



Partnership for Inclusive Agricultural Transformation in Africa, Final Evaluation

Volume II – Technical Appendices for the Final Evaluation Report

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Conflicts of Interest

The Tegemeo Institute of Agricultural Policy and Development is an occasional partner and competitor of AGRA in policy reform work. Tegemeo representatives did not participate in any analysis related to policy and state capability under this evaluation.

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Acronyms

AGRA	Alliance for a Green Revolution in Africa
AGRF	Africa Green Revolution Forum
CAADP	Comprehensive Africa Agriculture Development Programme
DFI	Development Finance Institution
GAP	Good agriculture practices
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
LSMS–ISA	Living Standards Measurement Study-Integrated Surveys on Agriculture
M&E	Monitoring and Evaluation
MSMEs	Micro-, small-, and medium-sized enterprises
NAIP	National Agriculture Investment Plan
PFJ	Planting for Food and Jobs
PIATA	Partnership for Inclusive Agricultural Transformation in Africa
PID	Program Innovations and Delivery
SHF	Smallholder Farmer
SMEs	Small- and Medium-sized Enterprises
ToC	Theory of Change
USAID	United States Agency for International Development
UN	United Nations
VBA	Village-Based Advisor

Appendix A: PIATA Evaluation Questions and Data Sources

Exhibit A.1 provides the full set of 38 evaluation questions for the PIATA evaluation, as well as the research methods the team used to answer these questions. This includes the primary and secondary qualitative and quantitative data sources. Qualitative sources are described in more depth in Appendix D, and quantitative sources are described in more depth in Appendix E.

Exhibit A.1. PIATA evaluation questions and data sources

Domain	Evaluation question	Key data sources
 Policy and State Capability	Policy 1. Is there evidence that AGRA's work on policy has changed how policies are developed and executed in target countries? 2. How successful was AGRA in partnering and collaborating with other actors in creating a conducive policy environment? 3. To what extent has AGRA helped to strengthen government capacity to effectively develop, pass, and implement policies? 4. What evidence suggests that outcomes are sustainable beyond the life of the intervention? State capability 5. How has AGRA's support of state capability affected the ability of government to plan, coordinate, and drive investment? 6. How is the state capability approach supported by AGRA a relevant tool to facilitate and fast track NAIP implementation in focus countries? Are governments buying in to flagships? 7. How effective has AGRA's input into NAIPs and national development plans been in improving government capabilities for planning and strategy? 8. How does AGRA's work affect public investment flow and funding? 9. To what extent have flagships served AGRA's inclusion goals, particularly with respect to women and youth?	• Reports and M&E data • Over 50 semi-structured interviews with AGRA staff, public officials, outside experts, and civil-society representatives • Structured web survey with 51 AGRA direct partners and knowledgeable stakeholders

Domain	Evaluation question	Key data sources
 Partnerships	10. How successful has AGRA been in engaging the private sector as a partner? 11. To what extent are AGRA partnerships supporting scaling business models toward increased investments and toward improving productivity of smallholder farmers? 12. How has AGRA's support of regional and national coalitions and industry associations worked to address bottlenecks in last-mile delivery and cluster development? 13. To what extent has AGRA leveraged public and private investments in the agriculture sector across the 11 focus countries? 14. What has the Agribusiness Deal Room contributed to new partnerships and investments across the continent? 15. What evidence suggests that outcomes are sustainable beyond the life of the intervention? 16. What has been the role and impact of Development Finance Institutions and other innovative financial solutions in de-risking investments in agriculture to MSMEs?	• Reports and M&E data • Over 20 semi-structured interviews with AGRA, private partners, and donors • Structured web survey with 49 AGRA direct partners and knowledgeable stakeholders
 Systems Development	Seed systems 17. What outcomes has AGRA's seeds systems approach created or contributed to? 18. What evidence suggests that outcomes are sustainable beyond the life of the intervention? 19. How could implementation of the seed sector approach have been improved? Input distribution 20. What outcomes have AGRA's input distribution investments created or contributed to? 21. How well did AGRA's interventions in distribution trigger increased farmer access to quality inputs? 22. Are outcomes sustainable outside the life of the intervention? Extension 23. What outcomes has AGRA's extension approach created or contributed to? 24. How well did AGRA's interventions in extension trigger increased farmer access to quality inputs? 25. To what degree did the VBA approach allow for innovation in extension (for example: digital)? 26. Are outcomes sustainable outside the life of the intervention? Consortia 27. How effective has AGRA been in driving integrated approaches to systems development? 28. Have consortia helped increase farmer access to finance and output markets? 29. To what extent have consortia "crowded in" new market actors and investments? 30. What evidence suggests that consortia are sustainable beyond the life of the intervention?	• Reports and M&E data • AGRA Wave 1 and 2 Geopoll telephone survey • Over 75 interviews with consortia members, agro-dealers, seed company staff, off-takers, and VBAs • 12 focus group discussions with farmers • Structured web survey with 161 AGRA direct partners and knowledgeable stakeholders

Domain	Evaluation question	Key data sources
 Farmer outcomes	31. What evidence suggests that AGRA's work has achieved its vision of catalyzing transformation for smallholder households in Africa across its four main objectives and associated business lines? What was the contribution of the full set of PIATA investments to farmer-level outcomes? 32. How is AGRA's work catalyzing technology adoption? 33. Has PIATA helped increased smallholder farmers' access to finance? 34. How is AGRA's work contributing to increasing productivity, food security, and income?	• LSMS-ISA Tanzania, AGRA outcome surveys in Burkina Faso, Ghana, and Nigeria. • Over 50 semi-structured Interviews with AGRA staff, donors, and outside experts • 12 focus group discussions with farmers and over 30 interviews with agro-dealers and VBAs
 Overarching	35. How did interventions work interdependently to achieve outcomes? Which models are most likely to scale and why? 36. Were there any unintended consequences of AGRA's work—either positive or negative? 37. To what extent was AGRA successful in prioritizing inclusion, developing approaches, and achieving outcomes with respect to gender, ethnicity, youth, etc.	• 159 semi-structured interviews with AGRA staff, public officials, outside experts, private sector actors, and grantees

Appendix B: PIATA’s Evaluable Theory of Change

The PIATA evaluable ToC describes how the program is expected to achieve change and identifies external factors that might account for observed changes. Early in our design phase, we conducted an evaluability assessment of PIATA’s ToC, according to the criteria that Davies poses for this process, to determine its suitability for evaluative purposes (Davies 2018; Mayne 2018). We concluded from this assessment that although AGRA had developed a comprehensive ToC that met many evaluability criteria, the evaluation would benefit from refining this initial schematic into a more “evaluable theory of change” by identifying the most salient impact pathways that have emerged over the past four years of implementation. To guide these revisions, we then applied the “ToC model with nested theories of change for multifaceted sufficient interventions” proposed by Mayne as an overall framework for this work (Mayne 2015).

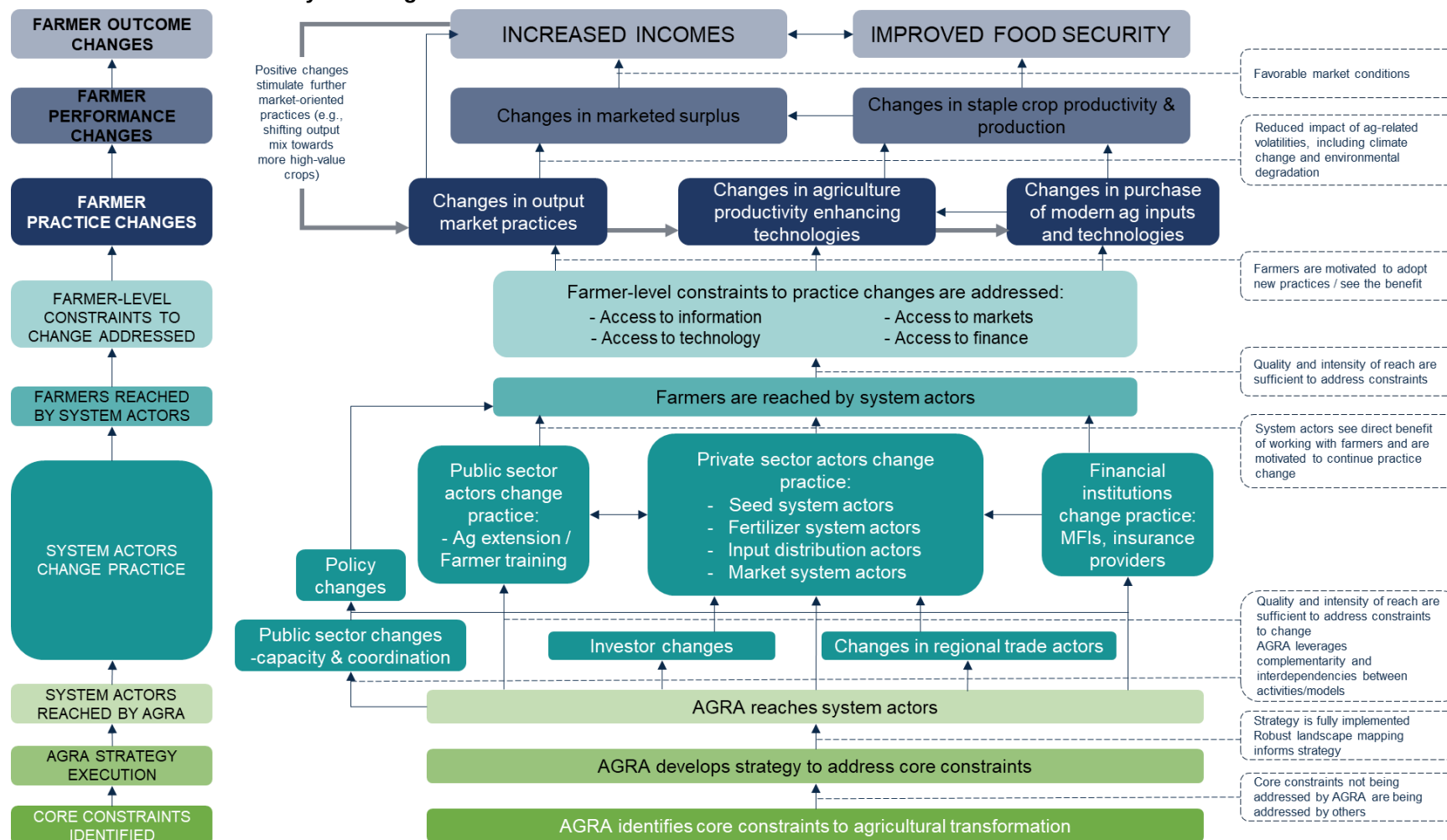
Through a series of workshops, we synthesized AGRA’s activities and results into its essential impact pathways, including:

- Activities undertaken by the program; goods and services produced as direct outputs of such activities
- The reach of these activities on the intended target groups, and their reaction
- Changes in capability, opportunity, or motivation of those reached by the program
- The practice changes that occur among a target group reached
- The direct benefits, or improvements, in the state of an individual after enacting this practice change
- The longer-term improvements that accrued in the overall lives of individuals

We also considered external influences, events, and conditions unrelated to the intervention that could contribute to the realization of desired results, as well as the (positive or negative) unintended consequences of the initiative’s activities. Last, and very important, we included assumptions about the causal links in the impact pathway: the salient events and conditions that must occur for each link in the causal pathway to work as expected.

We began the process for developing the PIATA evaluable ToC by gathering and analyzing several secondary and primary data sources. Secondary sources included program documentation provided by AGRA and externally available sources relevant to the work of AGRA in the 11 focus countries. Primary sources included meetings with the AGRA program team, thematic leads, and regional and country leads. In late May 2021, we validated the evaluable ToC with program stakeholders during a ToC workshop with more than 50 AGRA staff. We will continue to update the ToC as the evaluation is implemented.

The evaluable ToC (Exhibit B.1) can be considered an “overarching theory of change” that describes at a high level how PIATA strategies (as implemented by AGRA) intend to drive agricultural transformation. However, each of PIATA’s main activities/program models (examples: the consortium model, the VBA model, the inclusive finance model) has its own ‘nested’ ToC that provides more detailed information on each step in the impact pathway relevant to that program model, while conceptually aligning to the main steps in the impact pathway of the overarching ToC. These nested ToCs provided the main structure for conducting the contribution analysis.

