the overall evaluation is to generate evidence and lessons learned on the contributions of CGIAR in stimulating policy changes that created an enabling environment for agri-food systems innovation. A separate synthesis report (forthcoming) draws out lessons across all four cases.

The objectives of this case study are:

1. To determine and document how and in what ways CGIAR interventions contributed to the mainstreaming of biofortification in the AU;
2. To identify other major actions/factors that contributed to the AU biofortification trajectory;
3. To generate findings to strengthen CGIAR contribution to the AU biofortification trajectory;
4. To contribute to a synthesis document that compares and contrasts the ways in which CGIAR actions have influenced policy in four cases.

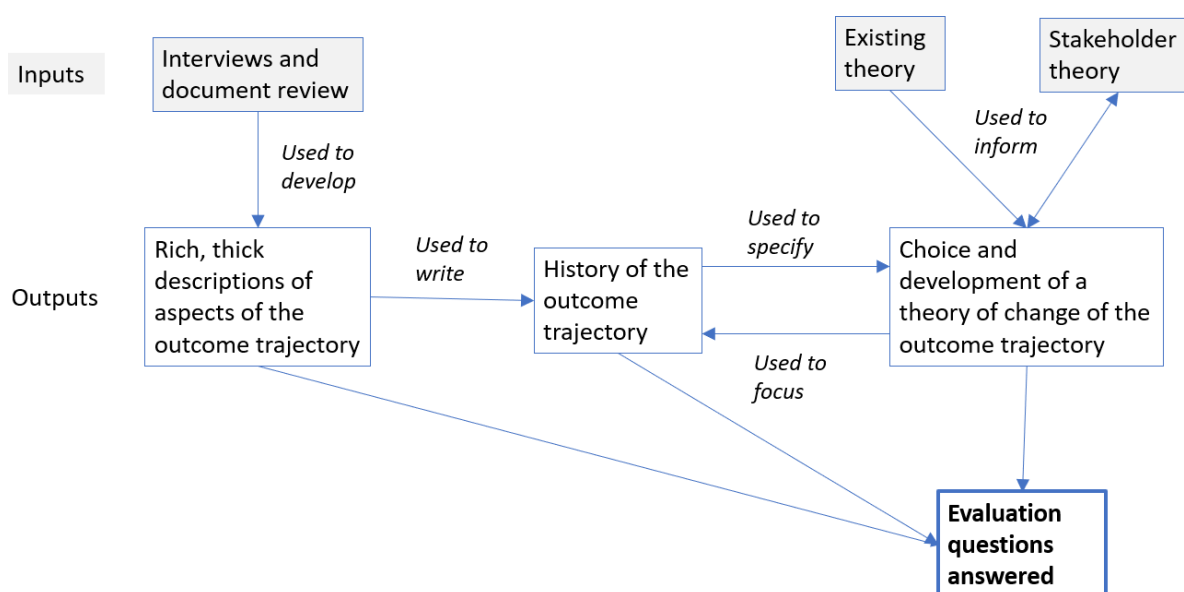
The primary intended users are decision-makers in CGIAR, particularly respective CRP management units and committees, Flagship Project Leaders, Cluster Leaders and Project Leaders and the CGIAR System Organization. Secondary intended users are donors; other CRPs or research for development (R4D) programs working to improve the enabling environment for agri-food systems and/or wanting to assess/evaluate their role in changing the enabling environment; and national partners and stakeholders.

Methodology

This case study and the overall evaluation use a version of outcome harvesting called outcome evidencing (Paz and Douthwaite, 2017). Outcome harvesting is ‘backward looking’ in that it starts with an outcome and works backward to identify and understand the patterns of interactions between people, institutions and technology that contributed to it over time. This slow-changing pattern is called an ‘outcome trajectory.’ The approach then seeks to identify the contribution made by the evaluands (in this case, CIP/RTB and HarvestPlus/A4NH) to the outcome trajectory. In contrast, most program evaluations model how program activity and outputs are contributing to outcomes. They do not acknowledge an outcome trajectory as a mediating mechanism and as a result tend to overemphasize the role of the program and underplay the role of other actors and on-going processes, from local to global level.

This study followed a series of steps (*Figure 1*). Three methods were used to develop the outputs: document review, interviews, and a verification workshop. The AU biofortification trajectory theory of change is based on a ‘formal’ theory from the literature selected to best fit participants’ understanding of how change happened, i.e., their ‘stakeholder’ theory. The theory is then used to help focus the writing of the AU biofortification trajectory history. The history draws upon the rich, thick descriptions of aspects of the AU biofortification trajectory captured in interviews and available documentation. Once written, the first evaluation question is how the theory of change is manifest in the history of the AU biofortification trajectory. The answer is used to make the formal theory of change, which is necessarily generic, specific to the case at hand. The specified theory of change is then checked with stakeholders in a virtual workshop before being used to help answer the remaining evaluation questions.

Figure 1: Flow diagram of the evaluation approach used



The evaluation questions are:

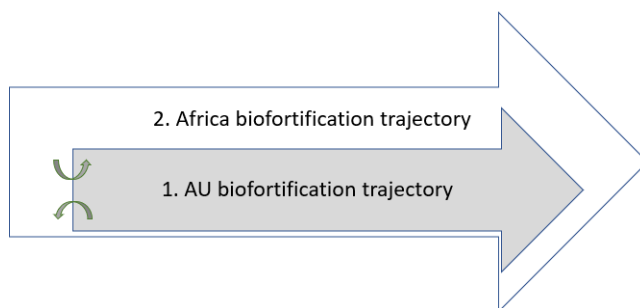
1. How can the chosen generic theory of change be made more specific to the AU biofortification trajectory?
2. What are the main outcomes resulting from the AU biofortification trajectory and how did CGIAR contribute to them?

3. Has CGIAR contributed to integration/consideration of gender in the AU biofortification trajectory and, if so, how?
4. Is the AU biofortification trajectory likely to be sustained and scaled over the long term?
5. What worked well, what did not work so well, and what is needed in the future?

The outcome claim this case study explores is that HarvestPlus/A4NH and CIP/RTB contributed to the mainstreaming of biofortification in the AU, to the point that biofortification was included with food fortification in an Africa-wide declaration on scaling up ready to be tabled to heads of state and government at an AU Summit within this year (2020). This case was also chosen because of its significance, which is that endorsement of biofortification at this level, and subsequent country-level operationalization, is recognized by all partners as a strategic step in accelerating the scale-up and adoption of biofortified crops and products.

When the evaluator began to describe the history of the AU biofortification trajectory, it became clear that it was necessary to understand it as nested (see *Figure 2*) within and influenced by the broader biofortification trajectory to develop and promote biofortified crops across Africa as a solution to micronutrient malnutrition (Africa-wide biofortification trajectory). Accordingly, both outcome trajectories are described in Appendix 1. The AU biofortification trajectory tells the story of how biofortification has and is being mainstreamed into the AU. It focuses on identifying and describing the AU mainstreaming outcomes over time, together with the processes and events that directly influenced them. These processes and events were themselves influenced by a broader set of events, processes and outcomes relating to the development and promotion of biofortification in Africa – i.e., the Africa-wide biofortification trajectory. Readers of this report who are less familiar with the history and context of biofortification in Africa may find it useful to start with the Appendix and read both outcome trajectories before reading the evaluation findings.

Figure 2: The concept of nested outcome trajectories that influence each other



Description of the generic theory of change chosen

The generic theory of change was selected and agreed on by the evaluation and case study teams as the model that best matches their experience. Staff chose from among five so-called ‘global’ theories of change identified by Stachowiak (2013) to describe the policy change process. The theory of change is redrawn in *Figure 3* so that the flow from strategies to outcomes goes from left to right rather than from top to bottom.

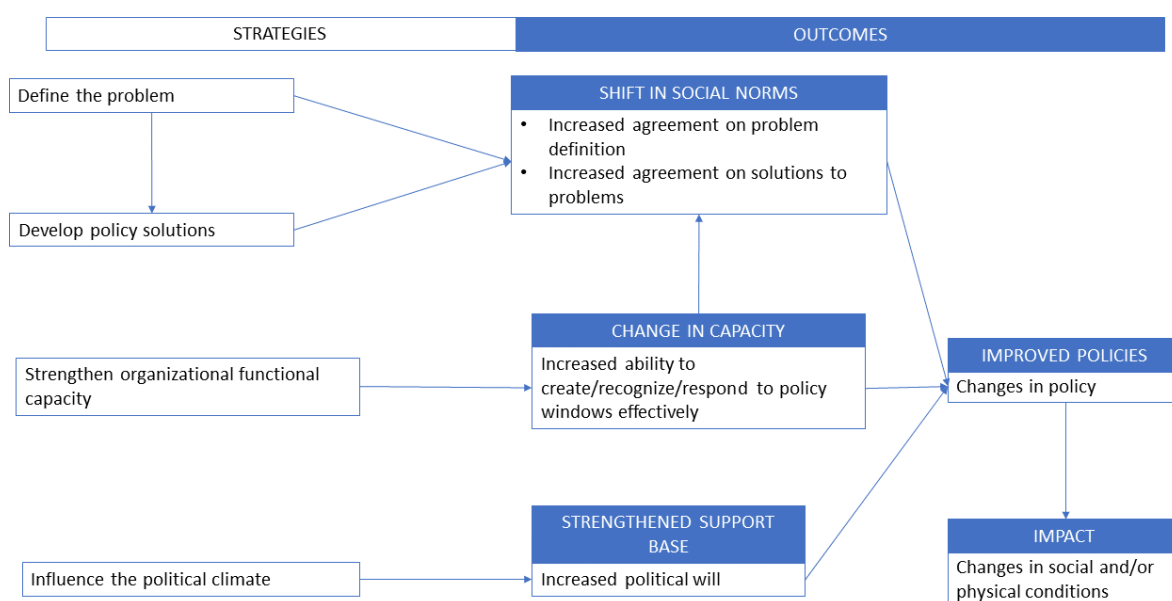
The theory chosen is the policy window theory that comes from political science, developed by Kingdon (1995). The model proposes that policy changes during *windows of opportunity* help advocates successfully connect two or more components of the policy process. The components are: the way a *problem* is defined; the *policy solution* to the problem; and, the *politics* surrounding the issue (Sabatier and Weible, 2007; Stachowiak, 2013). Windows of opportunity are moments when progress can be made. They can be created by natural events such as pandemics, droughts, or earthquakes; for example, an earthquake is an opportunity to change building

regulations. They can be man-made events like spikes in air pollution that lead to changes in clean air regulations. They can also be changes in government, budget cycles, or landmark meetings and summits held as part of ongoing national, regional or global processes. Policy windows are often short in duration and may be predictable or unpredictable.

Stachowiak (2013 p. 7) made a number of qualifying statements with respect to the theory of change:

- Often there are many competing ideas on how to address problems. To receive serious consideration, policy solutions need to be seen as technically feasible and consistent with policy maker and public values;
- The way a problem is defined makes a difference as to whether and where the problem is placed on the agenda. Problem definition also has a value or emotional component; values and beliefs guide decisions about which conditions are perceived as problems;
- Advocates can attach their solution to an existing problem that has gained prominence on the agenda, even if that prominence is independent of their efforts;
- To effectively recognize and take advantage of open policy windows, advocates must possess knowledge, time, relationships, and good reputations;
- Policy is translated into action plans and implemented.

Figure 3: Policy window theory as to how policy changes, chosen as the best fit to describe how biofortification is being mainstreamed in the AU (redrawn from Stachowiak, 2013)



The main limitation to this evaluation is that the resources available to carry out this case study, which is one of four being considered, are extremely small compared to the 25 years spent working on biofortification in CGIAR and the more than half a billion US dollars invested to date. Hence the focus on one of many biofortification outcomes: the mainstreaming of biofortification in the AU. HarvestPlus/A4NH alone estimate that they spent just 0.1 percent of this amount over five years to support mainstreaming. A second limitation is that the COVID-19 pandemic meant the evaluator could not visit the field and all interactions had to be virtual.

Finally, given this is a learning-focused evaluation, and the assumption that the change process is complex, the evaluation neither attempts to value contributions made, nor splits apart which entity contributed what within a shared project. Systems theory suggests that when outcomes are driven by interactions between people, institutions and knowledge, one is dealing with a non-linear phenomenon for which it is not possible to know the exact worth of one entity's actions compared to another.¹ For example, how does one value the expensive actions that brought a system to a tipping point versus the modest action that finally triggered it? Moreover, seeking to attribute outcomes of collective effort to the action of individual organizations can endanger trust and the positive feedback loops required to drive outcome trajectories in the first place.

¹ Axelrod and Cohen, 2000

Findings

The findings come from answering the evaluation questions, as described in the Methodology section (see *Figure 1*).

EQ1: How can the chosen generic theory of change be made specific to the AU biofortification trajectory?

The generic policy window theory of change is made more specific by identifying what activities, events, and outputs, from the descriptions of the biofortification trajectories provided in Appendix 1, contributed to the model's three main outcomes:

- *Shift in social norms*, understood as AUC employees and AU stakeholders coming to a shared agreement that micronutrient malnutrition is a problem that can be solved through biofortification;
- *Change in capacity*, understood as increased ability by those advocating for the mainstreaming of biofortification in the AU;
- *Strengthened support base*, understood as a more enabling environment in the AU and Africa for the adoption and scaling of biofortification.

The three main outcomes together lead to improved policies, understood to be the mainstreaming of biofortification in the AU. The specified theory of change is shown in *Figure 4*.

EQ1.1 How does the 'shift in social norms' manifest itself in the outcome trajectories?

Finding 1: The 'shift in social norms' is evident in a shift in the AUC and among AU stakeholders to see biofortification as an important strategy to combat micronutrient malnutrition.

HarvestPlus/A4NH and CIP/RTB worked to frame both the problem and solution to be compelling in terms of the size of the problem and the effectiveness of the solution. In doing so, the two organizations have taken care to frame biofortification as complementary to other ways of tackling micronutrient malnutrition, i.e., fortification, diverse diets, and supplementation, which likely has helped with the acceptability of the message in the AU. The focus on women and children is consistent with policy maker and public values. The two organizations also framed biofortification as a way for African governments to meet their commitments in the Malabo Declaration and elsewhere. Despite, or perhaps because of this success, biofortification is criticized by some donors and civil society organizations for 'shading out' less well researched nutrition investments that many think are more impactful and broader based.