Exhibit B.1. Evaluable theory of change

To structure the evaluable ToC, we applied the actor-based change framework, an approach to developing a ToC for interventions aimed at catalyzing change in complex systems (Koleros et al. 2019). In this way, the evaluable ToC is centered on farmers as AGRA’s ultimate intended target population, identifying the expected practice changes that the program aims to catalyze among them:

- Changes in farmers’ adoption of agriculture productivity-enhancing technologies
- Changes in the purchase of modern agricultural inputs and technologies
- Changes in their output market practices

These practice changes are intended to lead to farmer-level performance changes in staple crop productivity and production as well as marketed surplus. These changes in farmer-level performance are intended to lead to outcome-level changes in terms of improved food security and increased incomes for farming households.

The ToC posits that farmer-level practice changes come about as a result of farmer-level constraints to change being addressed or alleviated, such as constraints regarding low access to information and technology, poor access to new markets, and lack of access to finance. To alleviate or address these constraints, farmers are reached by other market system actors who provide them with new goods and services that can address these constraints and who find it in their business interest to reach farmers. We used actor-based systems-mapping approaches to identify the relevant actors in the systems in which AGRA intervenes who are intended to reach farmers with these new goods and services. These included the following system actor groups:

- Public-sector actors, including agricultural extension workers
- Private sector actors, including seed system, fertilizer system, input distribution, and market system actors
- Financial institutions, including microfinance institutions and insurance providers
- Public-sector actors, including ministries of agriculture and other coordinating bodies
- Private investors
- Regional trade actors

These system actor groups must therefore change their individual practices to reach farmers with new goods and services that address farmer-level constraints to change. However, these actors also have their own constraints to changing practice that make it unprofitable to serve farmers. This is the point at which AGRA intervenes, reaching these system actors with goods and services that respond to their constraints to change, and ultimately setting them on a pathway to change their practice vis-à-vis farmers. AGRA’s interventions with these groups are based on a careful identification of core constraints to agricultural transformation in the 11 focus countries. Along with partner mapping, AGRA then develops a comprehensive strategy to reach these groups through the program’s primary investment mechanisms: grants, technical assistance, and partnership support.

Some changes in the ToC cannot be addressed solely through a change in practice from system actors, including changes related to socioeconomic factors, agro-ecological conditions, and issues related to population density and market conditions. Therefore, the overall ToC is underpinned by causal link assumptions at each step in the impact pathway. These are also called ‘conditions for success’ in our contribution narratives found in Appendix F.

References for Appendix B

- Davies, R. (2018). Representing Theories Of Change: A Technical Challenge With Evaluation Consequences. CEDIL Inception Paper 15. London.
- Koleros, A. “Long-Term Perspectives in Evaluation: Increasing Relevance and Utility.” In *Using a Wide Lens to Take a Long View: How Integrating Systems Thinking into a Short-Term Evaluation Can Help Answer Long-Term Evaluation Questions*, edited by K. Forss, I. Lidkvist, and M. McGillivray. New York: Routledge, 2020.
- Mayne, J. (2015). "Useful Theory of Change Models." Canadian Journal of Program Evaluation 30(2): 119-142. Available at http://cjpe.journalhosting.ucalgary.ca/cjpe/index.php/cjpe/article/view/230/pdf_38
- Mayne, J. (2018). Developing Useful Theories of Change, Evergreen Briefing Note. Available at https://http://www.researchgate.net/publication/323868372_Developing_and_Using_Useful_ToCs

Appendix C: Structured Web Survey and Contribution Scoring

In June 2021, we sent a structured web survey to 1,496 stakeholders and grantees that collaborated with AGRA from 2017 to 2021. The survey asked respondents about constraints their organization faces, their perception of changes in those constraints, and AGRA's role in addressing them. The survey also asked stakeholders about their general perceptions of AGRA and its contributions to state capability, private investment, extension, market integration, and other key outcomes. We also asked grantees, as well as organizations receiving financial and technical assistance directly from AGRA, more specific questions about their experience with AGRA's support.

We received a total of 315 responses to the structured web survey, for a response rate of 21 percent. Of those who responded, 215 (68 percent) represented organizations that currently receive AGRA grants or have in the past. (For context, AGRA made 530 grants from 2017 to 2021 across all thematic areas.) Exhibit C.1 below provides more detail on the number of respondents by organization type and the number of respondents by AGRA's countries of operation.

Exhibit C.1. Structured web survey respondents by organization type and country

Country of operations	Organization type											
	Private sector		Government		NGO/ advocacy		Research		Other		Total	
	Grantees	All	Grantees	All	Grantees	All	Grantees	All	Grantees	All	Grantees	All
Burkina Faso	11	19	14	18	9	15	1	3	2	5	37	60
Ethiopia	5	18	5	7	19	25	1	2	1	4	31	56
Ghana	16	31	10	12	13	18	2	3	1	2	42	68
Kenya	7	27	5	7	17	24	4	6	2	5	35	69
Malawi	8	14	1	3	10	14	2	3	1	3	22	37
Mali	5	11	0	1	4	10	1	2	1	3	11	27
Mozambique	7	16	1	2	10	14	5	6	1	2	23	40
Nigeria	10	23	7	11	10	17	1	3	1	2	28	56
Rwanda	10	25	2	3	9	15	5	6	1	3	27	52
Tanzania	12	27	1	2	17	23	3	4	1	4	34	60
Uganda	3	17	2	3	11	15	1	3	1	3	20	41
Regional/other	14	23	3	4	7	7	1	3	1	4	26	41
Total	71	122	58	75	59	76	19	24	8	18	215	315

Notes: NGO = Non-governmental organization. Private sector respondents include agro-dealers, extension services, importers/exporters, input producers, and other agri-businesses. Other respondents include donors/funders, farmers' or breeders' collectives or cooperatives, and independent consultants. Respondents were able to select more than one country in which their organization operates. As a result, totals across countries are greater than the total number of respondents to the survey.

The research team used structured web survey responses to calculate contribution scores for PIATA Phase 2 investments. Contribution scores capture the extent to which PIATA stakeholders reported a positive trend in key agriculture outcomes since 2017 and attributed this positive trend to AGRA's work. We used several survey questions to calculate contribution scores. First, the survey asked respondents to identify

the thematic area(s) with which they were most familiar: policy and state capability, systems development, and/or partnerships. For those thematic areas with which respondents were most familiar, they were asked to indicate to what extent they agreed/disagreed that key outcomes had improved or increased in their country since 2017. Examples of these key outcomes include private investment in agriculture in the case of partnerships, public capability to drive agriculture programming in the case of policy and state capability, and farmer access to extension and markets in the case of systems development. Respondents could select from the following six options: strongly agree, somewhat agree, neither agree or disagree, somewhat disagree, strongly disagree, or don't know/prefer not to say.

When respondents reported that they strongly agreed or somewhat agreed that a positive change had occurred since 2017, they were then asked to rate AGRA's responsibility for the change on a scale of 1 to 5 [1 = AGRA is not responsible, 2 = AGRA has some responsibility, 3 = AGRA is partly responsible, 4 = AGRA has a lot of responsibility, 5 = AGRA fully responsible, or Don't know/prefer not to say]. Exhibit C.2 summarizes how we converted responses into contribution scores ranging from 0 to 8.

Exhibit C.2. Contribution scoring matrix

		AGRA's responsibility for change				
		5 (AGRA fully responsible)	4 (AGRA has a lot of responsibility)	3 (AGRA is partly responsible)	2 (AGRA has some responsibility)	1 (AGRA not responsible)
Outcome change	Strongly agree	8	6	4	2	0
	Somewhat agree	7	5	3	1	0
	Neither	0	0	0	0	0
	Somewhat disagree	0	0	0	0	0
	Strongly disagree	0	0	0	0	0

Once contribution scores were computed for each outcome in each thematic area among all respondents, we calculated the average contribution score for each outcome within each thematic area, as well as the minimum and maximum scores reported by respondents. Next, we sorted average contribution scores into four categories: (1) Average contribution scores of 0 indicate *no positive change or little AGRA contribution* to change; (2) average scores greater than 0 and up to 2 indicate a *small AGRA contribution* to positive change; (3) average scores greater than 2 and up to 4 indicate a *moderate AGRA contribution* to positive change; and (4) average scores above 4 indicate a *large AGRA contribution* to positive change.

In Volume 1 and Appendix F, these contribution score results are presented by two groups of respondents: (1) AGRA grantees and other direct partners and (2) other survey respondents who did not directly partner with AGRA.

Appendix D: Qualitative Data Collection and Analysis Methods

Qualitative data collection

To inform our performance evaluation and case studies, in June, July, and August 2021 we conducted a total of 159 semi-structured interviews and focus group discussions (FGDs) with respondents across all of AGRA’s countries of operations. Each conversation lasted 60 to 90 minutes. We developed a separate interview protocol for each topic or type of respondent, but in general we asked respondents about their work and their relationship with AGRA or its partners; how AGRA influenced their work or organization; their challenges and successes; and outcomes for system actors and farmers. Below is more detail on the focus of interviews with different stakeholders:

- Interviews with **AGRA country managers** focused on high-level activities and results in Phase 2, as well as relationships between investments in various countries. In contrast, interviews with other **AGRA leadership and technical staff** focused on case study topics, including VBAs, consortia, flagships, and partnerships.
- Interviews with **consortium partners** explored the origins of consortia and each partner’s role, as well as the partners’ experience with implementation and perspective on farmer outcomes.
- Interviews with **private sector representatives** explored AGRA’s effect on private investment and agricultural transformation through policy reforms, the Deal Room, and partnerships, among other investments.
- Interviews with **public officials** focused in depth on policy and state capability topics, including micro-reforms, NAIPs, and flagships.
- Discussions with **sector experts** focused on their perception of AGRA’s assessment of market constraints and opportunities, as well as the appropriateness of AGRA’s response to them.
- Interviews with **VBAs** focused on their training and outreach to farmers, their participation in input and output markets, and their financial incentives to continue VBA activities.
- In interviews with **SME representatives**, we explored whether and how they had expanded operations and outreach to farmers, and the extent to which these efforts were profitable.
- In focus groups with **farmers**, we asked about their experience with extension agents, VBAs, agro-dealers, and other SMEs; their use of good agricultural practices and improved inputs; and their yields, sales, and household well-being in recent years.

We conducted 38 interviews with AGRA staff and 109 with other AGRA stakeholders, which included consortia members, private sector partners, public officials, sector experts, VBAs, and SME representatives. We also conducted 12 FGDs with farmers in five countries, with each focus group including between 5 and 15 participants. In Exhibit D.1, we provide an overview of the number of AGRA staff and stakeholders interviewed by type of respondent.

Exhibit D.1. Qualitative interviews and FGDs by respondent type

Respondent type	Total
AGRA country managers	11
Other AGRA technical staff and leadership	27

Respondent type	Total
Consortium partners/grantees	26
Private sector representatives (including investors and corporate representatives)	11
Public officials	14
Sector experts	9
VBAs	18
SMEs (agro-dealers, processors, off-takers, seed companies)	31
Farmer focus group discussions (5–15 farmers apiece)	12
Total	159

Notes: FGD = focus group discussion; SME = small and medium enterprise; VBA = village-based advisor.

Although we conducted interviews with AGRA staff and most types of stakeholders (consortia members, private sector partners, public-sector partners, and experts) in all 11 AGRA countries, only a subset of countries (Ethiopia, Ghana, Kenya, Mozambique, and Tanzania) was selected for farmer FGDs and interviews with SMEs, VBAs, and additional consortia members. These are considered the five “deep dive” countries for qualitative data collection. The number of interviews conducted in each country is shown in Exhibit D.2, which disaggregates the number of AGRA and other stakeholder interviews by country.

Exhibit D.2. Qualitative interviews and FGDs by country

Country	Number of interviews and focus groups		
	AGRA staff	Other stakeholders	Total
Burkina Faso	1	4	5
Ethiopia	2	18	20
Ghana	7	32	39
Kenya	5	21	26
Malawi	1	3	4
Mali	2	2	4
Mozambique	6	13	19
Nigeria	2	3	5
Rwanda	1	5	6
Tanzania	4	14	18
Uganda	1	3	4
Multi-country	6	3	9
Total	38	121	159

Note: Deep-dive countries are shaded in gray.

We conducted four in-depth case studies for the evaluation, which featured data collection in the five ‘deep dive’ countries discussed above. Case studies fulfilled two key objectives. First, they helped us document and assess implementation of AGRA’s centerpiece activities and models in each of the three thematic areas and across various country contexts. Second, case studies provided an opportunity to gather the perspectives of a wider group of stakeholders on PIATA’s contribution to achieving key outcomes, as outlined in the evaluable ToC. Interpreted in tandem with our rigorous analyses, these perspectives provided critical information to developing defensible contribution narratives.

The first case study focused on flagships—PIATA’s signature engagement in the policy and state capability body of work—in Ghana, Kenya, and Mozambique. The second case study focused on consortia arrangements in the systems development body of work, which provided integrated support to boost farmers’ productivity and market access. For this, we drew on data from Ethiopia, Ghana, Mozambique, and Tanzania. We also conducted a case study on the VBA model within the systems development body of work, drawing from the experience of Ghana, Kenya, Mozambique, and Tanzania. The fourth case study focused on partnerships for last-mile delivery in Ghana, Kenya, and Tanzania, with a focus on mechanization and digital investments (see Exhibit D.3 for countries covered in each case study).

We selected these case studies based on four selection criteria that were co-developed with PIATA resource partners and AGRA staff: (1) alignment with research questions, (2) representation of major investments, (3) potential to inform decision-making, and (4) opportunity for rigorous analysis. We gathered information on each of these selection criteria using an online survey of 54 key stakeholders, including PIATA representatives and AGRA leadership. After selecting the case study topics, we used online survey responses to choose five countries that represented a range of experiences and outcomes on these topics—including success stories, mixed successes, and challenging cases (Exhibit D.3). Further, these countries provide representation from each of the three regions (East, West, and Southern Africa), as well as representation among “push” countries (with an extension focus) and “pull” countries (with a market focus). Therefore, the case studies captured much of the range in performance, regional variation, and strategic distinctions in AGRA’s highly heterogeneous country portfolio.

Exhibit D.3. Countries selected for case studies

Countries ¹	Ethiopia	Ghana	Kenya	Mozambique	Tanzania
Push/pull country	Push	Push	Pull	Push	Push
Region	Eastern	Western	Eastern	Southern	Eastern
Flagships. An analysis of AGRA’s input into and support of flagship programs in various country contexts, including best practices in leveraging public funds and building public capacity.	<i>Few mentions</i> ²	Most-cited successful country ²	Third-most-cited successful country ²	Fourth-most-cited challenging country ²	<i>Few mentions</i> ²
Consortia. An analysis of the extent to which the multiple supports of consortia meet farmers’ binding constraints to enhanced production and sales, thus improving their income and resilience.	<i>Few mentions</i> ² (\$6.8M) ³	Second-most-cited successful country ² (\$0.7M) ³	<i>Few mentions</i> ² (\$0) ³	Most-cited challenging country ² (\$8.8M) ³	Most-cited successful country ² (\$2.5M) ³
Village-based advisors (VBAs). An analysis of the extent to which VBAs fulfill their potential as change agents in providing farmers with seeds, fertilizer, and training, as well as facilitating access to output markets.	<i>Few mentions</i> ²	<i>Few mentions</i> ²	Most-cited successful country ²	Second-most-cited successful country (tied with Tanzania) ²	Second-most-cited successful country (tied with Mozambique) ²
Partnerships for last-mile delivery. Documenting last-mile delivery partnerships, with an emphasis on digital services and mechanization.	<i>Few mentions</i>	<i>Few mentions</i>	<i>Few mentions</i>	<i>Few mentions</i>	<i>Few mentions</i>

¹Shaded cells denote countries that will be included in each case study.

²Based on online survey of 54 AGRA and resource partner staff.

³AGRA's investment in consortia in each country, according to AGRA presentation PID updates – Impact Assessments. May 2021.

Each case study also represents a distinct, critical pathway in PIATA's evaluable ToC. In the flagships case study, we assessed whether AGRA helped leverage large infusions of public, private, and donor funding for agriculture, as well as whether AGRA's support altered the capacity of public authorities to drive agriculture programs. The case studies of the consortium model, VBAs, and partnerships for last-mile delivery focused on whether investments in regional and local authorities, SMEs, VBAs, and financial institutions—coupled with strategic partnerships with off-takers and other private partners—have altered these actors' behavior in a way that strengthens market linkages and catalyzes farmer adoption. The impact pathways of all four case studies converged at the same point in AGRA's ToC: the mitigation of smallholder farmers' constraints to enhanced production and sales. Therefore, the full set of case studies gave us insight into whether AGRA has successfully unlocked farmers' constraints through policy, partnerships, and systems development efforts, as envisioned.

Qualitative data analysis

Once data collection was complete, we conducted thematic coding of all qualitative transcripts. We first organized transcript passages into 'chunks' of information—between 1-4 sentences that conveyed a discrete set of ideas or perspectives. We organized these information chunks by country and thematic area (partnerships, seed systems, extension, etc.) using Excel. Next, we sorted the information chunks into topics within each thematic area—for example, each information chunk related to seed systems was placed into the most appropriate Excel column of the following: (a) What AGRA supported, (b) What went well, (c) What didn't go well, (d) How AGRA influenced system actors, (e) How system actors influenced farmers, and (f) Profitability and sustainability. Next, we identified common themes in the information chunks by country, thematic area, and topic, and composed a country summary for each of AGRA's 11 focus countries. The summaries contained key comparisons between actor types as well as verbatim quotes that exemplified common themes. Finally, we synthesized country-level findings into a condensed set of portfolio findings across all 11 countries. Only themes that emerged across at least 3 focus countries were elevated to this set of portfolio findings.

Appendix E. Quantitative Data, Empirical Approach, and Results

To complement the qualitative assessment and to understand the effects of PIATA on a host of farmer-level outcomes, we leveraged available administrative and previously collected survey data, and four different empirical approaches.

1. We first relied on national-level administrative data from ministries of agriculture in Ghana and Tanzania to shed light on PIATA’s impact on country-level agricultural performance.
2. We then used official subnational statistics from Ethiopia, Ghana, and Kenya to evaluate the incremental impact of PIATA’s regionally targeted farmer-facing interventions on agricultural productivity. We also repeated these analyses in Tanzania using multiple waves of the Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS–ISA), which allowed us to assess impacts on farmer-level adoption of improved inputs and engagement with extension services.
3. Next, we used farmer-level data from the latest round of the AGRA outcome survey to assess impacts on farmers who previously engaged with AGRA. In particular, we focused on three PIATA focus countries (Burkina Faso, Ghana, and Nigeria) where data on non-targeted comparison farmers were also collected.
4. Finally, we used data from all seven PIATA-focus countries to assess the extent to which key outcomes of interest improved for farmers who ultimately adopted improved inputs and engaged with extension services. In so doing, we looked to understand whether the use of improved inputs and engagement with extension—central pillars of PIATA’s farmer-facing strategy—has the potential to drive farmer-level outcomes if uptake is sufficiently high.

In this appendix, we present the data, empirical approach, and results associated with each of these four methods.

1. Assessing the impact of PIATA’s national-level interventions

We used interrupted time-series (ITS) analysis to assess the extent to which key milestones in the roll-out of PIATA in selected countries are associated with changes in national-level agricultural performance. The goal of this analysis was to leverage longer-term data to formally evaluate whether the roll-out of PIATA’s in-country strategy and interventions resulted in an increase or decrease in the level and the rate of change of agricultural production and productivity in selected countries.

Data

For Ghana, we used data on annual national-level maize and rice yield (in metric tons per hectare [MT/ha]) for the period 2000–2020 from Ghana’s Ministry of Agriculture. Similar statistics on maize and rice productivity were unavailable in the Tanzanian context. For this reason, for Tanzania, our analyses relied on data on annual total production of maize and rice (in thousand MT) for the period 1985–2019.

Empirical approach

To conduct the ITS analysis, we estimated the specification in Exhibit E.1:

Exhibit E.1. Specification for ITS analysis

$$y_t = \beta_0 + \beta_1 T_{2008} + \beta_2 P_{2008} + \beta_3 P_{2008} T_{2008} + \beta_4 P_{2017} + \beta_5 P_{2017} T_{2017} + \epsilon_t$$

where y_t is the value of the outcome of interest in year t ; T_{2008} and T_{2017} indicate the difference in the number of years between 2008 (start of PIATA Phase 1) and 2017 (start of PIATA Phase 2), respectively, and the year t ; P_{2008} and P_{2017} are binary variables that equal 1 for all years greater than 2008 or 2017, respectively; and ϵ_t is a normally distributed error term. Our coefficients of interest are β_2 and β_3 (which indicate the impacts on the level and rate of change, respectively, of the outcome that occur following the launch of Phase 1), and β_4 and β_5 (which indicate the impacts on the level and rate of change, respectively, of the outcome that occurs following the launch of Phase 2). To account for correlation between past and present values of the outcome variable, we estimated the equation in Exhibit E.1 using Prais–Winsten estimation (Prais and Winsten 1954).

Results

Exhibit E.2 summarizes the results of the ITS analysis for maize and rice yield in Ghana. This figure shows that the launch of Phase 2 of PIATA in 2017 was associated with an increase in the level as well as growth rate of maize yield while that of Phase 1 in 2008 had no detectable impact. National rice yield in Ghana, in contrast, jumped sharply following the launch of Phase 1 but did not exhibit any detectable changes following the launch of Phase 2.

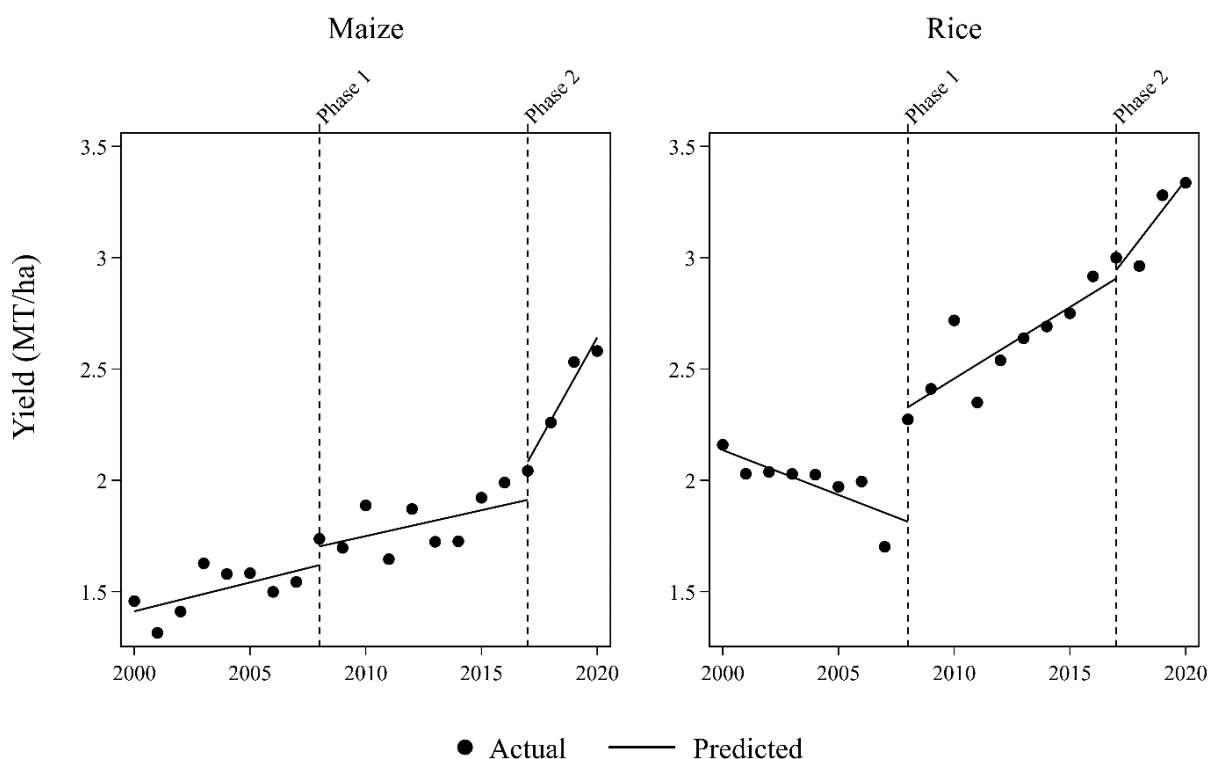
Exhibit E.2. Actual and model-predicted maize and rice yield in Ghana between 2000 and 2020

Exhibit E.3 summarizes the results of the ITS analysis for maize and rice production in Tanzania. This figure shows that, in the case of both crops, the growth rate of production increased sharply following the launch of Phase 1, while Phase 2 appeared to have been associated with a production downturn. Exhibit E.4 presents the full estimation results.