The 'shift in social norms' main outcome is clearly manifest in the AU biofortification trajectory, because without AUC employees and AU stakeholders having come to a shared understanding about the importance of biofortification, it is unlikely that the cumulative mainstreaming of biofortification, described later on in *Table 2*, would have happened. Other indirect evidence that biofortification became an important issue in the AUC is that the AU Commissioner for the Department for Rural Economy and Agriculture (DREA) actively lobbied for biofortification both within and outside the AU.

A key HarvestPlus/A4NH advocacy output was a policy brief produced on behalf of the AUC DREA in support of the continental declaration in 2019. The brief demonstrates how HarvestPlus/A4NH has been able to frame the problem and solution in a compelling way:

“Micronutrient deficiency, also referred to as hidden hunger, affects 2 billion people worldwide and has seriously affected the nutrition and health status of millions of women and children in Africa.

Almost half of children living in sub-Saharan Africa under five years of age suffer from vitamin A deficiency; a third are at risk of zinc deficiency; and 60 percent suffer from anemia, of which iron deficiency is a leading cause. The latest trends show that hidden hunger is on the rise in Africa, costing Africa billions of dollars in GDP growth annually.”² Other health claims made were that biofortification helps reduce diarrhea and night blindness and increases cognitive and physical performance.³ In terms of the solution, the brief goes on to say that eating biofortified crops can provide up to 100 percent of a child’s daily need for vitamin A, 80 percent of iron, and 50 percent of zinc.

A shift in norms was clearly important in the Africa biofortification trajectory. The story of the trajectory’s first years was all about framing the problem and the solution. It started with two individual researchers independently seeking to convince skeptical colleagues and donors that biofortification was a viable and cost-effective solution to a real and pressing problem. They were clearly successful in that the two organizations they worked for, HarvestPlus and CIP, have attracted more than half a billion US dollars in investments on biofortification over a 15-year period. The story also includes linking biofortification to commitments made by African governments in the Malabo Declaration and elsewhere.

One respondent pointed out that a number of donors, civil society actors and nutritionists were concerned biofortification had been oversold by CGIAR as a solution to malnutrition more broadly.⁴ In proving strong evidence to support its efficacy and efficiency, CGIAR has managed to position biofortification as a safer and scalable investment relative to other nutrition investments that many think are more impactful. The argument has been made by some organizations, including the European Union (EU) and the International Baby Food Action Network, that CGIAR has overemphasized a single nutrient approach that runs counter to national nutrition policies and UN recommendations for food-based, bio-diverse approaches.⁵

Other respondents did not share the concern, saying that biofortification had been framed as a complementary strategy to others identified by the broader nutrition community, namely: fortification, dietary diversity, and supplementation. They point out that the continental declaration supports fortification and biofortification.

Finding 2: The shift in social norms occurred by HarvestPlus/A4NH and CIP/RTB working together to: 1) provide hard ‘gold standard’ evidence that biofortification works; and, 2) lead projects and programs to introduce biofortified crops to millions of African households, thus demonstrating that biofortification is possible at scale. HarvestPlus/A4NH worked to support the shift in norms by engaging with the indicators used in biennial Comprehensive Africa Agriculture Development Programme (CAADP) reviews. HarvestPlus/A4NH worked for five years, ultimately unsuccessfully, to agree upon a definition of biofortification with Codex Alimentarius that includes transgenic breeding as a way to increase micronutrients in crops. This may have contributed to suspicion of biofortification among African countries reluctant to adopt genetically modified organisms (GMOs). It also showed that not all stakeholders working on nutrition see biofortification in the same way – see Finding 1.

The outcome trajectories show that two areas of work were pivotal in building awareness of and interest in biofortification. The first was the HarvestPlus-led Reaching End Users (REU) project,⁶ from 2011 to 2014, that provided hard evidence using randomized controlled trials (RCTs) that growing and eating a biofortified crop –

² AUC DREA, 2019. Policy Brief in Support of an African Union Continental Declaration on Biofortification.

³ <https://www.harvestplus.org/evidence-document>

⁴ Respondent 11 and <https://www.fian.org/en/press-release/article/when-the-sun-casts-a-shadow-2282>

⁵ <https://www.fian.org/en/press-release/article/when-the-sun-casts-a-shadow-2282>, p.51

orange fleshed sweetpotato (OFSP) – reduced vitamin A deficiency in children and women in Mozambique and Uganda.⁶ CIP worked closely with HarvestPlus, leading the breeding of OFSP,⁷ and was a key collaborator on the project.⁷ The second was work by CIP to develop adapted OFSP varieties and seed systems that worked technically, and which were eventually scaled out to millions of households in Africa through CIP-led projects. HarvestPlus/A4NH complemented the depth of this work by encouraging CGIAR breeders to develop other biofortified crops that were also planted in farmers' fields across Africa.

HarvestPlus/A4NH and CIP/RTB were able to frame the message that biofortified crops can help combat malnutrition and that varieties and seed systems exist or can be developed. The message has worked in the sense that 38 countries in Africa are testing or have released biofortified crops. Over the years, HarvestPlus/A4NH has: 1) developed and promoted a wide range of biofortification indicators to assess progress; 2) developed more than 200 packages of evidence that demonstrate efficacy and effectiveness; and, 3) identified strategic platforms to share the various evidence pieces at national, regional and continental levels. HarvestPlus' monitoring and evaluation (M&E) played an important role in this work.

HarvestPlus/A4NH worked on indicators as a way of supporting a shift in norms, as the theory of change predicts. The AU biofortification trajectory describes how HarvestPlus/A4NH acted on an opportunity to include biofortification indicators for biennial CAADP reviews as a way of putting soft pressure on African leaders to fulfil the commitments they made in Malabo in 2014, including those on nutrition. While not able to add any new indicators, the planting of biofortified crops was accepted within the CAADP process as part of using improved seeds.

In 2014, HarvestPlus/A4NH supported Zimbabwe to lead a process to agree upon a definition of biofortification with Codex Alimentarius. It was felt that a definition would make it easier for governments in Africa and globally to include biofortification in their National Agricultural Implementation Plans (NAIPs) or equivalents. The proposed definition stated that biofortification could be achieved through, one, conventional crop breeding; two, transgenic (i.e., GMO) crop breeding; and three, agronomic methods (i.e., fertilizer). More than 20 countries, including the USA and several in Africa, advocated for this inclusive definition during the years-long process to develop the definition. The EU opposed it, in part because in Germany the term 'bio' refers to organically produced foods and products, so the term 'biofortification' would not be permitted under EU law.⁸ In 2019, Codex members determined that there was no need for a new definition because biofortification can be assumed to be covered by existing standards.

One unexpected consequence of pushing for an inclusive definition that includes transgenic modification is that, as reported by several respondents, African countries reluctant to adopt GMOs are also reluctant to plant biofortified crops.

⁶ https://gaap.ifpri.info/files/2011/12/OFSP_Qual_Report_FINAL.pdf

⁷ In that CIP carried out sweetpotato breeding for HarvestPlus see BMGF_HarvestPlus Phase II Proposal_2008.pdf

⁸ <https://www.fian.org/en/press-release/article/when-the-sun-casts-a-shadow-2282>, p.51

EQ1.2 How does the ‘change in capacity’ main outcome manifest itself in the outcome trajectories?

Finding 3: The most important functional capacity that helped achieve the mainstreaming of biofortification in the AU was the capacity to advocate. Both CIP/RTB and HarvestPlus/A4NH supported and worked with networks of biofortification champions. The champions saw high-level meetings and conferences on nutrition, in particular, as windows of opportunity for advocating for biofortification. What also worked well was supporting the champions to develop and implement their own action plan for how they would mainstream biofortification in their respective organizations. This work represented an important departure for CGIAR, traditionally reluctant to engage in advocacy.

The primary way the ‘change in capacity’ main outcome manifests itself in the AU biofortification trajectory is in the building of capacity to advocate. Advocacy was first identified as important in the CIP-led Reaching Agents of Change (RAC) project.

One of the RAC project components was to recruit and support a network of national and regional champions (see Appendix 3 for list of the Building Nutritious Food Baskets (BNFB) regional champions). The champions were chosen as people who were already influential with respect to nutrition, and who came from organizations working on the subject, such as the Food and Agriculture Organization of the United Nations (FAO) and the AU. The project represented a major departure for CGIAR, which does not see itself playing an advocacy role.

The BNFB project supported champions by holding regular retreats in which the champions were trained in how to deliver simple messages about the problem and solution. They were provided with advocacy material and trained by experts on how to advocate.⁹ The Forum for Agricultural Research in Africa (FARA) led the advocacy component. BNFB continued to support the network of champions until the project finished in 2018.

HarvestPlus/A4NH built its own capacity in advocacy at the start of its scaling phase in 2014. The program created a Head of Advocacy and Policy position and appointed a person with years of experience in advocacy to it. HarvestPlus subsequently hired a full-time African Advocacy Specialist in July 2016, who worked intensively on AU advocacy, and created a Strategic Alliances position in Africa, supported by the Head of Advocacy and Policy. A large part of the appointee’s job was to attend high-level meetings on nutrition to advocate for biofortification, including DREA and Department of Social Affairs (DSA) meetings at the AU.

A4NH supported HarvestPlus’ efforts by creating a position based in Addis Ababa to support national and regional nutrition policy processes on the continent. The appointee had a track record of advocating for biofortification and promoted it before making contact with HarvestPlus/A4NH and is likely to have been responsible for the first reference to biofortification by the AU in a document, which was the Southern African Development Community (SADC) Food and Nutrition Strategy 2015-2025.¹⁰

The AU biofortification trajectory shows how champions were supported and how they worked was as indicated in the theory of change. High-level meetings on nutrition were identified as policy windows and champions received support to attend them to advocate for biofortification. By 2018, champions had attended 21 meetings to advocate for biofortification (Omari et al. 2018), most of which were AU meetings or had AU representatives in attendance. An effective tactic shared by one champion was to take copious notes during key meetings and then make sure agreements reached appeared in the meetings’ records.¹¹ Another champion shared they ensured they knew the steps in passing an AU continental Declaration and timed interventions accordingly. For

⁹ Respondent 5

¹⁰ <https://www.nepad.org/publication/sadc-food-and-nutrition-security-strategy-2015-2025>

¹¹ Respondent 13

example, endorsement by Specialized Technical Committees is crucial for a declaration to go to the AU Summit and these meetings happen only once every two years.

Champions received support to plan and implement ways of mainstreaming biofortification into their own organizations, which worked particularly well for the AU biofortification champion.¹² Two champions¹³ contributed to the writing of the African Union Development Agency (AUDA-NEPAD) Nutrition and Food Systems Implementation Plan 2019-2025, which identifies seven flagships, two of which include work on biofortification, one addressing micronutrient deficiencies and one on homegrown school feeding.¹³ Homegrown school feeding has long been a priority for AUDA-NEPAD. That biofortification was included in the flagship suggests a champion was able to identify an entry point for biofortification (i.e., school meals). This is an example of ‘coupling policy streams,’ a capacity identified as important by the policy window theory of change.

Invitations to review strategic documents such as the African Development Bank (AfDB) nutrition strategy were also recognized as policy windows.¹⁴ Champions encouraged each other to review them to make sure biofortification was included and that more than one reviewer was giving the same message.¹⁵ An A4NH respondent said she was able to help HarvestPlus/A4NH advocacy work by pointing out that AU processes follow a timeline which cannot be controlled by CGIAR, and that HarvestPlus/A4NH and CIP/RTB needed to work opportunistically with it.¹⁶

The champions supported each other, whether they were nominally A4NH, BNFB project, or HarvestPlus. Several champions attended a workshop in December 2019 to develop an AU continental road map in support of the continental declaration. HarvestPlus/A4NH organized the meeting with the AUC and paid the travel costs of several champions in addition to their own.

EQ1.3 How does the ‘strengthened support base’ main outcome manifest itself in the outcome trajectories?

Finding 4: Strengthened support base for biofortification is manifest in the large amounts of funding available for work on biofortification and funding for large-scale initiatives to strengthen the agricultural sector that include it. It is also manifest in the existence and actions of high-level panels of African leaders including the Global Panel on Agriculture and Food Systems for Nutrition (Global Panel) and the African Leaders for Nutrition (ALN) initiative. The sustained support for biofortification from donors, in particular the Bill & Melinda Gates Foundation (BMGF), Department for International Development (DFID) of the United Kingdom, the United States Agency for International Development (USAID) and the McKnight Foundation, has been crucial to providing a support base. Awards of the World Food Prize to individuals who have worked on and championed biofortification have likely strengthened positive global sentiment towards biofortification.

In Africa, strengthened support for biofortification was manifest in a broadening of support from high-level panels, groups of leaders and large-scale funding initiatives. With respect to the latter, the first time the support base strengthened significantly was with CGIAR’s decision to launch HarvestPlus in 2002 and BMGF’s decision to fund half of HarvestPlus’ US\$50 million total budget for the first five years. The support base strengthened again in 2009 with a significant increase in funding available for HarvestPlus and CIP’s work on biofortification, particularly in Africa. HarvestPlus and CIP had demonstrated that biofortified crops

¹² Respondent 10

¹³ Respondents 7 and 6

¹⁴ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Banking_on_Nutrition_ActionPlan_A4_V1d_single.pdf

¹⁵ Respondent 13

¹⁶ Respondent 13

could provide high rates of micronutrients to women and children, and that farmers would grow the crops and people would eat them. Two windows of opportunity also likely contributed to increased funding: an increased interest in agriculture after the 2008 global food price crisis, and an increased interest by multilateral agencies in nutrition more broadly thanks to convincing evidence from *The Lancet* and the Copenhagen Consensus.

With respect to support from high-level panels and groups of African leaders, in 2015, the 12- member Global Panel published their first brief making the case for investment in biofortified crops. The brief likely influenced the AUC, as one its authors and a panel member was the AU Commissioner for DREA. In 2018, the AfDB launched the ALN initiative, made up of current and former heads of state, finance ministers and eminent leaders, including the founding Director of HarvestPlus. In the same year, the African Task Force on Food and Nutrition Development (ATFFND) recommended AU member states endorse biofortification. The significance of ATFFND's endorsement is that the Task Force involves ministries of both health and agriculture, thus signaling the acceptance of the framing of biofortification as part of a comprehensive approach (i.e., including supplementation and health) to tackling malnutrition.