Exhibit E.3: Actual and model-predicted maize and rice production in Tanzania between 1985 and 2019

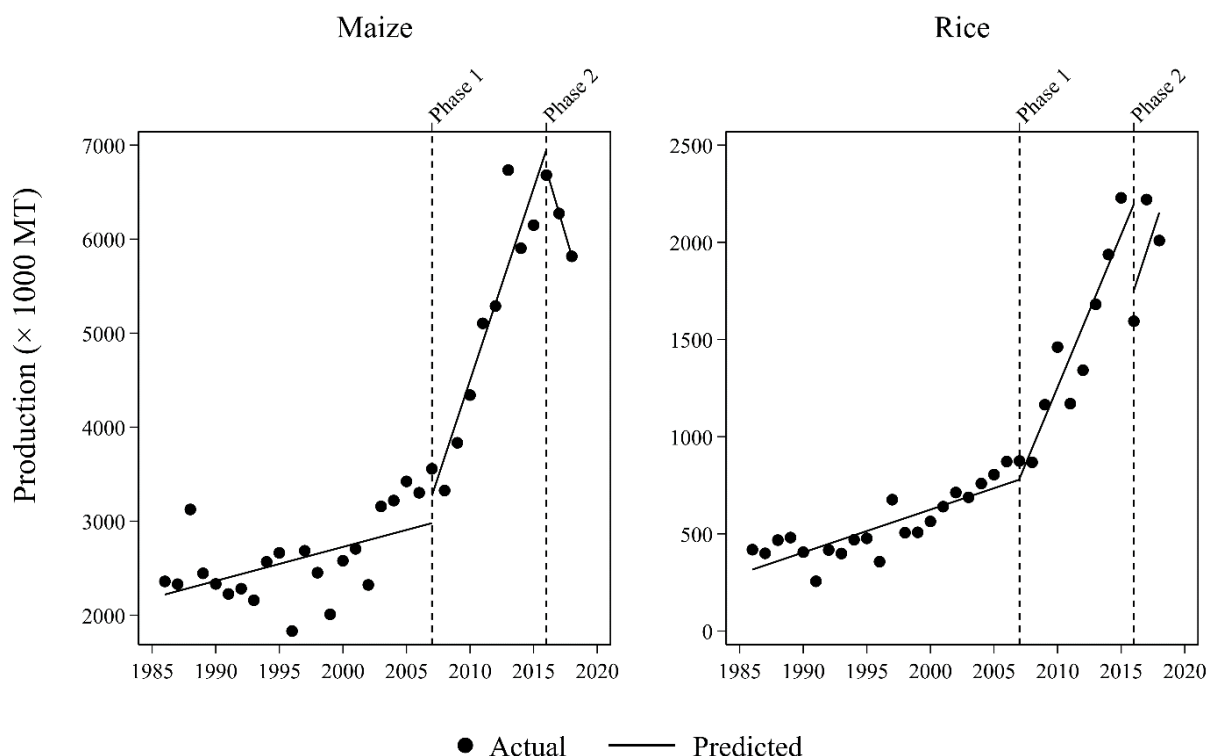


Exhibit E.4. Assessing impacts on national maize and rice performance in Ghana and Tanzania using ITS

	Ghana		Tanzania	
	(1) Maize yield (MT/ha)	(2) Rice yield (MT/ha)	(3) Maize production ('000 MT)	(4) Rice production ('000 MT)
T_{2008}	0.026*	-0.040**	36.1**	22.0***
	(0.013)	(0.014)	(16.4)	(4.49)
P_{2008}	0.084	0.51***	292.7	4.50
	(0.082)	(0.089)	(335.2)	(96.4)

	Ghana		Tanzania	
	(1) Maize yield (MT/ha)	(2) Rice yield (MT/ha)	(3) Maize production ('000 MT)	(4) Rice production ('000 MT)
$P_{2008} \times T_{2008}$	-0.0027 (0.016)	0.10*** (0.017)	372.5*** (59.7)	134.9*** (16.9)
P_{2017}	0.17* (0.095)	0.038 (0.10)	-211.5 (475.5)	-442.5*** (153.6)
$P_{2017} \times T_{2017}$	0.16*** (0.040)	0.071 (0.044)	-868.0*** (291.0)	42.8 (95.5)
Constant	1.41*** (0.052)	2.14*** (0.057)	2220.0*** (192.8)	316.4*** (52.3)
N	21	21	33	33
Adj. R-sq.	0.95	0.97	0.91	0.95

Notes: ***, **, and * indicate significance at the 1, 5, and 10 percent critical level, respectively. All models use Prais–Winsten estimation to account for serial correlation of type AR(1).

2. Assessing impact of PIATA's farmer-facing interventions

To assess the incremental impact of PIATA's farmer-facing interventions on input use and crop productivity, we relied on a dynamic difference-in-differences (DID) design. Specifically, by combining programmatic information on the spatial targeting of PIATA's farmer-facing interventions with administrative subnational/survey data on farmer-level outcomes, we sought to shed light on the extent to which areas selected for the roll-out of farmer-facing initiatives experienced differential outcomes relative to areas that benefited only from PIATA's national-level strategy.

Data

Exhibit E.5 provides an overview of the data sets we used to evaluate the incremental impact of AGRA's farmer-facing interventions in four countries. In addition to providing an overview of the basic structure of the data, this table also describes how we identified relevant areas of the country that received farmer-facing interventions during the two phases of PIATA and indicates whether restructuring of administrative boundaries was needed to allow us to study consistent regional units over time.

Exhibit E.5. Overview of data used for assessing subnational impact of farmer-facing interventions

Country	Ethiopia	Ghana	Kenya	Tanzania
Outcome variable(s)	Panel data on annual region-level maize yield for the period 2016–2020 for 10 regions. Source: Derived from region-level data on area under maize cultivation and total maize production provided in Agricultural Sample Survey reports produced by the Central Statistical Agency.	Panel data on annual district-level maize yield for the period 2000–2019 for 105 districts. Source: Statistics Research & Information Directorate, Ministry of Food and Agriculture.	Panel data on annual county-level maize yield for the period 2012–2018. Source: Derived from county-level data on area under maize cultivation and total maize production available in the Ministry of Agriculture, Livestock, Fisheries and Co-operatives' Kilimo Open Data portal.	Repeated cross-sectional data on household-level input use (purchase of improved seeds and use of inorganic fertilizer), engagement with extension services, and self-reported maize yield for the years 2008, 2010, 2012, 2014, and 2019. Source: Tanzania National Panel Survey via the Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS–ISA).
Other data	–	Mean district-level monthly precipitation for the period 2000–2019. Source: Derived from the Climate Hazards group Infrared Precipitation with Stations (CHIRPS) data set v2.0 using the GIS shapefile for district-level boundaries of Ghana in the year 2000 made available by IPUMS-International.	–	–
Identification of targeted areas	Regions targeted under Phase 1 identified using list of Phase 1 farmer-facing interventions provided by AGRA; regions targeted under Phase 2 identified using AGRA's Ethiopia Operational Plan.	Districts targeted under Phase 1 identified using list of Phase 1 farmer-facing interventions provided by AGRA; districts targeted under Phase 2 identified using list of all active VBAs in the country provided by AGRA.	Counties targeted under Phase 1 identified using list of Phase 1 farmer-facing interventions provided by AGRA; counties targeted under Phase 2 identified using list of all active VBAs in the country provided by AGRA.	Districts targeted under Phase 1 identified using list of Phase 1 farmer-facing interventions provided by AGRA; districts targeted under Phase 2 identified using list of all active VBAs in the country provided by AGRA.

Country	Ethiopia	Ghana	Kenya	Tanzania
Administrative boundary adjustment required?	Yes – administrative boundaries of newly created Sidama region adjusted to pre-2020 boundaries.	Yes – administrative boundaries in later years readjusted to resemble those existing in the year 2000.	No	Yes – administrative boundaries in later years readjusted to resemble those existing in the year 2008.

Empirical approach

To conduct the DID analysis, we estimated the basic equation in Exhibit E.6:

Exhibit E.6. Specification for DID analysis

$$y_{irt} = \sum_{j=T}^{J-1} [\beta_{1,j} \times Phase_{1,i} \times 1(year = j) + \beta_{2,j} \times Phase_{2,i} \times 1(year = j)] \\ + \sum_{k=J+1}^{T'} [\beta_{3,k} \times Phase_{1,i} \times 1(year = k) + \beta_{4,k} \times Phase_{2,i} \times 1(year = k)] + \gamma_i + \gamma_{rt} \\ + \epsilon_{irt}$$

where y_{irt} is the value of the outcome variable of interest in the second-level subnational administrative unit i (“district”) within the first-level subnational administrative unit r (“region”) in year t ; $Phase_{1,i}$ and $Phase_{2,i}$ are binary variables that equal one if district i received a farmer-facing intervention in Phase 1 of PIATA only or during Phase 2, respectively, and zero otherwise; $1(year = j)$ and $1(year = k)$ represent year-specific binary variables for each year in the data; γ_i and γ_{rt} are district and region-by-year fixed effects; and ϵ_{irt} is a normally distributed error term. We cluster standard errors at the region level, and weight each district–year observation by the total district area or the area under cultivation of the relevant crop based on data availability.¹

Note that the first and last year in our analyses (represented by T and T' , respectively, where $T < T'$) varied depending on the country (data for Ghana, for instance, covered the period 2000–2019 while those for Kenya covered 2012–2018). Similarly, the year-specific binary variable that we omitted to avoid perfect multicollinearity (represented by J) also varied by country. Specifically, when data covering the period prior to the launch of Phase 1 were available for any given country, we omitted the binary variable for the year 2007, effectively rescaling our estimates relative to the year immediately before the launch of AGRA’s in-country work. If this was not the case, we omitted the binary variable for the earliest available year.

Our coefficients of interest correspond to the series represented by $\beta_{2,j}$ and $\beta_{4,k}$, which indicate the impacts on yields—before and after the launch of Phase 2, respectively—in areas of the country in question that received farmer-facing interventions before as part of Phase 2. Null results associated with the series of coefficients represented by $\beta_{2,j}$ (that is, no detectable differences in yield trends between targeted and comparison areas prior to the launch of farmer-facing interventions in the former) would help us partially validate the parallel pre-trends assumption that is crucial to such an analysis. That said, data limitations (such as non-availability of data prior to the launch of AGRA’s work) can constrain our ability to estimate these results.

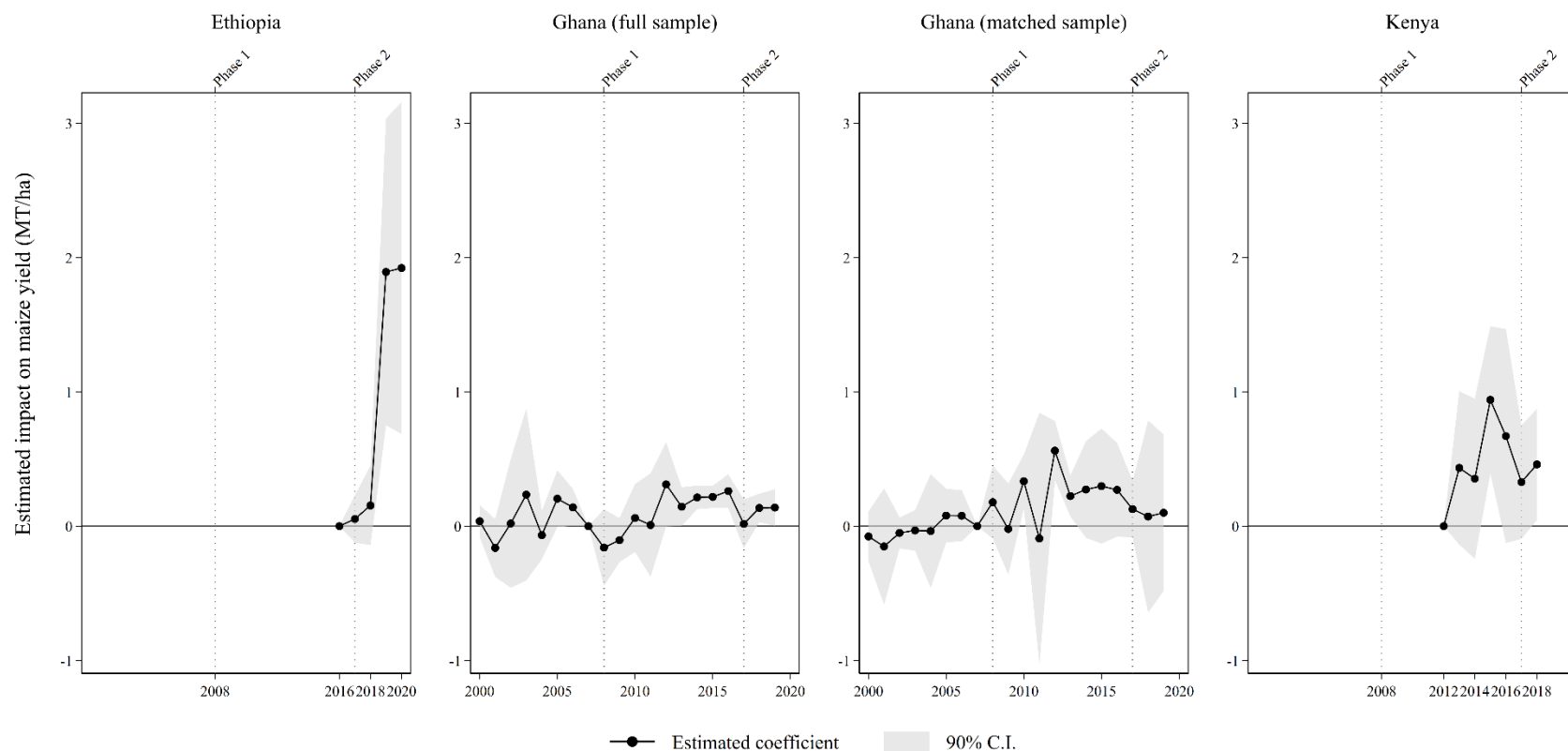
¹ Variation in the structure of the data for different countries led to minor changes in the empirical specification we estimated. For instance, the data for Ethiopia were available only for first-level subnational administrative units (“regions”). For this reason, for Ethiopia, we conducted our analyses at the region level using a slightly modified version of Exhibit E.6) that included year fixed effects instead of region-by-year fixed effects. Similarly, data for Tanzania were available at the household level. Accordingly, we conducted our analyses at the household level, included fixed effects to account for households’ rural status, and weighted each household–year observation by the corresponding LSMS–ISA household-level sampling weight.

Note that as outlined in Exhibit E.5, for Ghana, in addition to historical data on district-level yield, we also had data available on historical precipitation trends for the 2000–2019 period. This allowed us to repeat the analysis outlined in Exhibit E.6 with a matched sample of districts. Specifically, we used propensity scores to match each district that received farmer-facing interventions in Phase 2 with a “pure” comparison district that never received farmer-facing interventions. We matched these districts based on their maize yield and their monthly precipitation in the five-year period prior to the launch of AGRA’s work in the country (that is, 2003–2007). This ensured that districts remaining in the analytical sample had initially similar agricultural productivity levels and agroecological conditions, thereby improving our ability to attribute any subsequent differences in outcomes to AGRA’s work.

Results

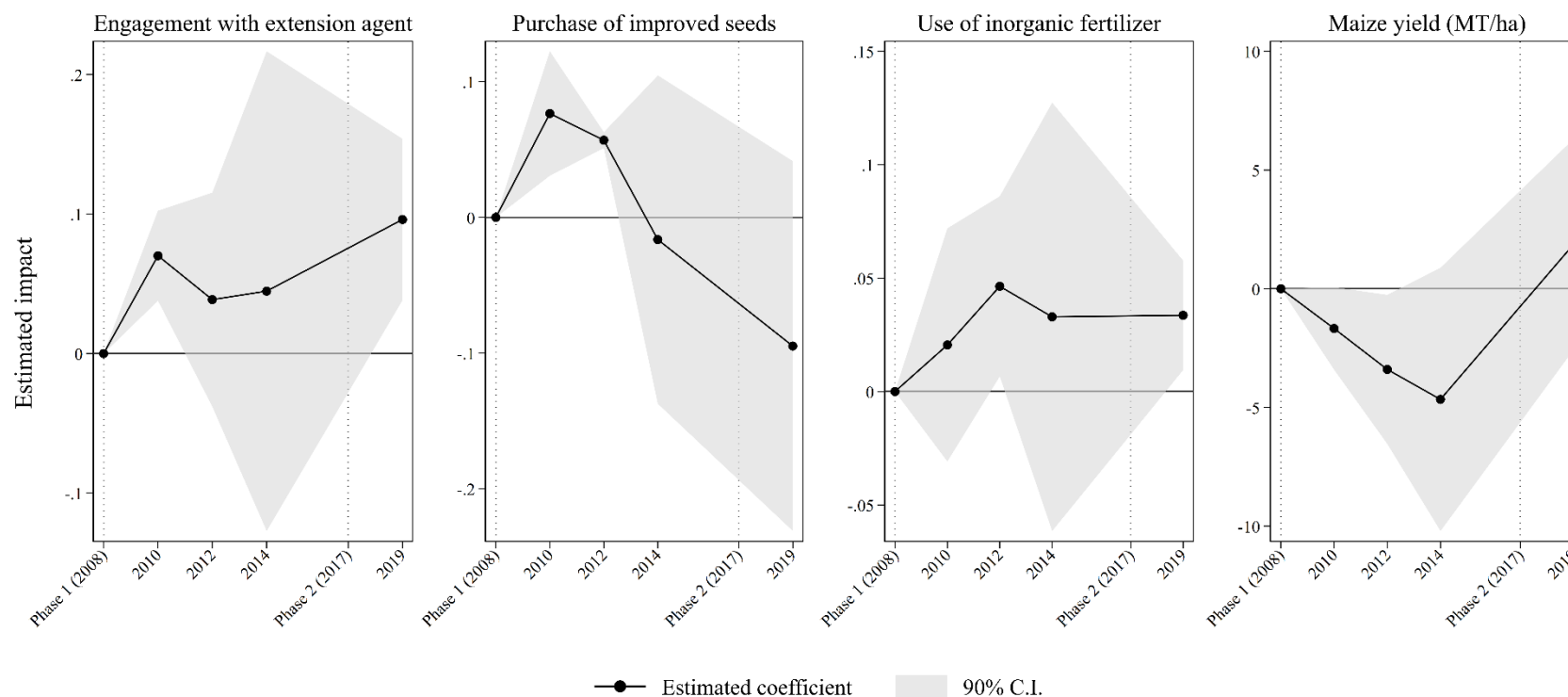
Exhibit E.7 presents results from estimating specifications corresponding to Exhibit E.6 to evaluate the impact of AGRA’s regionally targeted farmer-facing interventions on maize yields in Ethiopia, Ghana, and Kenya. This figure shows that the launch of Phase 2 increased maize yields increased by about 2 MT/ha in regions of Ethiopia targeted by AGRA, representing a 60 percent increase relative to the pre-Phase 2 mean level in non-targeted regions. In districts of Ghana and counties of Kenya targeted by AGRA’s farmer-facing interventions, however, maize yields appear to have already been elevated near the end of Phase 1. This limits our ability to ascribe any differences observed during Phase 2 to AGRA’s work. Note also that country-level differences in the temporal coverage of data available also limits our ability to study regional trends more thoroughly in some countries. For Ghana, for instance, we can verify that maize yields in districts that ultimately received farmer-facing interventions during Phase 2 were trending similarly to those that did not between 2000 and 2006, that is, before the launch of any of AGRA’s work in the country. In Ethiopia, on the other hand, regionally disaggregated data on maize yields are unavailable before 2016, which makes such a check infeasible.

Exhibit E.8 presents results from estimating specifications corresponding to the equation in Exhibit E.6 to evaluate the impact of AGRA’s regionally targeted farmer-facing interventions on a series of outcomes across the farmer impact pathway in Tanzania. Our data consist of a farmer-level repeated cross-section created using multiple survey waves of the Tanzania LSMS-ISA. We find that farmers in districts of Tanzania selected for the roll-out of farmer-facing interventions during Phase 2 had partially elevated rates of engagement with extension agents, purchase of improved seeds, and use of inorganic fertilizer prior to the launch of Phase 2. As before, this limits our ability to ascribe any subsequent differences observed during Phase 2 to AGRA’s work. In addition, we find no difference in reported maize yields between farmers in targeted districts and those in other parts of the country.

Exhibit E.7. Trends in maize yield in areas targeted by farmer-facing interventions during Phase 2 in Ethiopia, Ghana, and Kenya

Notes: Each point plots the corresponding $\beta_{2,j}$ and $\beta_{4,k}$ coefficients (that is, the year-by-year impact in the relevant country's counties/districts/regions where farmer-facing interventions were carried out during Phase 2). Shaded area represents the 90 percent confidence interval associated with each estimated coefficient. Analyses for Ethiopia include region and year fixed effects. Analyses for Ghana include region–year and district fixed effects. Analyses for Kenya include province–year and county fixed effects. Based on data availability, analyses weighted by gross area or the area under maize cultivation in the relevant county/district/region. Standard errors clustered at the region level for Ethiopia and Ghana and at the province level for Kenya. Data sources indicated in Exhibit E.5. Analytical sample sizes equal 50 (Ethiopia), 2,078 (Ghana – full sample), 356 (Ghana – matched sample), and 319 (Kenya).

Exhibit E.8: Trends in access to extension, use of improved inputs, and maize yield in areas targeted by farmer-facing interventions during Phase 2 in Tanzania



Notes: Each point plots the corresponding $\beta_{2,j}$ and $\beta_{4,k}$ coefficients (that is, the year-by-year impact in Tanzania's districts where farmer-facing interventions were carried out during Phase 2). Shaded area represents the 90 percent confidence interval associated with each estimated coefficient. All models include region-year fixed effects, district fixed effects and rural household fixed effects. Households weighted by year-specific sampling weight. Standard errors clustered at the region level. Data sources indicated in Exhibit E.5. Analytical sample sizes equal 11,957 (Engagement with extension agent), 14,525 (Purchase of improved seeds), 10,712 (Use of inorganic fertilizer), and 3,517 (Maize yield).

3. Assessing PIATA's impacts on targeted farmers

To assess the direct impact of PIATA's farmer-facing interventions on input use, crop productivity, and farmer-welfare outcomes, we relied on a matched-comparison approach that leveraged farmer-level data collected by AGRA in three countries: Burkina Faso, Ghana, and Nigeria. Specifically, the goal of this analysis was to evaluate impacts on farmers that directly engaged with the farmer-facing interventions rolled out as part of Phase 2 of PIATA relative to a subsample of comparison farmers that did not have any such engagement.

Data

Our data come from the 2020 round of the AGRA outcome survey. AGRA conducted this survey in seven of PIATA's 11 focus countries. However, they collected data on a sample of potential comparison farmers (that is, those that had had no prior engagement with AGRA) only in three countries: Burkina Faso, Ghana, and Nigeria. These data provide insight on farmer- and household-level agricultural outcomes, such as use of various types of inputs, crop cultivation patterns, and agricultural sales. They also contain information on socioeconomic and demographic outcomes, such as characteristics of the household head and principal dwelling.

Empirical approach

We used propensity score matching to identify statistically comparable samples of targeted and comparison farmers separately within each of the three countries where data on comparison farmers were available. We then used this matched subsample of farmers to estimate differences in access to extension services, input use, crop productivity, and farmer welfare between targeted and comparison farmers.

In the absence of pre-intervention baseline data, our propensity-score-based matching approach used data on farmer-level characteristics that were unlikely to change in response to a farmer's exposure to AGRA (such as sex of the household head) or that were potentially slow to change (such as characteristics of the household's main dwelling) to create statistically comparable samples of targeted and comparison farmers. Specifically, in each of the three countries, we first created a binary variable that equaled one if a farmer engaged with AGRA, and zero otherwise.

We next used probit regression to regress this binary variable on the following farmer-level characteristics: household size, age of head of household, female-headed household status, the household head's disability status, number of sleeping rooms in the household's primary dwelling, the household's access to electricity and improved drinking water sources, total land ownership, a household-level asset index, and a regional indicator.² To generate comparable samples of farmers to estimate crop-specific impacts (such as impact on maize yield), we repeated this probit regression with a restricted sample of targeted and comparison farmers who indicated that they cultivated the crop in question in the most recent growing season.