Two African leaders who did more than most to broaden support for biofortification are Rhoda Peace Tumusiime, the AU Commissioner for DREA, and Akinwumi Adesina, President of the AfDB. Both are members of the Global Panel. Over the years, HarvestPlus considered DREA support for biofortification as pivotal to the entire process, and Tumusiime played a key role in ensuring it.¹⁷ She was also an ambassador for biofortification in presentations made in high-level conferences and meetings. For example, she emphasized the need to “rapidly scale up the availability and consumption of fortified and biofortified foods” in her closing statement at the 2015 Global Summit on Fortification. Likewise, during the time Adesina has been AfDB President, he has launched Technologies for African Agricultural Transformation (TAAT) and the ALN initiative. The AfDB also produced the Multi-Sectoral Nutrition Action Plan 2018-2025, in which biofortification is listed as one of eight interventions with the greatest impact on nutrition.¹⁸ The 2016 awarding of the prestigious World Food Prize to CIP and HarvestPlus scientists working on biofortification almost certainly helped build high-level support for the technology. The World Food Prize is the foremost international award recognizing individuals who have increased the quality, quantity, or availability of food in the world.¹⁹ Adesina was awarded the prize in 2019, strengthening his global voice and hence the weight of his support to biofortification.

Fundamental to both biofortification trajectories has been donor support, from BMGF and DFID in particular, as well as others. BMGF has funded HarvestPlus from 2003 and continues to fund advocacy work. It was also the main donor to CIP's work on OFSP and supports the two AfDB initiatives, TAAT and ALN. DFID is one of HarvestPlus' main donors and has also funded several of CIP's OFSP projects and the Global Panel. Both USAID and the MacArthur Foundation have funded HarvestPlus work in Africa, including advocacy activities.

¹⁷ From HarvestPlus review of first draft of the report

¹⁸ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Banking_on_Nutrition_ActionPlan_A4_V1d_single.pdf

¹⁹ <https://www.worldfoodprize.org/>

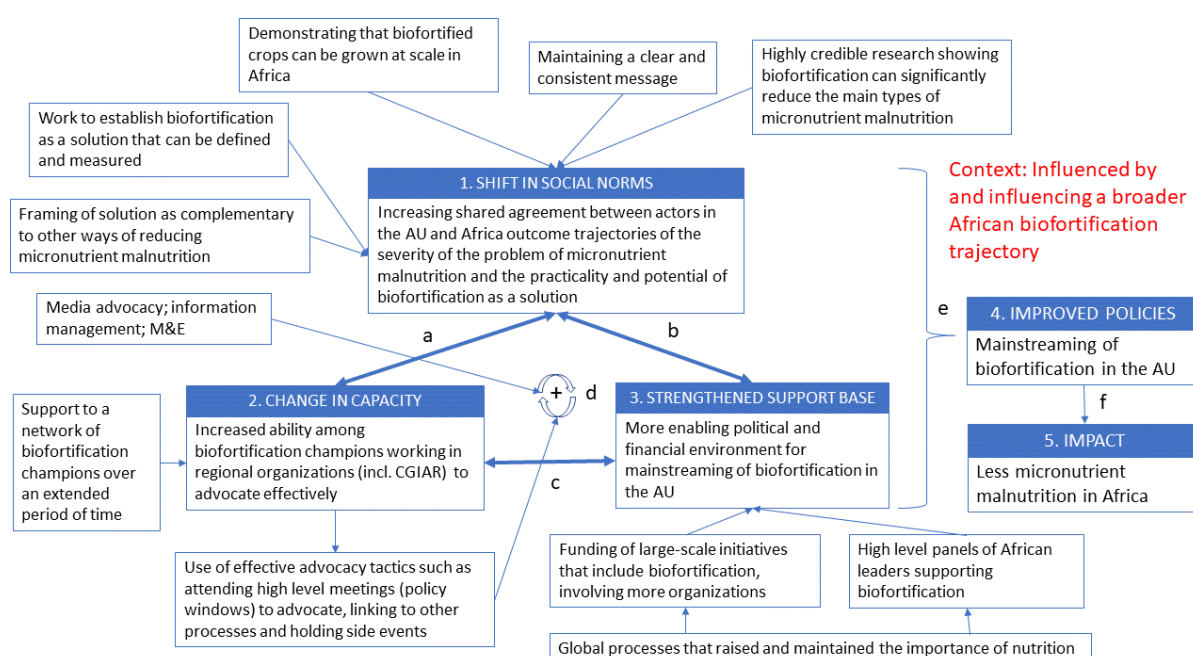
EQ1.4 Based on the answers above, what adaptations to the generic theory of change make it more relevant to the mainstreaming of biofortification in the African Union?

Finding 5: The generic policy window theory of change was made more specific and relevant by identifying and describing what activities and events contributed in practice to the model's three main outcomes – shift in social norms, change in capacity, and strengthened support base. The main structural change is to recognize that the three main outcomes are linked to each other and form a self-reinforcing loop that drives the outcome trajectory.

The evaluator used the findings from EQ1.1-1.3 to adapt the generic policy windows theory of change to be more specific about how mainstreaming of biofortification in the AU came to be. These specifications were validated in an on-line workshop¹⁹ attended by key actors.²⁰

The main modification to the generic theory of change is to show the three outcomes linked to 'improved policies' as interconnected at the center of the model (*Figure 4*), each linked to the others in a self-reinforcing feedback loop described in the list of causal assumptions following the diagram.

Figure 4: Policy window theory of change adapted to describe how biofortification is being mainstreamed within the AU



The causal assumptions underpinning the theory of change are indicated by letters in the diagram and are as follows:

- The framing of the problem and solution motivates the champions. Because they are convinced, champions play an important role in convincing key actors of the importance of the problem and solution. Advocacy efforts provide information that contributes to better understanding of biofortification.
- The framing of the problem and solution motivates donors and leaders to create a more enabling environment for biofortification. Actors' perceptions of a more enabling political and financial environment reinforce the message that biofortification is a solution to a significant problem.
- Biofortification champions lobby donors and political leaders. At the same time political leaders support champions in their role.

²⁰ Held on 27 May 2020

- d. A positive feedback loop provides momentum to Mainstreaming of biofortification in the AU. This comes in part from occurrence of policy windows and champions' ability to make progress during them.
- e. The declaration still needs to be passed. If not, there is a risk the process will unwind.
- f. The impact from mainstreaming of biofortification in the AU will emerge in the coming years, depending on implementation of the plans in which biofortification is part.

The evaluator found evidence to support all six causal assumptions, at least by inference.

The specified theory of change shows the main outputs and processes that contributed to achieving the main outcomes. *Table 1* provides more detail drawn from the descriptions of the biofortification trajectories.

Table 1: Details of the activities, processes, and outputs carried out by CGIAR that feed into the three main policy window outcomes and provide impetus

Box	Specifics from the outcome trajectories
1. SHIFT IN SOCIAL NORMS	
Highly credible research showing biofortification can significantly reduce the main types of micronutrient malnutrition	In particular the 'gold standard' RCT efficacy and effectiveness studies. Later monitoring and adoption studies together with modeling
Demonstrating that biofortified crops can be grown at scale in Africa	Cumulative CGIAR effort resulting in 14.7 million rural households growing and eating biofortified crops globally, mostly in Africa ²¹
Creating and maintaining a clear and consistent message	Taking the research findings and crafting them into a clear and consistent message in policy briefs and other advocacy materials with particular audience in mind
Framing of solution as complementary to other ways of reducing micronutrient malnutrition	Framing it together with fortification, dietary diversity, and supplementation
Creating and maintaining a clear and consistent message Providing first-hand experiences	<ul style="list-style-type: none"> - Creating and maintaining a clear and consistent message in advocacy documents, e.g, policy briefs. - Working on biofortification with more than 400 partners who gain first-hand experience with the technology, including individuals eating biofortified food at conferences
2. CHANGE IN CAPACITY	
Support to a network of biofortification champions over an extended period of time	<ul style="list-style-type: none"> - The work of the REU project and the subsequent BNFB project as well as HarvestPlus/A4NH support to champions at national, regional and global levels - Placement of A4NH Research Coordinator in Addis Ababa, Ethiopia, to coordinate advocacy
Use of effective advocacy tactics such as identifying and attending high-level meetings (policy windows), linking to other processes (home school gardening) and holding side events	As a result of capacity development, champions attend high-level meetings to advocate for biofortification, including holding side meetings, e.g., at Global Panel meetings. Champions in AUDA-NEPAD have pushed to include biofortified crops in their long-running home school feeding flagship.

²¹ CIP/RTB, through the Sweetpotato for Profit and Health Initiative (SPHI) reached 6.2 million rural households in Africa by 2019 (<https://www.sweetpotatoknowledge.org/sphi-dashboard/#>) in addition to HarvestPlus that reached 8.5 million households globally in the same year

3. STRENGTHENED SUPPORT BASE	
Funding of large-scale initiatives that include biofortification, involving more organizations	E.g., AfDB-led TAAT and potential Japan International Cooperation Agency (JICA)-funded Initiative for Food and Nutrition Security in Africa
High-level panels of African leaders supporting biofortification	E.g., Global Panel and the ALN initiative
Global processes that raised and maintained the importance of nutrition	Including the Scaling Up Nutrition movement (SUN) and the Global Alliance for Improved Nutrition (GAIN), both supported by BMGF
PROVIDING IMPETUS TO THE POSITIVE FEEDBACK LOOP	
Media advocacy	Issuing press releases and creating a WhatsApp group used to help biofortification champions communicate and support each other ²²
Information management	Making information readily available online in part through information management portals such as the Sweetpotato Knowledge Portal, part of the Sweetpotato for Profit and Health Initiative (SPHI) ²³
M&E advocacy	Three steps: developing and packaging a robust evidence base; identifying and sharing it with strategic platforms; and identifying and pushing for the use of biofortification indicators

EQ 2: What are the main outcomes resulting from the AU trajectory and how did CGIAR contribute to them?

Finding 6: The main AU biofortification trajectory outcome is a continental declaration and road map to be submitted by the AUC at the next AU Summit. Both are the culmination of other mainstreaming outcomes including endorsement of the declaration by African ministers and inclusion of biofortification in CAADP and AUDA-NEPAD implementation plans. The perceived value of the declaration is that it will add impetus and permanency to biofortification within African governments' policies, programs and budgets, as well as sending a signal to the private sector to increase investments.

Interviewees said the declaration was important because it is a statement from the heads of African states, which gives biofortification legitimacy, signaling that those working on biofortification are doing so in a sanctioned environment and that biofortification is an acknowledged priority requiring effort. The declaration provides biofortification champions recognition and a mandate and signals the private sector to invest. The declaration will help sustain work on biofortification over time, showing new personnel that biofortification remains a priority.²⁴

One respondent said it was important to implement biofortification action plans because in the past some AU declarations have not. However, she pointed out that even without the declaration, biofortification is already embedded in CAADP and AUDA-NEPAD implementation plans.²⁵

Finding 7: CGIAR contributed to eleven tangible mainstreaming outcomes by supporting biofortification champions and advocacy and by providing support to AUC-DREA in writing key documents. The eleven outcomes are indicators of a policy window process CGIAR contributed to, described in the theory of change. The policy

²² Omari et al., 2019

²³ <https://www.sweetpotatoknowledge.org/>

²⁴ Respondent 10

²⁵ Respondent 6

window process is driven by a positive feedback loop involving shifting social norms, capacity development and strengthening the support base. Advocacy is key to keeping the process going, in particular the ability to collectively and consistently identify and engage with policy windows as they emerge over time. Policy windows are opportunities to make progress towards policy change and include high-level meetings and conferences where commitments are made to future action to improve nutrition in Africa.

Table 2 shows the outcomes that built up to the drafting of the declaration and road map. The outcomes are identified in the AU biofortification trajectory shown in Figure 5 and can be characterized as:

- High-level AUC personnel publicly endorsing biofortification at high-level events;
- Inclusion of biofortification in CAADP and AUDA-NEPAD implementation plans;
- African ministers requesting policy briefs and a declaration;
- The AUC submitting the declaration for approval at the AU Summit in February 2020.

Table 2: AU mainstreaming outcomes and possible causes and contribution

Date	Mainstreaming outcomes	Influences
2015	AU Commissioner for DREA publicly endorses biofortification in final statement at Global Summit on Fortification	<ul style="list-style-type: none"> - Membership on the Global Panel promoting biofortification as a solution - Advocacy by HarvestPlus Director and Head of Strategic Engagement in Africa - The AU Commissioner for DREA's advisor was a BNFB biofortification champions
2015	SADC Food and Nutrition Strategy 2015-2025 identifies the biofortification as a means of addressing micronutrient deficiencies	Presentation on biofortification in workshop to develop the strategy given by North West University researcher. The RAC project Regional Advocacy Advisor attended the workshop that developed the Strategy, at the request of SADC. CGIAR provided technical support through RAC project.
2017	DREA staff develop AU Business Plan to Implement the CAADP- Malabo Declaration published, specifying biofortification as a way of ending hunger in Africa by 2025	The AU Commissioner for DREA, and her advisor, drafted and reviewed the business plan and advocated internally.
2017	African Ministers of Agriculture, Water and Environment (STC-ARDWE) call for the AUC to write policy briefs leading to a continental declaration.	Biofortification champions played a key role. Governments receiving joint briefing notes signed by HarvestPlus, BNFB and FARA.
2018	AU Executive Council back African Ministers' call	Standard practice that Executive Council backed the Specialized Technical Committee on Agriculture, Rural Development, Water and Environment's (STC-ARDWE) recommendations
2018	Planting and consuming biofortified crops accepted as a way of improving dietary diversity in the CAADP Biennial Review Process	Active participation by HarvestPlus/A4NH in the review process and in key meetings and advocacy for specific indicators on biofortification (albeit unsuccessful)
2019	Biofortification included in two flagships in the AUDA-NEPAD Nutrition and Food Systems Implementation Plan 2019-2025	Two BNFB champions involved in writing the plan
2019	AUC-DSA publish a briefing note in support of an endorsement by ministers of Health for a declaration on biofortification	HarvestPlus/A4NH support the drafting of the document. HarvestPlus/A4NH and CIP/RTB cooperate in writing to ministers

Date	Mainstreaming outcomes	Influences
2019	African agricultural ministers (STC-ARDWE) re-endorse continental declaration	Suggestion to do so from AU Commissioner. HarvestPlus/A4NH and CIP/RTB representatives attended.
2020	AUC-DREA submit declaration to the office of the Secretary General for approval in the AU Summit, accompanied with a road map for upscaling biofortification in Africa	HarvestPlus/A4NH organized a workshop in December 2019 to develop a roadmap in support of the Declaration, attended by several BNFB champions
2020	AU position paper submitted to the 53 rd UN Commission on Population and Development calls biofortification a useful strategy to address micronutrient malnutrition. ²⁶	A4NH/HarvestPlus led the drafting of a background paper to inform the position paper, drawing input from the broader CGIAR community and other stakeholders, including FAO. ²⁷ The invitation to write the position paper came from a framing presentation made by A4NH/HarvestPlus at a meeting of the AU Specialized Committee on Health, Population and Drug Control (STC-HPDC) in Egypt in 2019.

The specific policy window theory of change (*Figure 4*) shows that, more fundamentally, mainstreaming of biofortification in the AU happened as a result of three main outcomes that interact with each other in an ongoing and self-reinforcing cycle. *Table 1* also shows the specific measures described in the biofortification trajectory timelines that contributed to the main outcomes.

Finding 8: HarvestPlus/A4NH and CIP/RTB have contributed significantly to measures that have supported and driven the policy window process described in the theory of change. For some measures, both entities made equally important contributions, e.g., carrying out and publishing high-quality research to show biofortification works. For other measures, one entity did more than the other, e.g. HarvestPlus, with additional support from A4NH, has led the effort to ensure biofortification can be defined and measured by African countries, whereas CIP has led the effort to build and support a network of biofortification champions. The process has been non-linear, in the sense that sometimes small interventions have had a large effect, for example, an endorsement of biofortification at a global-level conference on nutrition. Many other organizations have also contributed, not least the International Maize and Wheat Improvement Center (CIMMYT), the International Institute of Tropical Agriculture (IITA), and the International Center for Tropical Agriculture (CIAT).

A question several respondents asked the evaluation to address is: “How has HarvestPlus/A4NH contributed to the mainstreaming process compared to CIP/RTB?”

The timelines, interviews and document review suggest both entities have contributed to ‘shift in social norms’ and ‘change in capacity.’ Where the two entities have contributed to the same measure, they have generally been complementary. For example, CIP/RTB has shown that OFSP can be grown at scale while HarvestPlus/A4NH has shown the same for other biofortified crops. For other measures, one entity may contribute more than the other and vice versa. For example, HarvestPlus/A4NH has led the effort to ensure biofortification can be defined and measured by African countries whereas CIP/RTB has provided more support to biofortification champions. One area of strengthened collaboration is carrying joint M&E. This includes joint lesson learning, for example on working with humanitarian organizations, and the joint commissioning and management of this evaluation.

²⁶ Position Paper for the 53rd Session of the UN Commission on Population and Development on: “Population, Food Security, Nutrition and Sustainable Development”

²⁷ Respondent 13

Of the interviewees questioned, all thought HarvestPlus/A4NH and CIP/RTB have complemented each other well. Each had its own part to play, without which the AU mainstreaming process would not have gone as far as it has.

Finding 9: CGIAR has implemented the main measures in support of ‘shifting social norms’ and ‘capacity development’ while donors and African leaders have made the main contributions to ‘strengthening support base.’ The latter have likely been influenced by global processes that have raised and maintained the importance of nutrition over time.

The main contribution to the ‘strengthening support base’ outcome has come from donors, in particular BMGF and DFID, and from high level panels and groups of African leaders. These contributions have themselves been influenced by global processes that have raised and maintained the importance of nutrition over time. This includes the Scaling Up Nutrition (SUN)²⁷ movement and the Global Alliance for Improved Nutrition (GAIN).^{28, 29} In other words, the biofortification outcome trajectories are themselves nested in and influenced by a broader nutrition trajectory. It has been beyond the scope of this evaluation to explore these influences.

Finding 10: BMGF and DFID work with entities at different scales in the biofortification outcome trajectories and as such have a unique vantage point from where to integrate this work. Such integration would be very useful to help avoid territoriality and tensions that can arise when funded entities are uncertain of future support and compete with each other as a result.

BMGF and DFID have both funded work by HarvestPlus and CIP directly, plus the two CRPs, – A4NH and RTB, more broadly, as well as large-scale funding initiatives and high-level panels. BMGF also funds SUN and GAIN. This gives both donors an overview of and influence over biofortification and nutrition outcome trajectories that CGIAR does not have, and a unique opportunity to play an integrative role within CGIAR and indeed the other entities they fund. It is known that providing people with the “big picture” and their role in it helps avoid territoriality and tensions that arise between programs that are insecure in their future role and funding streams.

EQ 3: Has CGIAR contributed to integration/consideration of gender in the AU biofortification trajectory and how?

Finding 11: Gender and social inclusion are included in the framing of the problem by CGIAR that the AU biofortification trajectory seeks to address – micronutrient malnutrition in women of reproductive age and children under five years of age. This may have contributed to a successful effort led by AUDA-NEPAD, supported by HarvestPlus/A4NH, the World Food Program (WFP) and FAO, to include biofortified crops in AUDA-NEPAD’s long-running homegrown school feeding flagship program, targeting children. The framing of the problem around women and children is reflected in the declaration and the policy brief that supports it. Other AU documents mention biofortification as a priority solution to micronutrient malnutrition in general without going into detail as to who should benefit. The contribution of CGIAR has been in framing the problem in the first place and supporting initiatives that have responded to it.

The biofortification outcomes (Table 2) have documents associated with them. The evaluator reviewed these documents to establish the extent to which gender and social inclusion have been considered. Most frequent mention was made in the policy brief in support of the declaration. The policy brief urged that:

- Promotion is targeted to nutritionally vulnerable populations through gender-sensitive extension, among other methods;

²⁸ <https://scalingupnutrition.org/>

²⁹ <https://www.gainhealth.org/homepage>

- Biofortification should be mainstreamed in relevant programs that impact on gender and social protection as well as health, trade and livelihoods; and
- Impact assessment considers gender among other criteria.

The draft declaration does not mention gender specifically, focusing instead on children and mothers. In this regard, the declaration says that the AU:

- Recalls its commitment toward supporting interventions leading to ending hunger in Africa by 2025 realized through, among others, eliminating child undernourishment;
- Is encouraged by the realization that opportunities abound for women smallholder farmers and youth, who constitute the majority of food producers, to invest in food system-based approaches, including breeding, processing, distribution and marketing of biofortified foods;
- Is appalled by overwhelming evidence indicating that a substantial number of African children, pregnant and lactating mothers and economically vulnerable populations, do not meet the recommended daily requirement of micronutrients through consumption of macro- and micronutrient-rich diets; and
- Commits to promote the inclusion of biofortification and fortification, by way of knowledge management and promotion in relevant health programs, including ante- and post-natal counselling and infant and young child feeding programs.

Other documents, including the AU Business Plan to Implement the CAADP-Malabo Declaration and the AUDA-NEPAD Nutrition and Food Systems Implementation Plan 2019-2025, mention biofortification as a priority solution to micronutrient malnutrition without going into detail as to who should benefit. There is no mention of gender.

Perhaps the most gendered aspect of the biofortification trajectories is the framing of the problem that biofortification helps solve – micronutrient malnutrition in women and children under five years of age (see Finding 1). This signals a direction and intent that is manifest in the work to include biofortification indicators. One interviewee said that HarvestPlus/A4NH efforts had helped to include an indicator for minimum dietary diversity for children from age six to 24 months and for women.³⁰ Other indicators discussed for AUC Biennial Review and NAIPs relate to market share of biofortified crops and per capita intake of crops that are biofortified. The latter could be disaggregated by gender.³¹

The framing of biofortification may have facilitated the inclusion of biofortified crops in AUDA-NEPAD's long-running home school feeding program to improve nutrition. Two biofortification champions who work for AUDA-NEPAD confirmed that including biofortified crops in home school feeding programs was a priority.³² According to an interviewee, AUC-DSA, in partnership with HarvestPlus, WFP, and FAO, is leading the advocacy efforts to include biofortified crops in the school feeding and home-grown food program being piloted in Ethiopia, Rwanda and Uganda.³³

Biofortification is included in the AUDA-NEPAD Nutrition and Food Systems Implementation Plan 2019-2025.

³⁰ Respondent 13

³¹ AUC Biennial Review_2018_Addis_Final_Bho.ppt

³² Respondents 6 and 7

³³ Respondent 4

The CIP-led BNFB project supported a network of youth biofortification champions given the crucial role women and youth play in both the production and post-production stages of agricultural value chains, necessary for biofortified crops to reach consumers.³⁴

EQ 4: Is the AU biofortification trajectory likely to be sustained and scaled over the long term?

Finding 12: The COVID-19 pandemic is making the approval of the declaration in the next AU Summit less likely. If the declaration is not passed, then the AU biofortification trajectory will likely lose momentum, but not necessarily stop. Whether the declaration is approved or not, the future of the trajectory involves implementing the road map. Momentum exists in that biofortified crops are in testing or have been released in 38 countries, and in the endorsement of biofortification by ATFFND and agriculture ministers. The biofortification network of champions has an important role to play, which has been endangered by the discontinuation of support after the end of the BNFB project in 2018.

Since 2014, the AU biofortification trajectory has been increasingly aimed at the pronouncement of an AU continental declaration on biofortification. The declaration was not tabled at the AU Summit in February 2020, as was hoped. The COVID-19 pandemic has already delayed the AU Summit scheduled for July 2020. When it does eventually take place, other priorities may prevent the declaration being tabled for a second time. If this happens, there is a real risk that the momentum behind the biofortification trajectory will be lost and the declaration abandoned. The view of the current AU Commissioner for DREA shares this concern. She recommends that HarvestPlus calls for an extra-ordinary meeting to pass the declaration while momentum is still strong.³⁵

If the declaration is not approved, its expected benefits (see Finding 6) will not emerge and this will be a setback for the broader biofortification trajectory in Africa. However, all would not be lost. In building toward the declaration, biofortification has been included in a number of action plans, a road map has been developed (see Finding 7), and biofortification has been endorsed by the ATFFND and by agricultural ministers. Continued progress will depend on making sure these intentions follow through to be included in the NAIPs as most implementation is carried out at the national level. This will not happen as a matter of course even if backed by a continental declaration.³⁶

The people who have driven the trajectory to date are the biofortification champions. Track record and the theory of change suggest the champions will be important to push for implementation in their respective organizations. Funding the champions largely ended with the conclusion of the BNFB project in 2018, making it likely that this network is being underutilized. HarvestPlus will continue at least until 2022. One of its four program pillars is on Influence & Impact to “ensure biofortification is embedded into national and international policy, research initiatives and implementation plans.”³⁷ However, this does not include support for implementation itself, or at least it does not include continuing to work with the BNFB champions. One positive development has been the recognition of the importance of advocacy by FARA through its leadership of the advocacy component of the BNFB project.

³⁴ <https://ypard.net/zh-hans/2018-05-01/promoting-youth-agripreneurship-africa>

³⁵ According to respondent 9

³⁶ Respondent 8

³⁷ HarvestPlus 5-Year Strategy_2018-2022.pdf, p.9

According to one respondent, future advocacy will need to concentrate on the national level with the appointment of national biofortification champions who link up with existing networks and coalitions, e.g. the SUN networks.³⁸ This will require funding.

EQ 5: What worked well and not so well?

The following section is largely based on responses given by interviewees to these questions.

What has worked well?

Finding 13: Respondents identified CIP/RTB and HarvestPlus/A4NH support to a network of regional champions as working particularly well. They identified a number of strategies and tactics that proved effective including well-run side events at large conferences. Champions themselves call for continued support to their network to continue mainstreaming biofortification in the AU and Africa-wide. The evaluator found CIP/RTB and HarvestPlus/A4NH information management particularly good at providing documents that could verify information given in interviews.

Respondents thought that the CIP/RTB and HarvestPlus/A4NH support on advocacy had worked well

(see Finding 3). Strategies and tactics respondents said were important included:

- Coupling proven and ready-to-go technologies with advocacy for biofortification as a solution to micronutrient malnutrition;
- Speaking with one voice with a consistent message;
- Being able to present a basket of crops as a solution, not just one crop;
- Being able to influence at the highest levels through strategically targeting key processes and attending and advocating at key events; and
- In particular, running well-planned and funded side events to which every conference delegate was invited. The events were designed to attract participation with strategic involvement of youth, strategic selection of topics and keynote speakers, and the opportunity to handle biofortified crops, taste biofortified foods, and talk to farmers.

Champions were keen to continue to advocate for biofortification so they may continue to support its scaling in Africa. As one respondent said, just as people go to church to renew their faith, so key decision makers need to be reminded of the benefits of biofortification.³⁹ She also said that to support implementation of existing plans, there is an ongoing need to support program designers to interface with policy makers and donors to increase investment.

Another reason suggested by a respondent for continued advocacy is high turnover of policy makers in member states and senior staff in strategic positions within the AU and Regional Economic Communities (RECs). High turnover calls for keeping and agreeing on a clear record of what has been agreed so as to help ensure continuity and avoid reversals.⁴⁰

The evaluator has been able to check and add detail to nearly all claims made by interviewees quickly and easily thanks in part to information management portals such as the Sweetpotato Knowledge Portal, part of the

³⁸ Respondent 15

³⁹ Respondent 12

⁴⁰ Respondent 15

Sweetpotato for Profit and Health Initiative (SPHI).⁴¹ HarvestPlus/A4NH has also made information easily accessible online.

What did not work so well?

Finding 14: One area that respondents identified for improvement was in the follow-up of actions necessary to take advantage of a window of opportunity, such as making sure that decisions made in important meetings are minuted and acted upon. A second area that caused concern for CGIAR staff was the sometimes-territorial behavior of HarvestPlus/A4NH and CIP/RTB toward each other. However, while lack of acknowledgement had clearly troubled the CGIAR staff involved, non-CGIAR interviewees said it had not adversely affected the process of mainstreaming biofortification in the AU.

The main action three champions highlighted as something that could have been done better was following up on windows of opportunity. One respondent wished she had spent more time on following up that people had acted on opportunities she had identified, for example on making sure biofortification indicators were included in the 2019 CAADP Biennial Review. Another respondent speculated that the declaration was not tabled at the AU Summit in February 2020 due to a lack of follow-up.⁴²

Most respondents mentioned that there had been tension at times between HarvestPlus/A4NH and CIP/RTB. One example was when BMGF funded CIP/RTB to lead the BNFB project to carry out advocacy work on crops other than OFSP, something that HarvestPlus thought was under its mandate. Nevertheless, HarvestPlus/A4NH did link and include its ongoing advocacy work to the project.