² The regional indicator used in this regression was country specific. For Burkina Faso, Ghana, and Nigeria, the regional indicator was a binary variable that equaled one if the farmer lived in the Boucle du Mouhoun Region, the Northern Region, or the Niger Region, respectively. The asset index—constructed using principal component analysis applied to a series of binary variables indicating sample households' ownership of various durable and non-durable assets—was similarly specific to each of the three countries.

Finally, we used the results of these probit regressions to generate the propensity score (the model-predicted likelihood that a farmer will have engaged with AGRA based on farmer-level characteristics), and matched targeted and comparison farmers with similar propensity scores.³ Exhibit E.9 shows that following the conclusion of our matching exercise, the selected subsamples of targeted and comparison farmers in each of the three countries are generally statistically indistinguishable from each other along a host of socioeconomic and demographic characteristics.

³ The availability of a relatively larger sample of surveyed farmers in Ghana and Nigeria allowed us to match without replacement (that is, each targeted farmer was matched with a unique comparison farmer with a similar propensity score). In Burkina Faso, where the number of farmers in the surveyed sample was relatively low, we relied on matching with replacement to ensure that selected subsamples of targeted and comparison farmers remained statistically comparable.

Exhibit E.9: Testing for balance in full and maize-only matched samples in Burkina Faso, Ghana and Nigeria

Variable	Burkina Faso						Ghana						Nigeria					
	Full sample			Maize sample			Full sample			Maize sample			Full sample			Maize sample		
	(1)	(2)	t-test	(3)	(4)	t-test	(5)	(6)	t-test	(7)	(8)	t-test	(9)	(10)	t-test	(11)	(12)	t-test
	Compar- ison Mean/SE	Targeted Mean/SE	Diff. (1)-(2)	Compar- ison Mean/SE	Targeted Mean/SE	Diff. (3)-(4)	Compar- ison Mean/SE	Targeted Mean/SE	Diff. (5)-(6)	Compar- ison Mean/SE	Targeted Mean/SE	Diff. (7)-(8)	Compar- ison Mean/SE	Targeted Mean/SE	Diff. (9)-(10)	Compar- ison Mean/SE	Targeted Mean/SE	Diff. (11)-(12)
HH size	11.686	11.191	0.495	11.205	11.532	-0.328	12.341	12.719	-0.378	12.404	11.832	0.572**	10.092	10.018	0.074	9.651	9.651	0.000
	[0.948]	[0.385]		[1.554]	[0.600]		[0.368]	[0.295]		[0.838]	[0.405]		[0.366]	[0.226]		[0.470]	[0.213]	
HH head age (year)	48.114	48.025	0.088	46.571	45.887	0.684	48.197	48.670	-0.473	48.244	47.718	0.526	39.683	39.516	0.167	38.752	38.638	0.115
	[0.857]	[1.320]		[0.589]	[1.287]		[0.741]	[0.667]		[1.101]	[1.054]		[0.734]	[0.564]		[1.004]	[0.871]	
Female-headed HH	0.018	0.031	-0.013***	0.008	0.028	-0.020	0.031	0.037	-0.006	0.040	0.010	0.030*	0.012	0.002	0.010	0.011	0.000	0.011
	[0.007]	[0.003]		[0.001]	[0.007]		[0.006]	[0.006]		[0.008]	[0.005]		[0.006]	[0.001]		[0.006]	[0.000]	
HH head suffers from at least one disability	0.021	0.022	-0.001	0.008	0.011	-0.003*	0.059	0.058	0.001	0.056	0.042	0.014	0.009	0.006	0.003	0.000	0.000	N/A
	[0.008]	[0.003]		[0.002]	[0.003]		[0.005]	[0.005]		[0.010]	[0.009]		[0.005]	[0.003]		[0.000]	[0.000]	
Number of sleeping rooms in HH	4.520	4.558	-0.038	4.210	4.614	-0.404	5.448	5.508	-0.060	5.338	5.042	0.296	5.420	5.290	0.129	5.015	4.913	0.102
	[0.996]	[0.412]		[1.160]	[0.441]		[0.162]	[0.149]		[0.347]	[0.170]		[0.160]	[0.214]		[0.137]	[0.211]	
HH has electricity	0.773	0.795	-0.022	0.812	0.802	0.010	0.804	0.861	-0.057	0.866	0.996	-0.130*	0.398	0.403	-0.006	0.353	0.349	0.004
	[0.108]	[0.074]		[0.106]	[0.086]		[0.065]	[0.046]		[0.062]	[0.004]		[0.091]	[0.065]		[0.119]	[0.087]	
Total land ownership (ha)	8.023	8.434	-0.410	9.393	9.607	-0.214	6.327	5.315	1.012	5.647	5.092	0.554	4.123	3.905	0.219	3.451	3.280	0.170
	[2.542]	[1.099]		[4.329]	[1.028]		[0.595]	[0.301]		[0.902]	[0.572]		[0.298]	[0.368]		[0.263]	[0.151]	
HH asset index	-0.121	-0.102	-0.018	0.044	-0.056	0.100	0.121	0.065	0.056	0.193	0.282	-0.089	-0.443	-0.504	0.061	-0.448	-0.474	0.026
	[0.213]	[0.197]		[0.234]	[0.180]		[0.164]	[0.067]		[0.173]	[0.121]		[0.097]	[0.072]		[0.128]	[0.116]	
HH has improved drinking water source	0.824	0.831	-0.007	0.914	0.893	0.021	0.677	0.663	0.014	0.658	0.650	0.008	0.494	0.518	-0.024	0.471	0.477	-0.006
	[0.076]	[0.035]		[0.037]	[0.042]		[0.063]	[0.074]		[0.089]	[0.096]		[0.033]	[0.019]		[0.042]	[0.036]	
Intra-country regional distribution	0.605	0.548	0.057	0.569	0.532	0.037	0.991	0.996	-0.004	0.972	0.988	-0.016	0.300	0.272	0.028	0.000	0.000	N/A
	[0.370]	[0.222]		[0.404]	[0.230]		[0.010]	[0.003]		[0.031]	[0.008]		[0.134]	[0.133]		[0.000]	[0.000]	
N	574	2555		274	708		1559	1559		500	500		1051	1051		541	541	
Clusters	3	7		3	6		16	20		11	16		13	12		6	6	

Notes: The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at the district level. District fixed effects are included in all estimation regressions. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level, respectively.

With the full and maize-only matched sample in each country, we separately estimated the empirical specification in Exhibit E.10:

Exhibit E.10. Specification for matched-comparison analysis

$$y_{ij} = \beta_1 T_i + X_i' \beta_W + \gamma_j + \epsilon_{ij},$$

where y_{ij} represents an outcome of interest for farmer i in district j , T_i is a binary variable that equals one if farmer i has previously engaged with AGRA and zero if not, X_i is a vector of farmer-level characteristics containing the variables used for propensity score matching, γ_j represents a district fixed-effect, and ϵ_{ij} is a normally distributed error term. Our coefficient of interest is β_1 , which—assuming that the propensity score matching process outlined above accounts for factors that might independently induce variation in key outcomes—represents AGRA’s impact on targeted farmers.

Results

Panels (a), (b) and (c) of Exhibit E.11 present results for our matched comparison analyses in Burkina Faso, Ghana, and Nigeria, respectively. We found that AGRA-targeted farmers in all three countries reported higher rates of engagement with extension agents in the past year, although it is worth noting that overall rates of access to extension remained relatively low in Burkina Faso and Ghana despite these increases.⁴ These farmers also consistently reported that the distance to the nearest agro-dealer had reduced.

This increased engagement with available extension services, however, translated into higher uptake of improved agricultural inputs only inconsistently. AGRA-targeted farmers in Ghana, for instance, reported higher rates of use of inorganic fertilizer relative to comparison farmers but not of adoption of improved maize varieties. Similarly, AGRA-targeted farmers in Burkina Faso reported higher rates of access to formal financial services relative to comparison farmers but not of adoption of improved maize varieties or use of inorganic fertilizer. It is only in Nigeria that we observed increased adoption of improved maize varieties and access to formal financial services among targeted farmers, accompanied by nearly universal use of inorganic fertilizer among all (targeted and comparison) farmers. This, in combination with higher rates of access to extension services among sampled farmers in the country, perhaps explains why it was only in Nigeria that AGRA-targeted farmers reported a large increase in maize yields.

Impacts on crop sales, availability of marketable surpluses, and farmer well-being outcomes (such as self-reported resilience to shocks) are similarly inconsistent. AGRA-targeted farmers in only Burkina Faso reported higher rates of sales of maize as well as other crops, although this did not translate into improved perceptions of resilience. Similarly, AGRA-targeted farmers reported higher levels of food insecurity, despite an increase in reported maize yields.

⁴ In both countries, only about 40 percent of AGRA-targeted farmers reported having met with an extension agent in the past year. In contrast, over 60 percent of such farmers did so in Nigeria.

Exhibit E.11. Impacts on AGRA-targeted farmers

	(1) Household met with extension officer in last year	(2) Distanc e to agro- dealer in km	(3) Distance to agro- dealer in minutes	(4) Adoption of improved maize varieties	(5) Use of inorganic fertilizer on maize crop	(6) Access to formal financial services	(7) Irrigated maize crop	(8) Maize harvest better than usual	(9) Maize yield (kg/ha)	(10) Sold any maize	(11) Had marketable maize surplus	(12) Sold any crop	(13) Experienced food insecurity during the last year	(14) High self- reported resilience	(15) Household took a loan
(a) Burkina Faso															
AGRA farmer	0.13*	-4.72*	0.98	0.029	-0.16	0.15*	0.0095	0.018**	-126.6	0.092**	0.098***	0.18***	0.0011	-0.087***	0.077***
	(0.061)	(2.27)	(1.85)	(0.057)	(0.14)	(0.076)	(0.0095)	(0.0064)	(169.2)	(0.032)	(0.0071)	(0.031)	(0.033)	(0.012)	(0.017)
Observations	3127	2631	363	982	982	3129	977	938	920	930	934	2879	3126	3120	3055
Comp. mean	0.31	13.1	5.43	0.22	0.88	0.33	0.0037	0.071	1179.2	0.16	0.26	0.26	0.36	0.83	0.22
Adj. R-sq.	0.097	0.095	0.17	0.27	0.25	0.14	0.0057	0.051	0.38	0.32	0.33	0.15	0.10	0.065	0.022
(a) Ghana															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
AGRA farmer	0.13*	-2.30*	2.04	0.054	0.067*	0.0097	-0.0074	-0.019	41.7	-0.019	-0.0072	-0.11**	0.027	-0.017	-0.034**
	(0.073)	(1.25)	(3.03)	(0.057)	(0.035)	(0.029)	(0.0091)	(0.027)	(48.6)	(0.035)	(0.033)	(0.052)	(0.030)	(0.028)	(0.014)
Observations	3114	1235	1762	999	999	3116	993	989	950	980	989	3019	3114	2818	3098
Comp. mean	0.27	11.4	28.4	0.30	0.63	0.70	0.010	0.097	677.6	0.28	0.34	0.65	0.57	0.55	0.20
Adj. R-sq.	0.096	0.10	0.099	0.069	0.14	0.072	0.020	0.011	0.15	0.068	0.049	0.12	0.063	0.027	0.023
(b) Nigeria															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
AGRA farmer	0.39***	-7.73**	-4.85	0.19**	-0.0016	0.090***	-0.027	0.13***	346.6***	-0.024*	0.0057	-0.0057	0.095**	0.033	0.11***
	(0.032)	(3.25)	(6.82)	(0.050)	(0.0014)	(0.028)	(0.021)	(0.019)	(84.6)	(0.011)	(0.0064)	(0.018)	(0.033)	(0.033)	(0.022)
Observations	2099	601	1352	1082	1082	2101	1078	1080	1068	1057	1070	2043	2101	2078	2090
Comp. mean	0.22	14.5	30.6	0.34	1	0.56	0.045	0.10	2497.9	0.94	0.95	0.91	0.50	0.30	0.038
Adj. R-sq.	0.19	0.36	0.24	0.076	-0.0061	0.11	0.074	0.050	0.063	0.032	0.020	0.025	0.063	0.041	0.085

Notes: Standard errors (in parentheses) clustered at the district level. All models include district fixed effects and control for variables used to generate matched samples. Regressions with maize-specific variables rely on matched sample of maize cultivators surveyed during the 2020 round of the AGRA outcome survey; other analyses rely on matched sample of all farmers surveyed during the 2020 round of the AGRA outcome survey. “Comp. mean” = mean value among comparison farmers. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level, respectively.