More recently, the leadership of HarvestPlus/A4NH and CIP/RTB have placed more emphasis on greater collaboration between the two entities. This has resulted in more explicit cooperation in lobbying health ministers to support the declaration and in the development of the road map to support it.⁴³ Both sides report this as being successful. Despite this, the draft declaration itself calls on AUC, FAO, WFP and HarvestPlus by name, but not CIP or CGIAR, to continue to support work on biofortification in Africa.⁴⁴ There was agreement to remove mention of specific stakeholders in the December 2019 meeting, but this may have been overlooked.⁴⁵

While tensions clearly troubled some CGIAR staff involved, non-CGIAR interviewees generally said that, although they were aware of difficulties, those difficulties had not adversely affected the work and the consistent messaging.⁴⁶ The one exception mentioned was when National Agricultural Research Systems (NARS) were visited first by HarvestPlus/A4NH who would talk about one crop and then visited by CIP/RTB who would talk about OFSP.⁴⁷

What is needed in the future?

Finding 15: What is needed for future scaling of biofortification in Africa is much more funding from national governments to increase the production and consumption of biofortified crops in more countries in Africa. This funding should be directed at the implementation of parts of existing AU strategies and plans that already commit African countries to improve nutrition in their respective populations.

⁴¹ <https://www.sweetpotatoknowledge.org/>

⁴² Respondent 14

⁴³ Respondent 14

⁴⁴ Drafting of the Declaration was supported by HarvestPlus not CIP

⁴⁵ Respondent 13

⁴⁶ Respondent 9

⁴⁷ Respondent 12

HarvestPlus' goal, laid out in its 2018 to 2022 strategy, is to reach a billion consumers by 2030. A goal shared by several champions is to have biofortified crops grown in the majority of African countries. Both goals require massive scaling up, at a time when some respondents are concerned that funding for biofortification is declining, at least for CGIAR. In the future, much more funding will be required from governments' own budgets.⁴⁸

One champion said that additional government funding should be directed to achieve the parts of existing AU strategies and plans that already commit African countries to improve nutrition and specify biofortification as a solution.⁴⁹ Holding governments to account through the CAADP Biennial Review and similar processes (e.g. AfDB) will be key.

Another well-placed champion argued that it will be necessary for AUC, specifically DREA and DSA, to play a stronger leadership and follow-up role, for which greater capacity will be required, particularly in DREA.

The champions interviewed all saw an important role for a network of champions to continue to advocate for biofortification. Part of the advocacy work should be to follow up on windows of opportunity, including those opened by inclusion of biofortification in AU policy documents. The advocacy focus now needs to shift from the AU level to the national and regional levels, as this is where implementation takes place.⁵⁰

Finally, one of the champions most involved in the AU biofortification trajectory thought that there was a profound lesson for CGIAR: namely, the need to be aware of and work with ongoing cycles and processes of high-level institutions such as the AU. CGIAR staff need to understand that they do not control the timeline, but rather should anticipate windows of opportunity as they emerge. She described the behavior as "catching rides" from someone, or some process, that is going in your direction.⁵¹ The behavior is about seeking entry points (the rides) and then following up. In other words, the behavior is what the policy window theory of change suggests is fit for purpose.

⁴⁸ Respondent 10

⁴⁹ Respondent 5

⁵⁰ Respondent 8

⁵¹ Respondent 13

Conclusions

Conclusion 1: There has been a clear process of mainstreaming biofortification in the AUC and AU over five years culminating in a continental declaration and road map due for presentation at the next AU Summit. The contributing outcomes include AUC bodies, regional leaders and regional- and global-level panels endorsing biofortification as a viable solution to the problem of micronutrient malnutrition and the subsequent inclusion of biofortification in AU documents including REC and AUDA-NEPAD strategies and plans.

Conclusion 2: Once made specific to the case, the policy window theory of change helped understand how CGIAR contributed to the mainstreaming of biofortification in the AU. CGIAR contributed by 1) framing the problem and 2) developing and framing the solution in tune with political will, while 3) advocating for change during windows of opportunity. Windows of opportunity included regional- and global-level conferences and other events as part of nutrition-

related processes. This process was supported by regional- and global-level panels (e.g. Global Panel on Agriculture and Food Systems for Nutrition).

Conclusion 3: HarvestPlus/A4NH and CIP/RTB, separately and together, engaged in a number of strategies that clearly made a strong contribution to mainstreaming biofortification in the AU . Both worked on carrying out and publishing high-quality research to show biofortification works. HarvestPlus brought the idea of a “basket” of biofortified crops bred by a number of CGIAR Centers and partners, while CIP worked in-depth on one crop. CIP/RTB led the effort to build and support a network of biofortification champions that complemented HarvestPlus/A4NH’s own advocacy work. Neither could have achieved the same level of outcomes by themselves. Respondents did not think that internal tensions between HarvestPlus/A4NH and CIP/RTB had a detrimental effect on outcomes.

Conclusion 4: The long-term and multi-level funding provided by BMGF and DFID gives the two donors an overview of and influence over biofortification and nutrition outcome trajectories that HarvestPlus/A4NH and CIP/RTB do not have. This gives both donors a unique opportunity to play an integration role for CGIAR Centers and Programs working on nutrition, which could help reduce competition and concerns over duplication.

Conclusion 5: Advocacy, a strategy that CGIAR has traditionally been wary of, played a pivotal part in driving forward the AU biofortification trajectory. HarvestPlus/A4NH and CIP/RTB ran advocacy strategies that complemented each other. Advocacy did not always work, for example with the attempt to agree on a definition of biofortification with Codex Alimentarius. This is a rich source of learning for CGIAR to help with scaling in the future.

Conclusion 6: The main way in which CGIAR has included gender and social inclusion in the AU biofortification trajectory has been in the framing of the problem to be addressed as micronutrient malnutrition in women of reproductive age and children under five years of age. This may have provided impetus to the inclusion of biofortification in AUDA-NEPAD’s long-running homegrown school feeding program.

Conclusion 7: A big push is needed to make sure the continental declaration is passed at the next AU Summit. While COVID-19 is likely to dominate the agenda, biofortification champions may be able to **use the link between good nutrition and health as a window of opportunity** to make sure biofortification remains a high priority at the Summit. Even if the declaration is delayed or eventually shelved, biofortification can be scaled up by consolidating progress made to date. This will require biofortification to be written into NAIPs and implementation to be

subsequently funded, predominantly from national budgets. It is important that future investments also build the evidence base for broader nutrition sensitive investments. **Advocacy has a vital role in making this happen.**

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Appendices

Appendix 1: History of the AU biofortification trajectory and the Africa biofortification trajectory in which it is nested

History of the AU biofortification trajectory

The timeline of the history of the mainstreaming of biofortification in the African Union (AU) is shown in Figure 5. It is focused on identifying and describing the AU mainstreaming outcomes over time, together with the processes and events that directly influenced them. Less-direct influences are described in the broader Africa-wide biofortification trajectory that follows.

2003

From the AU perspective, the ground was prepared for the mainstreaming of biofortification in the AU policy in 2003, when African Heads of State agreed under the Maputo Declaration that member countries commit to spending 10 percent of their budgets on agriculture and to increase expenditure by six percent per year. At the same time, the AU launched the Comprehensive Africa Agriculture Development Programme (CAADP) as a pan-African policy framework to provide broad principles and strategies that would help countries reach these targets. Since then, CAADP has remained the key African agriculture development strategy, supported by 44 countries. The New Partnership for Africa's Development, now called the African Union Development Agency (AUDA- NEPAD), is responsible for implementing CAADP. During its early years, CAADP's focus was on food security, not nutrition.

2005 to 2008

CAADP began with four pillars, one of which was increasing food supply and reducing hunger. One of the initiatives under the pillar was the Pan African Nutrition Initiative (PANI) that beginning in 2005 carried out stakeholder consultation, before calling in 2008 for a multi-sectoral response to malnutrition using a "nutrition lens" for planning and programming in CAADP. Among the 13 fast-track actions recommended was expanding production and consumption of locally grown, micronutrient rich foods with orange-fleshed sweetpotato (OFSP) as one of the focus crops (Covic et al., 2017). This was the first time biofortification was called for in an AU document, albeit not by name.

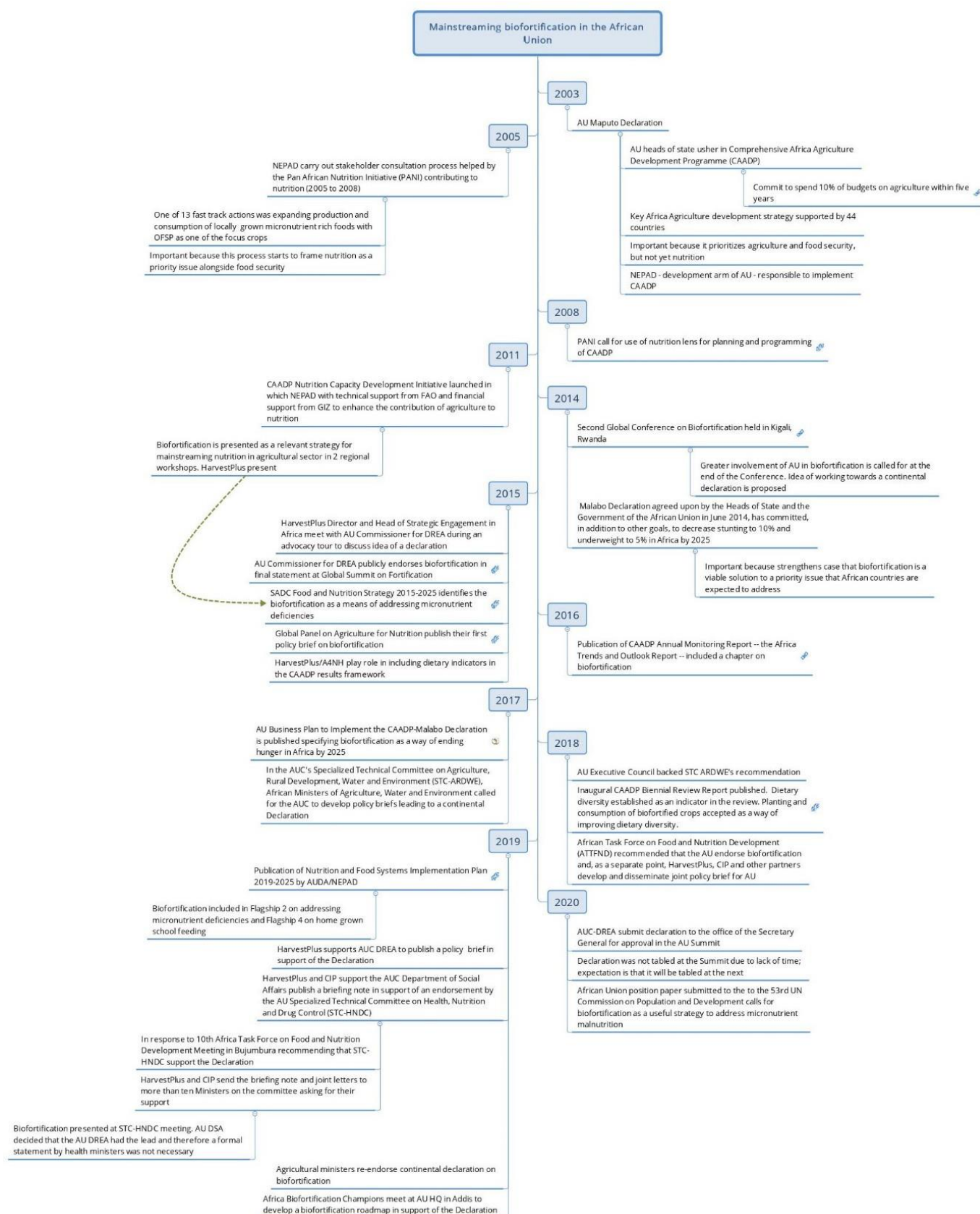
2011 to 2013

By 2011, momentum for a nutrition focus within CAADP was growing. The Food and Agriculture Organization of the United Nations (FAO) and AUDA-NEPAD, with financial support from Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), spearheaded the CAADP Nutrition Capacity Development Initiative (2011 to 2013) to increase the contribution of agriculture to improving nutrition. This involved holding meetings at the Regional Economic Communities (REC) level of the AU that led to a review of member countries' respective National Agricultural Investment Plans (NAIPs) to integrate nutrition into them.⁵² Namukolo Covic, a nutrition researcher at North West University in South Africa, was invited to present at a workshop for the Economic Community of West African States (ECOWAS) in 2011. She presented the UNICEF framework for malnutrition, gave examples of possible entry points for improving nutrition and specifically recommended biofortification as a possible intervention to improve nutrient intake within the framework. At this point, Covic had had no contact with HarvestPlus. The United States Agency for International Development (USAID), who carried out an evaluation of

⁵² 2016 ECOWAS Concept Note - Nutrition Workshop.doc

the workshop, found that participants liked her presentation and as a result Covic was invited to present at the Southern African Development Community (SADC) workshop in 2013. HarvestPlus later became involved in supporting the initiative (Covic et al., 2017).

Figure 5: Timeline of the AU biofortification trajectory



2014

Covic subsequently followed up on whether or not biofortification was included in the four corresponding regional nutrition strategies that came out of the FAO-NEPAD initiative. She found that biofortification was mentioned in the SADC Food and Nutrition Security Strategy 2015-2025, published in 2014.⁵³ The document gave a definition for biofortification and included the existence of legislation and standards on food fortification and biofortification as an indicator of reduced prevalence of micro-nutrient deficiencies. This is the first instance that the evaluator has found of the inclusion of biofortification in AU and/or REC strategy.

Momentum to improve nutrition continued to grow, culminating in June 2014, when the Heads of State and the Government of the AU committed in the Malabo Declaration, in addition to other goals, to decrease stunting to 10 percent and underweight to five percent in Africa by 2025. The Malabo Declaration's focus on nutrition made it easier to present biofortification as an important solution to micronutrient malnutrition.

Three months prior to the Malabo Declaration, HarvestPlus/A4NH held the Second Global Conference on Biofortification in Kigali, Rwanda. Laila Lokosang, Advisor on Food and Nutrition Security in the African Union Commission's (AUC) Department of Rural Economy and Agriculture (DREA), was invited to represent the AU along with representatives from 100 other organizations. No particular slot was provided for the AU in the agenda, despite the conference being held in Africa. At the end of the conference, Lokosang persuaded the organizers for him to say something on behalf of the AU, as a way for the AU to take ownership of the African part of a global initiative. Lokosang had dinner with the HarvestPlus Director, Howdy Bouis, and brought up the idea of advocating for an AU declaration on biofortification.

Two months later, Lokosang was recruited to join a network of regional-level biofortification champions supported by a CIP-led project called Reaching Agents of Change (RAC) and later by the Building Nutritious Food Baskets (BNFB) project. Lokosang subsequently received training in advocacy with other regional champions. The champions were chosen as those who were already influential with respect to nutrition, and who came from organizations working in the area, such as FAO or the AU, for example. As part of their training, they were asked to plan how they would advocate for biofortification in their respective organizations, and they were provided with some funding to implement them.

Champions were also supported to advocate for biofortification in key meetings. The coordinator for the advocacy component of the BNFB project (also led by CIP), identified 21 meetings attended by champions to advocate for biofortification (Omari et al. 2018), most of which were either organized by the AUC or had had AU representatives attending. One important effect was to raise awareness and likely the demand for biofortification in the AUC and among country teams attending the meetings.

Also in 2014, HarvestPlus began its third five-year phase focusing on scaling. HarvestPlus, realizing the importance of influencing policy in Africa for increasing the adoption and consumption of biofortified crops, appointed Anna-Marie Ball to play an advocacy role and to attend high-level meetings on behalf of HarvestPlus. Ball had been the HarvestPlus Uganda country leader, and had been heavily involved in the Reaching End Users (REU) project run in Uganda and Mozambique (2006 to 2009) that carried out a large-scale randomized controlled trial that demonstrated the efficacy and effectiveness of OFSP in reducing vitamin A deficiency.

2015

Ball joined Bouis, on an African tour in April 2015 to advocate for biofortification. Part of Lokosang's job was to advise the Commissioner of DREA who, in 2015, was Rhoda Peace Tumusiime from Uganda. Lokosang and Ball set up a meeting between Tumusiime and Bouis. Subsequent to the meeting, Tumusiime endorsed biofortification in

⁵³ <https://www.nepad.org/publication/sadc-food-and-nutrition-security-strategy-2015-2025>

a press statement.⁵⁴ In the closing statement of the 2015 Global Summit on Fortification held in September 2015 in Arusha, Tanzania, she emphasized the need to “rapidly scale-up the availability and consumption of fortified and biofortified foods.” She went on to say that “as Africans like to eat fresh foods, we may need more biofortification than fortification.”

Tumusiime and DREA were likely knowledgeable and pre-disposed to biofortification earlier through Tumusiime’s membership on the Global Panel on Agriculture and Food Systems for Nutrition (Global Panel). The Global Panel is an independent group of influential experts with a commitment to tackling global challenges in food and nutrition security. The Global Panel is working to ensure that agriculture and food systems support access to nutritious foods at every stage of life. In 2015, Panel members included Tumusiime as well as Rachel Kyte, Vice President of the World Bank, John Beddington, former UK Government Chief Scientific Advisor and Akinwumi Adesina, Federal Minister of Agriculture and Rural Development, Nigeria. In February 2015, the Global Panel produced its first policy brief titled “Biofortification: An Agricultural Investment for Nutrition” that laid out the technical evidence and arguments supporting biofortification as one element of a nutrient-sensitive national agricultural research and investment strategy.⁵⁵ The authors were the panel members, supported by the Panel Secretariat. HarvestPlus and CIP publications were referenced, among others from CGIAR. Given the publication date was February 2015, it is reasonable to assume that the authors had engaged with the evidence and arguments already in 2014. Lokosang said he was the link between the Global Panel and Tumusiime.

2016

In 2016, DREA staff developed the AU Business Plan to Implement the CAADP-Malabo Declaration (2017-2021). The final draft was published in February 2017, identifying the seven CAADP-Malabo Result Areas with their corresponding seven programs and 35 subprograms, as the core drivers of the business plan.⁵⁶ The third result area is “Ending Hunger in Africa by 2025: Access to and use of increased agricultural inputs and mechanization; post-harvest management; homegrown school feeding; biofortification; food and nutrition knowledge management, nutrition status and nutrition coordination; food/diet diversification; and social protection.”⁵⁷

The International Food Policy Research Institute (IFPRI), the CGIAR Center that co-administers HarvestPlus, facilitates the Regional Strategic Analysis and Knowledge Support System (ReSAKSS). ReSAKSS maps CAADP indicators across countries and regions to track progress toward CAADP goals and targets. In 2016, Bho Mudyahoto, the Head of Monitoring & Evaluation (M&E) in HarvestPlus, presented the case for including biofortification indicators at the ReSAKSS Conference in Ghana, as part of a HarvestPlus scaling strategy.

2017

In 2017, HarvestPlus began working with DREA to develop its own policy brief on biofortification as a way of discussing and agreeing upon a road map to achieve a declaration on biofortification. The writing process received a major boost in October during the Specialized Technical Committee on Agriculture, Rural Development, Water and Environment (STC-ARDWE). The STC-ARDWE is a bi-annual meeting of African ministers of Agriculture, Water and Environment. Recommendations from the meeting are presented at the AU Summit. The delegation from Uganda asked that the meeting reflect the promising performance of biofortified crops in their country. HarvestPlus, the BNFB project, and the Forum for Agriculture Research for Africa (FARA) sent a jointly signed letter to the delegates.⁵⁸ (Lokosang, 2016). The request was accepted. Lokosang helped draft the

⁵⁴ <https://au.int/ar/node/14026>

⁵⁵ http://www.glopan.org/sites/default/files/assets/documents/Biofortification_Policy_Brief_FINAL.pdf

⁵⁶ https://au.int/sites/default/files/documents/33005-doc-au_caadp_malabo_business_executive_summary-eng.pdf

⁵⁷ Ibid, p. i

⁵⁸ From HarvestPlus review of first draft of this report

text that went into the report of the meeting, shown in Box 1. The first recommendation was to write policy briefs, the first of which was published in March 2019.

The current AUC DREA Commissioner, Josefa Sacko, took up her post in January 2017. Ball and the Africa-based advocacy specialist met with Sacko in September 2017, when she agreed to become a biofortification champion.⁵⁹

Box 1. Text supporting the mainstreaming of biofortification in the AU **from the minutes of a STC-ARDWE meeting in October 2017**

Need to Scale Up Emerging Initiative for Improving Nutrition within the Agricultural Transformation Agenda⁶⁰

Biofortification is the process of breeding and delivering critical vitamins and minerals into staple crops that are naturally enriched with micronutrients. It complements commercial fortification, supplementation and dietary diversity. It therefore has great potential to contribute significantly to the Malabo Goal of reducing stunting to 10 percent and underweight to five percent by 2025. Biofortification is rapidly gaining international acclaim and nine AU Member States are already implementing biofortification projects with support of international research organizations. However, the initiative lacks high-level political backing from the AU. In this regard, the meeting made the following recommendations:

- Encouraged the AUC, NPCA and Development and Technical Partners to work together to develop policy briefs leading to a declaration on scaling up biofortification in Africa within the context of development of sustainable food systems; and
- Requested AUC-DREA to initiate a process for developing a framework for guiding the scale up of biofortification to cover more Member States, especially those with potential for adopting the program and mainstreaming it into their agribusiness and value chain development interventions.

2018

In January 2018, the AU Executive Council in its 32nd Ordinary Session backed STC-ARDWE's recommendations to produce policy briefs leading to a declaration on scaling up biofortification in Africa.

Also, in January 2018, AUC released the first CAADP Biennial Review Report with the expectation that, by publicly assessing the progress made on the national level, the review would put "soft pressure" on African leaders to fulfil the commitments they made in Malabo in 2014.

HarvestPlus/A4NH saw the review process as an opportunity to add biofortification indicators to the existing nutrition indicators. While not able to add any new indicators, the planting and consumption of biofortified crops was accepted as a way a country could demonstrate an increase in dietary diversity.⁶¹

In August, Bho Mudyahoto gave a presentation at a CAADP Biennial Review meeting in Addis Ababa suggesting that specific biofortification indicators could also be included in the NAIPs and the CAADP review process.⁶² He was invited on the basis of his ReSAKSS presentation in 2016.⁶³ The original ambition was to include five specific indicators. When it became clear that this was going to be difficult, the proposal was adjusted to disaggregate

⁵⁹ From HarvestPlus comments on first draft of the report

⁶⁰ https://www.uneca.org/sites/default/files/images/annex_a1.2.3-2_-_second_ordinary_session_of_the_specialized_technical_committee_stc_on_agriculture_rural_development_water_and_environment_en.pdf

⁶¹ Respondent 13

⁶² AUC_Biennial_Review_2018_Addis_Final_Bho.pdf

⁶³ Respondent 4

existing indicators such as area planted to improved varieties (biofortified vs not biofortified). Eventually, this did not pass either, the argument being that only a minority of African countries currently grow biofortified crops.⁶⁴

2019

In 2019, AUDA-NEPAD published its Nutrition and Food Systems Implementation Plan 2019 – 2025.⁶⁵ The publication of the document was supported by two BNFB biofortification champions: Kefilwe Moalosi, Program Officer, Nutrition and Food Systems in AUDA-NEPAD and Bibi Giyose while she was working for FAO.⁶⁶ The strategy identifies seven flagship programs, two of which include work on biofortification. Under Flagship 2: Addressing micronutrient deficiencies through food fortification, biofortification and supplementation, the plan said that AUDA-NEPAD will prioritize support to the RECs and Member States to develop fortification and biofortification interventions and to carry out public education and social mobilization with respect to biofortification and supplementation. Under Flagship 4: Homegrown school feeding, the plan said AUDA-NEPAD will expand the homegrown school feeding program across additional countries and, in the process, compare schools with biofortified food provision to those without to generate nutrition status impact evidence.

In April 2019, HarvestPlus supported the AUC Department of Social Affairs (DSA) to publish a briefing note in support of an endorsement by the ministers of Health comprising the AU Specialized Technical Committee on Health, Population and Drug Control (STC-HPDC), in the same way the STC-ARDWE had done in October 2017. HarvestPlus/A4NH and CIP/RTB cooperated to write letters to the ministers in 10 countries implementing biofortification projects to endorse biofortification. The reason HarvestPlus/A4NH and CIP/RTB sought support from STC-HPDC was that they felt the declaration would be stronger if developed and supported by both agriculture and health ministries, given that nutrition is an issue for both areas. However, DSA eventually decided DREA had the lead and therefore a formal statement by health ministers was not necessary. Also, neither HarvestPlus/A4NH nor CIP/RTB had sufficient funds or time to cover meetings attended by both health and agriculture and it proved difficult to agree upon the declaration through DREA and DSA.⁶⁷

In October 2019, at the Africa Day for Food and Nutrition Security in Cairo, Egypt, agriculture ministers for all 55 AU member states recommended a high-level endorsement of biofortification at the AU Summit in February 2020. The new Commissioner of the AUC DREA, Her Excellency Ambassador Josefa Sacko said:

“Working together with HarvestPlus and other stakeholders, we have produced a draft Declaration...for presentation and endorsement...at the summit. Efforts are ongoing to develop and launch a framework on accelerating the scaling up of biofortification to the rest of the countries in Africa.”⁶⁸

In December, HarvestPlus helped DREA organize the AU Consultative Meeting on Biofortification in Addis Ababa to which more than 30 people working on biofortification were invited, including several BNFB project champions, to develop a continental framework and road map to provide specific guidance on how to incorporate biofortification in countries’ policies and programs.

⁶⁴ Respondent 4

⁶⁵ <https://www.nepad.org/publication/nutrition-and-food-systems-implementation-plan-towards-coordinated-and>

⁶⁶ See acknowledgements on page v in the plan

⁶⁷ Respondent 2

⁶⁸ African Union Continental Declaration on Biofortification, HarvestPlus internal prez presentation

2020

With the framework and declaration drafted, all was in place for the AU Summit to approve the declaration. However, the declaration was not tabled and the hope is that it will be tabled and improved in the next AU Summit later in 2020.

When passed, the declaration will commit African States to promote industrial food fortification and biofortified food crops, specifically to encourage public procurement of biofortified seed and to encourage farmer input support programs to incorporate biofortified seed and training activities.

The declaration also encourages the use of biofortification and fortification in relevant health programs and more broadly to strengthen systems for inter-sectoral collaboration. The declaration requests that the AUC, World Food Program (WFP), FAO and HarvestPlus continue to support projects that include fortification and biofortification and work together in a community of practice with policy makers in member states.

All interviewees agreed that the declaration was an important step. One of the BNFB champions said that its importance was to provide legitimacy for future work on biofortification in Africa, because it is a declaration from African presidents and heads of state. This will give more weight to ministers to push for biofortification in NAIPs and signal to the private sector to invest. He also thought it would provide a mandate for the organizations mentioned to continue working on biofortification, and a mandate for biofortification champions to continue their work into the future.

A second champion, while supporting the declaration, cautioned that following up on implementation plans including biofortification was also important.

History of the Africa-wide biofortification trajectory

The timeline describing the broader Africa-wide outcome trajectory that influenced the direction and progress made in the African Union (AU) biofortification trajectory, as shown in Figure 2. The timeline describes the efforts of CIP/RTB and HarvestPlus/A4NH who have driven the development and promotion of biofortification in Africa, together with partners, to develop and promote biofortified crops in Africa as a solution to micronutrient malnutrition is shown in Figure 6.

1994 to 2000

From the perspective of CGIAR, the Africa biofortification trajectory began in the 1990s with two relatively small projects led by IFPRI and CIP. Prior to 1994, enhancing nutrient content had only infrequently been a breeding objective because of the pervasive belief that biofortification would reduce yield and consumer acceptance, and it was not proven that increasing micronutrient content in crops would lead to better nutrition for consumers.

The IFPRI project, led by Howarth Bouis, brought together IRRI, CIAT, and CIMMYT to explore the feasibility of enhancing vitamin content using conventional breeding. The latter, led by Jan Low, looked at the effect on vitamin A levels in women provided with orange fleshed sweetpotato (OFSP) in Kenya.

2001 to 2008

The projects began independently of each other, and both catalyzed further work. In 2001, CIP launched the Vitamin A for Africa (VITAA) Partnership to combat vitamin A deficiency in Sub-Saharan Africa with its own discretionary 'core' funding. After initial rejection, CGIAR agreed in 2003 to support the Biofortification Challenge Program co-administered by IFPRI and CIAT, later renamed HarvestPlus. The Bill & Melinda Gates Foundation (BMGF) provided half of the US\$50 million funding requested for the first five years (2003-2008), to work with CGIAR organizations and others to identify target populations and conduct proof-of-concept research to prove the feasibility of biofortification on six staple crops (rice, wheat, maize, sweetpotato, beans, cassava).⁶⁹ HarvestPlus worked with five CGIAR Centers with the mandate to breed the respective crops (IRRI, CIMMYT, CIP, CIAT, and IITA).