4. Assessing impacts on farmers who take up extension and improved inputs

To assess whether PIATA’s theory of change was valid and its focus on improving farmers’ access to extension, seeds and fertilizer would increase income and food security (without a similar focus on improving access to irrigation or other infrastructure), we conducted an additional analysis. Specifically, we assessed the impact of taking up extension services and using improved inputs on crop productivity and farmer-level welfare outcomes using an endogenous-treatment regression model. Although these analyses use farmer-level data from all seven PIATA-focus countries where data collection occurred as part of the latest round of the AGRA outcome survey, it is worth noting that these analyses do not reflect PIATA’s impact. Instead, they shed light on the extent to which key elements of PIATA’s farmer-facing strategy—uptake of improved inputs and engagement with extension—have the potential to drive agricultural transformation.

Data

Our data come from the latest round of AGRA’s outcome survey and cover farmers who engaged with AGRA across seven focus countries. For comparability across countries, we restricted our analyses to farmers who reported cultivating maize (which provides an analytical sample of about 6,000 farmers) and focused on evaluating the impact of taking up extension services and/or improved inputs on three key outcomes: reported maize yield and maize sales in the most recent growing season, and months of adequate household food provision in the past year.

Empirical approach

Farmers’ decisions to use extension services and improved inputs (such as improved seeds and inorganic fertilizer) are driven by a variety of socioeconomic, demographic, and attitudinal characteristics. Simple comparisons of outcomes between farmers who did or did not take up extension and improved inputs fail to account for these underlying factors, leading to potentially biased estimates of impact. To assess the extent to which extension and improved inputs drove farmer-level outcomes in PIATA focus countries, we relied on a “two-stage” endogenous-treatment regression model. We started by explicitly modeling farmers’ decisions to use extension and improved inputs as a function of observable farmer-level characteristics. The use of this model gives rise to a key assumption inherent in this approach, namely, that the model used to understand why a farmer does or does not use extension and improved inputs contains the main drivers of uptake. We then used the results from the first-stage model to augment and adjust the impact estimates that emerged from our main analyses, which focus on the impact of use of extension services and improved inputs on farmer-level outcomes.

Exhibit E.12 illustrates our empirical model for this analysis of whether farmers’ receipt of extension services and adoption of improved inputs led to improved household- and farmer-level outcomes.

Exhibit E.12. Specification for analysis of effects of farmer adoption

$$t_{idc} = \begin{cases} 1 & \text{if } W_i' \beta_W + \gamma_c + \mu_{idc} > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$y_{idc} = \beta_1 t_{idc} + W_i' \delta_W + \gamma_d + \epsilon_{idc}.$$

In the “first step,” t_{idc} is a binary variable that equals one if household i in district d of country c has engaged with extension services and/or used improved inputs, and zero otherwise.⁵ We modeled this variable as a function of household-level characteristics (W_i) corresponding to the ones used as part of our matched-comparison evaluation of impacts on farmers targeted by AGRA. We also included country fixed effects in our estimation.

The “second step” models our outcomes interest (y_{idc}) as a linear function of use of extension services and/or improved inputs, controlling for household-level characteristics. In this step, we also included district fixed effects in the estimation. A key assumption central to this approach is that μ_{idc} and ϵ_{idc} are distributed bivariate normal with mean zero and covariance matrix:

$$\begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix},$$

where ρ represents the correlation between the error terms in the first- and second-step estimating equations. This assumption implies that the unobservable characteristics that drive farmers’ uptake of extension and improved inputs are correlated with those that drive farmer-level impacts.⁶

Our coefficient of interest (β_1), thus, provides the estimated impact of using extension services and/or improved outcomes on household- and farmer-level outcomes, partially accounting for the bias introduced by farmer-level self-selection. It is worth noting that this estimate does not reflect PIATA’s impact on outcomes. Instead, it highlights the extent to extension and improved inputs—key pillars of PIATA’s farmer-facing strategy—can indeed drive outcomes in desired ways. In so doing, it helps provide one potential explanation for why farmer-facing interventions in certain countries do not appear to have detectable impacts on key outcomes, namely, that take up of extension services and/or improved inputs was insufficiently high.

Results

Exhibit E.13 presents the results from the second-step impact estimation outlined in Exhibit E.11 above. We find that uptake of extension services and adoption of improved inputs (namely, improved maize varieties and inorganic fertilizer) increased reported maize yields by over 700 kg/ha and increased reported maize sales quantities by over 800 kg per household. Farmers who adopted one or more of these inputs also reported experiencing between 1-2 months of adequate household food provision in the past 12 months. Taken together, these results suggest that enhancing access to extension services and improved inputs—key pillars of AGRA’s farmer-facing strategy—may be able to positively drive critical farmer-level outcomes if uptake is sufficiently widespread.

⁵ We repeat our analysis individually for engagement with extension services, use of improved crop varieties, and use of inorganic fertilizer. We also repeat the analysis with a binary variable that equals one if a farmer reports having taken up all three services.

⁶ Maddala (1983, 122) derives the maximum likelihood estimator associated with this specification. One advantage of the endogenous treatment-regression model relative to other approaches (such as instrumental variables) is that it partially relaxes the exclusion restriction assumption (Guo and Fraser 2014).

Exhibit E.13: Impacts on farmers who take up extension services and improved inputs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Maize yield (kg/ha)				Maize sold (kg)				Months of adequate household food provision			
Adopted improved maize varieties	1030.7***				972.7***				1.91***			
	(144.1)				(293.1)				(0.26)			
Used inorganic fertilizer on maize	1135.9***				1412.9***				1.32***			
	(114.1)				(232.2)				(0.26)			
Met ag. extension agent in last year	729.1***				1166.0***				1.56***			
	(234.9)				(294.1)				(0.26)			
All of the above	706.4***				802.7***				1.34***			
	(112.5)				(247.6)				(0.15)			
Observations	5944	5944	5944	5944	5932	5932	5932	5932	6116	6116	6116	6116
Rho (ρ)	-0.44	-0.39	-0.33	-0.13	-0.41	-0.60	-0.52	-0.22	-0.54	-0.16	-0.43	-0.31

Notes: Standard errors (in parentheses) clustered at the district level. All models include district fixed effects and control for household size, age of household head, sex of household head, household head's disability status, number of sleeping rooms in dwelling, household's access to electricity and improved drinking water, and household's total land ownership. First-stage regression results not shown. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level, respectively.

References for Appendix E

- Guo, S., & Fraser, M. W. (2014). Propensity score analysis: Statistical methods and applications (Vol. 11). Thousand Oaks, CA: SAGE Publications.
- Maddala, G. (1983). *Limited-dependent and qualitative variables in econometrics*. Cambridge University Press.
- Prais, S., Winsten, C., 1954, Trend estimation and serial correlation. Discussion Paper 383, Cowles Commission, Chicago, IL.

Appendix F. Contribution Analysis Methodology and Narratives

As discussed in the methodology section in Volume 1, we employed contribution analysis (CA) as our analytical approach. This entailed analyzing and interpreting findings from all qualitative and quantitative data gathered over the course of the evaluation to (a) assess the degree to which key outcomes and conditions in the ToC’s impact pathway held true; (b) identify claims of AGRA’s contribution to change, and (c) assess the sustainability of AGRA-influenced changes. Below we discuss these in more depth:

A. Assessing key outcomes and conditions in ToCs

We used all primary and secondary sources gathered over the course of the evaluation to assess key outcomes and conditions in the evaluable ToC. This started with an extensive review of over 200 program documents, including program reports, grantee reports, strategy documents, country operational plans, and KIT outcome reports, among others. To guide the document review, we first created a purpose-built template in MS Word for each nested ToC (flagships, input supply, extension, consortia, etc.). We then used these templates as a basis to develop country-specific templates for each of the 11 focus countries. Next, we systematically reviewed all documents for each country and extracted the relevant information to populate each nested ToC that corresponded to that country. This provided an overall assessment of how AGRA’s programmatic reports mapped to our detailed ToCs in each country.

Next, we organized raw qualitative findings from interviews and focus groups by country, thematic area, and topic, and layered these qualitative findings onto the country-level ToC templates used for the document review. We first scanned all qualitative transcript passages for evidence that key outcomes and conditions along ToCs had in fact occurred from 2017 to 2021. (For example, we reviewed Excel files across all 11 countries—including deep-dive countries—to collect all stakeholder accounts of whether VBAs made a profit from commissions.) Next, we assessed the full set of accounts of each key outcome and condition to make summary statements about (1) whether qualitative sources reported that the outcome occurred or condition held true, and (2) the strength of the qualitative evidence. To determine the strength of qualitative evidence, we considered firsthand sources (such as farmers and VBAs) to be more credible than second-hand sources (such as AGRA grantees), and we considered more detailed qualitative accounts with tangible examples to be more credible than general or vague accounts. This exercise allowed us to assess the extent to which each nested ToC had held according to qualitative data, as well as identify key conditions and outcome linkages that may not have held as planned.

Next, we layered quantitative findings into these nested country-level templates alongside findings from the document review and qualitative findings. This included insights from monitoring data reported by AGRA grantees, Geopoll phone survey data, as well as findings from LSMS-ISA household survey data and AGRA outcome survey data in several countries.

We then assessed the full set of qualitative and quantitative evidence at each step of each nested ToC for each country to determine the strength of evidence confirming whether changes occurred or key conditions were met. For each step in nested ToCs, we assigned the strongest evidence rating when multiple data sources confirmed that a change occurred (for example, quantitative analysis, qualitative analysis, and program data all indicated that VBAs enhanced farmer access to seeds over the four-year implementation period). Where evidence was conflicting between sources, we developed simple rules to guide the evidence rating. For example, quantitative findings typically outweighed qualitative findings

when they (1) were more representative than qualitative findings or (2) featured a more viable counterfactual than qualitative findings. For example, Geopoll survey data representing hundreds of VBAs across several countries was weighted higher than the aggregated accounts of the 18 VBAs we interviewed with respect to some key changes in the ToC (such as VBAs' access to finance, for example). However, our qualitative interviews with VBAs were critical to understanding the relationships between key outcomes, and why or how desired changes (such as profits through commissions) occurred or failed to occur.

B. Identifying claims of AGRA's contribution to change

Next, we posed and assessed contribution claims for each outcome that occurred and each assumption that held in nested ToCs, according to our evidence ratings. This required applying process tracing techniques to answer key questions around the relationship between PIATA interventions as a “cause” and observed outcomes as an “effect”. For example, when interrupted time-series analysis of household survey data indicated an upward national trend in maize productivity in Ghana from 2017 to 2021, we posed and assessed a series of hypotheses about the potential causes of this trend. These potential causes included a series of investments made directly by AGRA, investments indirectly linked to AGRA's assistance, as well as agriculture investments by public officials and other donors that could have influenced market and farmer outcomes. This exercise required us to review several outside sources—including research papers and journal articles, as well as news accounts and press briefings—to determine PIATA's contribution to change versus the contributions of other actors.

In addition, we used responses from the structured web survey of over 300 PIATA stakeholders to calculate contribution scores for key outcomes targeted by PIATA, including private investment in agriculture, government capacity to drive flagships, and farmer access to extension and markets. These scores capture the extent to which PIATA stakeholders reported a positive trend in key agriculture outcomes since 2017, and attributed this positive trend to AGRA's work. (See Appendix C for more detail on how these scores were calculated.)

C. Assessing the sustainability of AGRA-influenced changes

Lastly, we assessed the likelihood of positive system, market, and farmer changes being sustained after the PIATA intervention. This analysis focused on assessing the degree to which behavioral conditions and institutional incentives are in place to sustain key practice changes among public officials and market actors in the post-grant period. This analysis drew heavily on the Capability, Opportunity, Motivation – Behavior (COM-B) framework, which posits that meaningful behavior change occurs only when individuals and organizations have the capability, opportunity, and motivation to adopt and sustain the targeted behavior (Michie et al. 2011). In conducting this analysis, we also considered the extent to which key conditions of success that largely held during the grant period would likely remain in the post-grant period.