The VITAA Partnership was not able to raise substantial funding and HarvestPlus supported CIP's sweetpotato breeding efforts and annual VITAA meetings from 2003 to 2008 (Low and Thiele, 2020). This included helping to fund the Towards Sustainable Nutrition Improvement (TSNI) project led by Jan Low who had moved to Michigan State University. The TSNI project began in Mozambique in 2002 to alleviate malnutrition, particularly among young children, through growing and eating OFSP. The project found a 15 percent decline in prevalence of vitamin A deficiency to eating OFSP. This was the first efficacy study to show that eating OFSP could reduce micronutrient malnutrition, evidence that was needed to change breeders' view of biofortification.

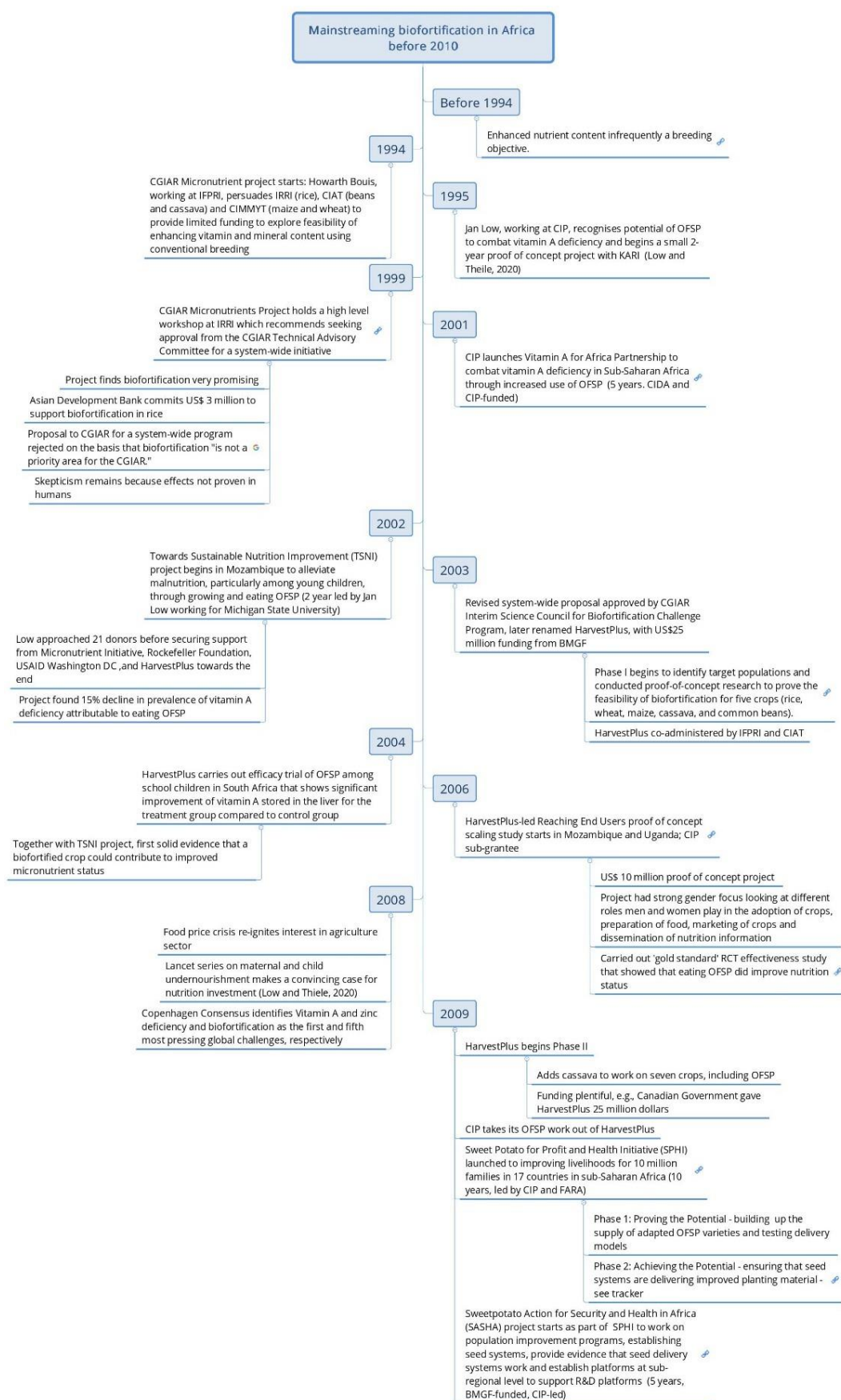
Building on the TSNI project, and the existential requirement to provide hard evidence that biofortification could work, in 2006 HarvestPlus funded a much larger efficacy and effectiveness trial again in Mozambique and also in Uganda as part of the Reaching End Users (REU) project.^{70, 71} The project cost US\$10 million, reflecting the cost of carrying out a randomized controlled trial (RCT), the gold standard in nutritional research and more widely accepted as a preferred approach for impact evaluations.

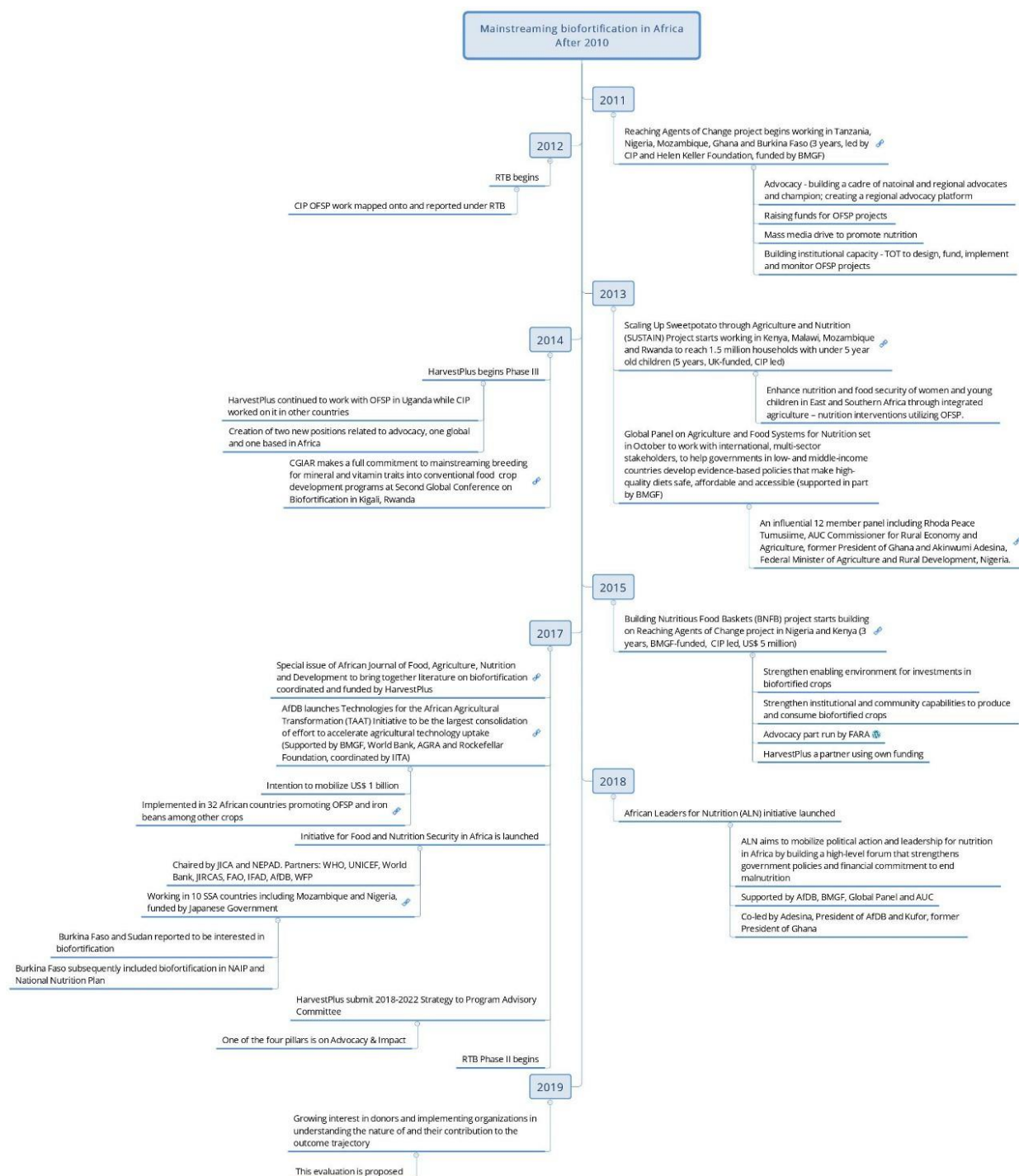
⁶⁹ <https://www.harvestplus.org/about/our-history> and BMGF HarvestPlus Biofortification Proposal_2003.doc

⁷⁰ Efficacy studies establish if the levels of micronutrient in the biofortified crop have beneficial effects when eaten.

⁷¹ Efficiency studies establish if providing biofortified seed to farmers leads to measurable beneficial effects to farmers and their families.

Figure 6: History of the Africa biofortification trajectory





Funding came from a direct grant from BMGF and from HarvestPlus' core donors: Denmark, Sweden, the Syngenta Foundation, the United Kingdom, the United States, and the World Bank.⁷² CIP was a sub-grantee on the project and collaborated on the design and implementation of the evaluation.

The REU project disseminated OFSP to 24,000 households in Mozambique and Uganda to test whether vitamin A could be provided through food. This was the first time a biofortified crop had been released on such a large scale. The trial showed a clear treatment effect: the results are summarized in Box 2.

Box 2. Findings of the REU project that proved to be convincing⁷³

1. Seventy-seven percent of project households in Mozambique adopted OFSP (compared with nine percent in the control group), and 65 percent of project households in Uganda adopted OFSP (compared with four percent in the control group).
2. The share of sweetpotato cultivated area devoted to OFSP increased from nine percent to 56 percent in Mozambique and from one percent to 44 percent in Uganda.
3. The intake of OFSP among young children, older children, and women increased by two-thirds or more in both countries when the project made OFSP available.
4. As a result of Item 3, total vitamin A intakes among young children, older children, and women increased significantly in both countries. Notably for children aged six to 35 months, OFSP contributed 78 percent of their total vitamin A intake in Mozambique and 53 percent in Uganda.
5. In Uganda, more vitamin A obtained from eating OFSP was associated with a lower likelihood of vitamin A deficiency among both children five to seven years old and women who had lower levels of vitamin A at the start of the project.

In 2008, a global food price crisis reignited interest and investment in the agricultural sector, which had been in a slump for several years. At the same time, the Copenhagen Consensus produced a prioritized list of recommendations on how to tackle ten of the world's most pressing issues, and micronutrient supplements for children (vitamin A and zinc) was ranked as the best development investment, while biofortification was ranked fifth.⁷⁴ This, along with The Lancet Series on Maternal and Child Nutrition, made a convincing case for nutrition investment (Low and Thiele, 2020). These changes, together with evidence that consumption of biofortified foods (at least OFSP) could reduce micronutrient deficiencies was a watershed moment for biofortification.

2009

In 2009, HarvestPlus began its second five-year 'developmental' phase in a very positive funding environment.⁷⁵ The phase was one during which:

- Breeding of a first wave of biofortified crops were completed and approved for release by national varietal release committees;
- Nutritional efficacy trials were expected to be completed; and
- Delivery plans were developed.⁷⁶

⁷² <https://www.sweetpotatoknowledge.org/project/harvestplus-reaching-end-users-orange-fleshed-sweetpotato-project/>

⁷³ https://www.harvestplus.org/sites/default/files/publications/HarvestPlus_OFSP_Brief_English_2012_v2_small_0.pdf, p.2

⁷⁴ https://en.wikipedia.org/wiki/Copenhagen_Consensus#Copenhagen_Consensus_2008

⁷⁵ Respondent 14

⁷⁶ <https://www.harvestplus.org/about/our-history>

HarvestPlus added millet and worked with ICRISAT to breed the crop. OFSP was a HarvestPlus delivery objective for Uganda and Mozambique.

The improved funding environment probably contributed to the decision by CIP to find its own funding for work on OFSP, for which it has the global mandate for breeding. Funding is a perennial issue for CGIAR Centers who need large projects to ensure the continuity of their research for development (R4D) activities in the absence of other long-term funding mechanisms.

As in 2003, CIP's response was to establish a collaborative multi-donor platform called the Sweetpotato for Profit and Health Initiative (SPHI) as a 10-year program to improve the livelihoods of 10 million families. SPHI was co-led by Forum for Agriculture Research for Africa (FARA). SPHI was far more successful than the VITAA Partnership in finding funding. In 2009, BMGF funded the five- year CIP-led Sweetpotato Action for Security and Health in Africa (SASHA) project to lay the foundations for the SPHI goal. The project's objectives were to:

1. Establish population improvement programs in Africa
2. Develop safe weevil-resistant sweetpotato
3. Establish seed systems for distribution of new varieties
4. Provide evidence that novel delivery systems work
5. Establish platforms at the sub-regional level to support sweetpotato R&D and build a community of practice.⁷⁷

2011

In 2011, as part of SPHI, BMGF funded the Reaching Agents of Change (RAC) project led by CIP. While SASHA was focused on breeding for local conditions and OFSP seed systems, the RAC project focused on building political awareness of OFSP as an answer to vitamin A deficiency. Importantly, the project established a cadre of national and regional OFSP champions linked together by a platform. Part of what the champions did was to seek funding for OFSP initiatives from the public sector, private sector and NGOs. The project worked in Tanzania, Nigeria, Mozambique and to a lesser extent, Ghana and Burkina Faso.⁷⁸

In February, IFPRI held the Leveraging Agriculture for Improving Nutrition & Health conference in New Delhi, India. Biofortification was on the agenda. The independent impact assessment of the conference suggested that the conference helped build donor support and momentum for biofortification globally, including in Africa.⁷⁹

2012

In 2012, CGIAR launched the first phase of their CGIAR Research Programs (CRPs). The CRP on Roots, Tubers and Bananas (RTB) began, led by CIP. Nearly all of CIP's work on OFSP was mapped to and reported through RTB. The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) began, led by IFPRI. HarvestPlus led A4NH's flagship program on Biofortification.

2013

In 2013, the UK, through its Department for International Development (DFID), lent its support to SPHI by funding the Scaling Up Sweetpotato through Agriculture and Nutrition (SUSTAIN) project with the objective of reaching 1.5 million households with under-five year old children in Kenya, Malawi, Mozambique, and Rwanda in five years.

⁷⁷ <https://www.sweetpotatoknowledge.org/project/sweetpotato-action-for-security-and-health-in-africa-sasha/>

⁷⁸ <https://www.sweetpotatoknowledge.org/project/the-reaching-agents-of-change-rac/>

⁷⁹ <http://2020conference.ifpri.info/files/2012/12/IADP-34-Paarlberg2020conferenceDelhi-uploaded1.pdf> (p.37-38, p.45)

The first Nutrition for Growth Summit was held in London where 100 stakeholders endorsed the Global Nutrition for Growth Compact and pledged more than US\$4 billion in new nutrition-specific investments and US\$19 billion in complementary nutrition-sensitive investments between 2013 and 2020.⁸⁰ The UK, the World Bank and some private companies included biofortification in their commitments. The Global Nutrition Report was established in 2014 following the first Summit. The report serves as an accountability mechanism to track progress against global nutrition targets and the commitments made to reach them.

The high-level Global Panel on Agriculture and Food Systems for Nutrition (Global Panel) was established to work with international, multi-sector stakeholders and help governments in low- and middle-income countries develop evidence-based policies that make high-quality diets safe, affordable and accessible.⁸¹ The Global Panel co-chairs are John Beddington, former UK Chief Scientific Advisor and John Kufor, former President of Ghana. The Global Panel is significant to the biofortification outcome trajectories because of the strong support it has given biofortification in Africa, both as a Global Panel, and through the actions of its members, as described in the AU biofortification trajectory.

2014

In 2014, HarvestPlus began its third five-year phase, focused on delivery and scaling up biofortified crops. The strategy was to foster development of central institutions and government funding to advocate and coordinate biofortification activities for several crops at country and regional level. This led to the creation of a Strategic Alliances position in Africa to strengthen advocacy work, filled by Anna-Marie Ball, who had previously worked as Country Manager for HarvestPlus in Uganda. A large part of Ball's job was to attend high-level meetings on nutrition to advocate for biofortification, including Department of Rural Economy and Agriculture (DREA) and Department of Social Affairs (DSA) meetings at the AU. HarvestPlus chose to integrate advocacy into all country programs, unlike CIP/RTB which had separate projects focusing only on advocacy.⁸²

At the Second Global Conference on Biofortification in Kigali, Rwanda, CGIAR made a full commitment to mainstreaming breeding for mineral and vitamin traits into conventional food crop development programs. This was an important indicator of the shift toward seeing micronutrient malnutrition as a serious issue and biofortification as a proven answer in CGIAR.

2015

In 2015, the Building Nutritious Food Baskets (BNFB) project began, building on the RAC project, also funded by BMGF. The BNFB project was different in that it advocated for countries to adopt a basket of biofortified crops, not just OFSP. Other crops included beans, maize and cassava, crops that HarvestPlus had been promoting in Africa. The project was co-led by CIP and FARA, who handled advocacy. HarvestPlus felt that advocacy was something they should have been asked to do. HarvestPlus were offered five percent of the budget but declined because they thought it was insufficient.⁸³ Nevertheless, HarvestPlus did participate in the project, working closely with some of the BNFB-supported regional champions, including those working for the African Union Commission (AUC) and the African Union Development Agency (AUDA-NEPAD).

⁸⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/248760/Endorserscompact_update7_10_2013.pdf

⁸¹ <https://www.glopan.org/about/>

⁸² Respondent 2

⁸³ Respondent 14

2016

In 2016, the World Food Prize was awarded to four researchers from CIP and HarvestPlus for biofortification. The award undoubtedly did much to raise the profile of biofortification as a solution to micronutrient malnutrition globally, in particular in Africa.

Three laureates from CIP were honored for their work developing “the single most successful example of biofortification, OFSP. Dr. Andrade and Dr. Mwanga, plant scientists in Mozambique and Uganda, bred the Vitamin A-enriched OFSP using genetic material from CIP and other sources, while Dr. Low structured the nutrition studies and programs that convinced almost two million households in 10 separate African countries to plant, purchase and consume this nutritionally fortified food.”⁸⁴

The fourth laureate was Dr. Howarth Bouis, honored as “the founder of HarvestPlus who over a 25- year period pioneered the implementation of a multi-institutional approach to biofortification as a global plant breeding strategy. As a result of his leadership, crops such as iron and zinc fortified beans, rice, wheat and pearl millet, along with Vitamin A-enriched cassava, maize and OFSP are being tested or released in over 40 countries.”⁸⁵

2017 to present

In 2017, the *African Journal of Food, Agriculture, Nutrition and Development* published a special issue on biofortification as way to pull the science together in one place. The special issue was funded and coordinated by HarvestPlus. Low, representing CIP’s work, was lead author on a chapter on sweetpotato development and delivery in sub-Saharan Africa and co-author on the introductory and final chapters with Bouis and others.

In 2019, Rose Omari, the leader of the advocacy component of the BNFB project, published a paper on advocacy for scaling up biofortified crops.⁸⁶ Laila Lokosang, advisor to the AU Commissioner for DREA, was co-author.

One of the objectives of the BNFB project was to lobby for more investment in biofortification in Africa. While it is not clear if the project had any influence, in 2017, Adesina, by then President of the African Development Bank (AfDB), launched the Technologies for the African Agricultural Transformation (TAAT) initiative, the largest consolidation of effort to accelerate agricultural technology uptake, with an intention to mobilize US\$1 billion.⁸⁷ As of 2019, the initiative was being implemented in 32 African countries.⁸⁸ The initiative, which is still on-going, is coordinated by the International Institute of Tropical Agriculture (IITA) and supported by BMGF, the World Bank, the Alliance for a Green Revolution in Africa (AGRA), and the Rockefeller Foundation.

Another investment in biofortification began in 2017 with the start of the Initiative for Food and Nutrition Security in Africa, co-chaired by the Japan International Cooperation Agency (JICA) and AUDA-NEPAD with funding from the Japanese government. The project works in 10 sub-Saharan African countries including Mozambique and Nigeria. The project partners are the World Health Organization (WHO), UNICEF, the World Bank, Japan International Research Center for Agricultural Sciences, the Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development, AfDB, and World Food Program. CGIAR is not a partner but is invited to regional consultative events. In these events, several countries have indicated a strong interest in funding work on biofortification.⁸⁹

⁸⁴ <https://farmingfirst.org/2016/06/biofortification-pioneers-win-world-food-prize-2016/>

⁸⁵ https://www.worldfoodprize.org/index.cfm/87428/40771/2016_world_food_prize_presented_to_four_international_researchers

⁸⁶ Omari et al., 2019. Advocacy for scaling up biofortified ...

⁸⁷ <https://www.afdb.org/en/news-and-events/afdb-agricultural-transformation-strategy-to-guarantee-513-million-tons-of-additional-food-production-17463>

⁸⁸ <https://digitalarchive.worldfishcenter.org/bitstream/handle/20.500.12348/2902/2019-05.pdf>

⁸⁹ Respondent 6

In January 2018, a new and existing high-level process began supporting biofortification. The AfDB, together with the AUC, the Global Panel, and BMGF launched the African Leaders for Nutrition (ALN) initiative.⁹⁰ ALN was founded by Adesina and John Kufuor. ALN aims to mobilize political action and leadership for nutrition in Africa by building a high-level forum that strengthens government policies and financial commitment to end malnutrition. It is part of eight flagship programs launched under the AfDB “High 5” priorities that include “Feed Africa” and “Improve the quality of life for the people of Africa.” In May, Howarth Bouis, who had retired from leadership of HarvestPlus in 2016, was invited to become an ALN champion and join African leaders to help address micronutrient malnutrition, signaling that ALN’s active support of biofortification.

In June, the African Task Force on Food and Nutrition Development (ATFFND) recommended AU member states endorse biofortification. ATFFND was established in 1987 by the Organization of African Unity, WHO, FAO and UNICEF to advocate to and sensitize Africa’s policy makers on the role of food and nutrition security.⁹¹ The significance of ATFFND’s endorsement is that the Task Force involves both ministries of health and agriculture, thus signaling the acceptance of biofortification as part of a comprehensive approach to tackling malnutrition.

⁹⁰ <https://www.afdb.org/en/news-keywords/african-leaders-nutrition-initiative>

⁹¹ <https://reliefweb.int/report/world/report-1st-meeting-african-task-force-food-and-nutrition-development>

Appendix 2: List of interviewees and participants in validation workshop

Name	Gender	Affiliation	Job title / role
Interviewees			
Kefilwe Moalosi	F	AUDA-NEPAD	Program Officer, Nutrition and Food Systems
Bibi Giyose	F	AUDA-NEPAD	Active in AUDA-NEPAD before going into FAO and then returned to AUDA-NEPAD
Dia Sanou	M	FAO Eastern Africa Sub-Regional Office	Senior nutrition and food systems officer and special advisor to AUDA-NEPAD CEO
Angelline Rudakubana	F	WFP	Director of WFP to the AU and to Economic Commission to Africa
Laila Lokosang	M	AUC-DREA	Technical Advisor, Food & Nutrition Security
John McDermott	M	A4NH	Director
Joyce Maru	F	CIP	Program Coordinator, Development and Delivery of Biofortified Crops at Scale Program
Namukolo Covic	F	A4NH	Ethiopia Country Coordinator
Peg Willingham	F	Formerly HarvestPlus	Head, Advocacy and Policy
Graham Thiele	M	RTB-CIP	Program Director
Anne-Marie Ball	F	Formerly HarvestPlus	Former Uganda Country Manager who took on an Africa-wide advocacy role
Ekin Birol	F	HarvestPlus	Director, Impact and Strategy
Bho Mudyahoto	M	HarvestPlus	Head, Monitoring and Evaluation
Rose Omari	F	Science and Technology Policy Research Institute, Accra	Senior Research Scientist
Participants in the validation workshop			
Boru Douthwaite	M	Evaluator	Selkie Consulting Limited
Claudio Proietti	M	RTB-CIP	Senior Program Manager
Anna-Marie Ball	F	Formerly HarvestPlus	Former Uganda Country Manager who took on an Africa-wide advocacy role
Namukolo Covic	F	A4NH	Ethiopia Country Coordinator
Paul Demo	M	CIP	Regional Director for Africa
Julia Tagwireyi	F	Independent consultant	Member of AUDA-NEPAD Food and Nutrition expert panel

Participants in the validation workshop			
Kefilwe Moalosi	F	AUDA-NEPAD	Program Officer, Nutrition and Food Systems
Joyce Maru	F	CIP	Program Coordinator, Development and Delivery of Biofortified Crops at Scale Program
Donald Mavindidze	M	HarvestPlus	Regional Director, Africa
Tawanda Muzhingi	M	CIP-RTB	Flagship Leader
Vivian Polar	F	RTB-CIP	Gender and M&E Specialist
Rose Omari	F	CIP	Science and Technology Policy Research Institute, Accra
Graham Thiele	M	RTB-CIP	Program Director
Peg Willingham	F	Formerly HarvestPlus	Head, Advocacy and Policy
Amanda Wyatt	F	A4NH	Program Manager

Appendix 3: Building Nutritious Food Baskets (BNFB) Project Regional Champions

Name	Organization	Position	Country
Mariam Akiror	Formerly at Africa External Affairs Directorate HarvestPlus	Advocacy Specialist	Uganda
Julia Tagwireyi	Independent consultant	Member of AUDA-NEPAD Food and Nutrition expert panel	Zimbabwe
Francis Zotor	University of Health and Allied Sciences	Immediate Past President, African Nutrition Society	Ghana
Kefilwe Moalosi	AUDA-NEPAD	Nutrition Programme and Research Officer	South Africa
Laila Lokosang	AUC	Food and Nutrition Advisor	Ethiopia
Nelson Ojjo	Formerly of Access Agriculture	Executive Secretary	Kenya
Mawuli Sablah	Formerly at FAO Regional Office for Africa	Chief Technical Advisor, CAADP Nutrition	Ghana
Matilda Steiner-Aseidu	University of Ghana	Prof of Nutrition & Dean, School of Biological Sciences	Ghana
Gloria Tetteh Essielfie	University of Ghana, School of Agriculture	Lecturer/Post-Harvest Specialist	Ghana
Boitshepo Doreen Giyose	AUDA-NEPAD	Food and Nutrition Security Advisor	South Africa
Isatou Jallow	Formerly of AUDA-NEPAD	Independent Consultant	Gambia
Rossana Agble	Formerly of Nutrition Unit, Ministry of Health, Ghana	Director, Nutrition Unit	Ghana
Mohamed Ag Bendeck	Formerly of FAO	Former Regional Nutrition Officer	
Josephine Kiamba	Ind. consultant		Kenya/ South Africa
Rose Omari	Science and Technology Policy Research Institute, (SCIR- STEPRI)	Consultant, Capacity Development and Advocacy on Biofortification	Ghana
Yemi Akinbamojo	FARA	Executive Director	Ghana
Dia Sanou	FAO	Nutrition Officer for Eastern Africa	Ethiopia
Margaret Akinyi Wagah	Development Concern International	International Food & Nutrition Security Consultant	Kenya

The CGIAR Research Program on Roots, Tubers and Bananas (RTB) is a partnership collaboration led by the International Potato Center implemented jointly with the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT), the International Institute of Tropical Agriculture (IITA), and the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), that includes a growing number of research and development partners. RTB brings together research on its mandate crops: bananas and plantains, cassava, potato, sweetpotato, yams, and minor roots and tubers, to improve nutrition and food security and foster greater gender equity especially among some of the world's poorest and most vulnerable populations. www.rtb.cgiar.org/

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The CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) is built on the notion that agriculture has the potential to do much more than contribute to basic food and income needs. A4NH is designed to fill the existing gap between agricultural development and its unfulfilled health and nutritional benefits, with research flagships focusing on food systems for healthier diets; biofortification; food safety; supporting policies, programs, and enabling action through research; and improving human health. Headquartered in Washington, DC, USA, A4NH is led by the International Food Policy Research Institute (IFPRI). www.a4nh.cgiar.org

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