The final product of this work is a series of eight contribution narratives, one for each nested ToC within PIATA's overarching evaluable ToC. We present these contribution narratives below in the following order:

1. Policy
2. State capability
3. Partnerships
4. Inclusive finance

- 5. Input supply
- 6. Input distribution
- 7. Extension
- 8. Consortia

1. Policy contribution narrative

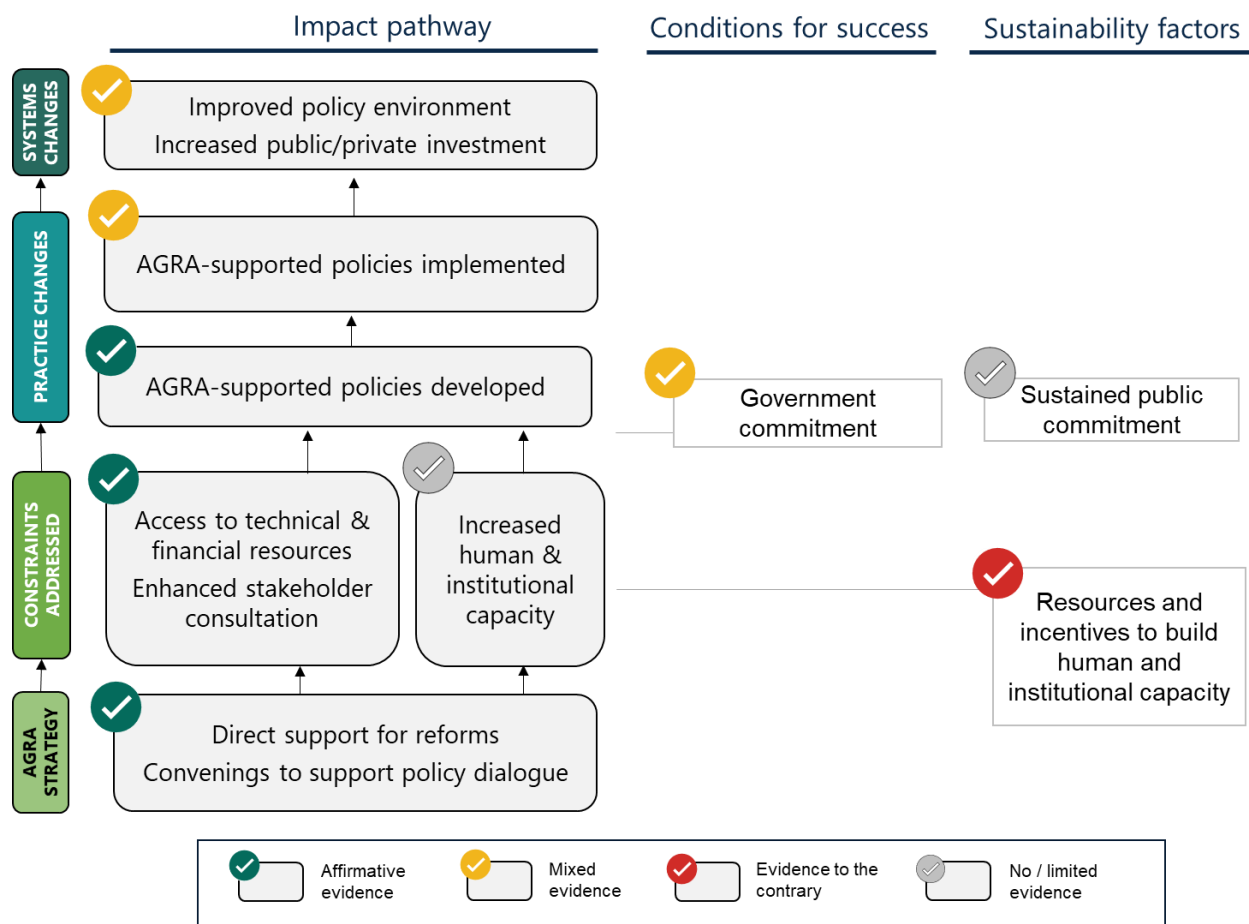
AGRA invested over \$6 million in policy reforms from 2017 to 2021 in all 11 focus countries, with particularly large investments in Kenya, Ghana, and Mozambique. Reforms focused on modernizing and streamlining policies on subsidies, input markets, output markets, and trade policy. In this section, we assess AGRA’s contribution to policy reforms, government capacity for policymaking, and the policy environment for agricultural transformation, among other questions of interest (Exhibit F.1).

Exhibit F.1. Research questions on policy

Primary question:	• Is there evidence that AGRA’s work on policy has changed how policies are developed and executed in target countries?
Secondary questions:	• How successful was AGRA in partnering and collaborating with other actors in creating a conducive policy environment? • To what extent has AGRA helped to strengthen government capacity to develop, pass, and implement policies effectively? • What evidence suggests that outcomes are sustainable beyond the life of the intervention?

ToC overview and overarching findings

AGRA supported micro-policy reforms with potential to stimulate private sector investment. AGRA provided financial and technical support, often in the form of consultants and seconded staff, to help public officials develop, enact, and implement modern and inclusive agriculture policies. To foment inclusive policymaking, AGRA also encouraged and incentivized non-state actors to participate in the policymaking process. As a result of these efforts, AGRA anticipated that stakeholders would increase their demand for more policy reforms and that public authorities would build capacity to develop and implement reforms, thereby creating an improved policy environment for private sector investment in agriculture (Exhibit F.2).

Exhibit F.2. Policy ToC

AGRA was successful in accelerating policy reforms and increasing stakeholder participation in policymaking. Through AGRA’s direct support and the technical resources it provided to governments, 72 agriculture policy reforms were initiated across the 11 target countries in seed, fertilizer, and output market access, among others (AGRA Program Performance Report Q4, 2020). This high volume of reforms initiated in five years represents strong performance against AGRA’s initial target of 55 reforms. However, 33 of the 72 reforms were not implemented by 2021, likely due to resource constraints, COVID-19 delays, and multi-year timelines commonly associated with policy reform. Stakeholders noted that multiple actors were involved in policy reform processes, including the World Bank, the International Fund for Agricultural Development (IFAD), and USAID. Although these other actors played a role in policy reforms, stakeholders mentioned that AGRA’s support was the most catalytic, given their strong connections to government and convening power, particularly with the private sector. In interviews, civil society representatives also reported increased participation in the policy reform process as a result of AGRA’s inclusion efforts. However, the overall sustainability of AGRA-introduced improvements is unclear, given governments’ weak incentives to build in-house capacity for agriculture policy reform (Exhibit F.2).

Detailed findings along the ToC

AGRA strategy

AGRA provided a wide range of direct technical and financial support to government partners in all 11 focus countries. AGRA provided ministries of agriculture with a range of financial and technical support to further the policy reform process, including financial support to conduct policy research and convene stakeholders; consultants and seconded staff to support reform processes; convening activities to increase non-state actor participation in the policy reform process; and grants to build information systems to serve analysis and advocacy (Exhibit F.3). AGRA technical experts and country staff also devoted a nontrivial portion of their time to shaping reforms, building political support for priority reforms, and encouraging advocacy groups to participate more meaningfully in policy reforms.

Exhibit F.3. Policy support provided by AGRA

Policy support provided by AGRA	BF	GH	MA	NG	MZ	MW	ET	KE	RW	TZ	UG
Grants and other financial support				x	x	x	x	x	x		x
Support to convenings and wider participation		x	x	x	x		x	x	x	x	x
Grants to non-state actors to participate in the policy process		x			x					x	x
Support for research and evidence-based policymaking			x	x	x		x	x	x	x	
Technical consultants				x			x		x		
Policy advisor seconded staff	x		x		x		x	x			

Constraints addressed

Government counterparts appreciated AGRA's financial and technical support. Stakeholders called AGRA's support high quality and credible, mentioning that AGRA is well known, well connected, and able to leverage their relationships with government to support policy reform. Many stakeholders described AGRA's expertise and role as a neutral broker and convener between government and the private sector as a key strength, as was the case for seed sector reforms in Rwanda. In Uganda, stakeholders described AGRA's successful strategy of using a combination of inside tactics (such as direct advocacy with decision makers in government) and outside tactics (for example, use of the media to garner public support for a policy change) to support policy reforms within the agricultural finance sector.

Now through a better ICT system we can get data directly. Now we can better do advocacy.

—Private sector representative

AGRA helped increase civil society's role in advocacy and policymaking, but even deeper engagement is possible. In interviews, independent civil society stakeholders commended AGRA's funding for improved information systems, which have enhanced stakeholders' analysis and advocacy efforts. Stakeholders also reported increased participation in the policy reform process as a result of AGRA's inclusion efforts. However, many civil society actors noted that their consultative role was often to validate policy agendas that had already been set with government authorities, as opposed to shaping them (Exhibit F.4).

It seems we were not fully engaged in AGRA's [work]. Next time, [AGRA should] engage the organization in the process fully.

—Civil society representative

Exhibit F.4. AGRA helped generate more participation in the policy reform process, with less meaningful engagement in setting the policy agenda.

To increase the engagement of non-state actors in the policy development process, AGRA supported convenings, task forces, public-private dialogues, and information and coordination platforms, and even incentivized non-state actors to participate (for example, through providing transportation costs). AGRA also made direct grants to civil society organizations to enhance their advocacy skills and efforts.

This support ultimately increased opportunities for non-state actors to engage in the policy reform process and led to the participation of 8,500 stakeholders in 300 policy advocacy convenings and roundtables in eight countries. In Uganda, the work on agricultural finance policy brought together multiple ministries, the central bank, as well as other financial agencies. In Rwanda, stakeholders gave AGRA credit for catalyzing effective public-private dialogue between relevant seed system actors. Some civil society organizations also reported that AGRA's support helped them more effectively engage in the policy arena, citing changes in their internal governance systems, improved relationships with government, and increased access to information. One group shared that AGRA's policy team effectively coached them to assume a less confrontational and more collaborative strategy with government.

Overall, we found evidence in about half the 11 focus countries that non-state actors reported having more direct engagement in policy reform processes. However, civil society representatives and farmers were most often brought into these processes in a consultative or validation capacity once reform agendas had been agreed upon with government, as opposed to more active engagement with these groups earlier on in setting the policy agenda. Inevitably, this weakened their ability to shape the character of policies. For example, one society representative requested that AGRA begin to see their policy collaboration as a “true partnership” in which both parties are fully informed, empowered, and invested in the process. ▲

Practice changes

AGRA supported 72 agriculture policy reforms in Phase 2, of which 39 progressed to implementation. These reforms were largely in the areas of seed, fertilizer, and output market access (Exhibit F.5). This is a significant achievement within the four-year time frame of their Phase 2 support. Stakeholders reported that AGRA's key contribution was its acceleration of the policy reform process through financial and technical resources and convening work. Stakeholders noted multiple actors involved in policy reform processes, including the World Bank, IFAD, and USAID. Although these other actors played a role within policy reforms, stakeholders mentioned that AGRA's support was the most catalytic. In Uganda, for example, stakeholders directly attributed the rapid pace of changes to agricultural finance policy directly to AGRA. If fully implemented and maintained, these reforms have the potential to benefit smallholder farmers and a range of private sector actors (Exhibit F.6).

Exhibit F.5. Policies entering implementation with AGRA support during Phase 2

Policy support provided by AGRA	BF	GH	MA	NG	MZ	MW	ET	KE	RW	TZ	UG	Total
Seeds	1	2		2	1	1			1	1		9
Fertilizer	1	2	1	4	1	1			1	2		13
Markets and trade	2		1	1		1	1	2	1	2		11
Finance	1						1	1				3
Mechanization and irrigation							2		1			3
Post-harvest												0
Extension												0
Total	5	4	2	7	2	3	4	3	4	5	0	39

Exhibit F.6. Groups that could be most influenced by AGRA-supported policies

Policies supported by AGRA with most potential to affect farmers.

- **Aflatoxin mitigation.** Implemented in Rwanda, these reforms can reduce mortality and generate large economic benefits through structured contracts with large off-takers.
- **Private sector engagement in input distribution.** Input distribution to farmers can improve if seed companies and agro-dealers are incentivized to engage directly with smallholders.

Policies supported by AGRA with most potential to affect the private sector

- **Seed sector reforms.** These can galvanize private sector engagement in the production of certified improved seed, as in Rwanda.
- **Agricultural finance reforms.** Finance remains a key constraint across all market actors, including seed companies, agro-dealers, and off-takers.
- **Input imports.** Removal of import taxes can stimulate fertilizer production as well as mechanization, among other essential agriculture goods and services. ▲

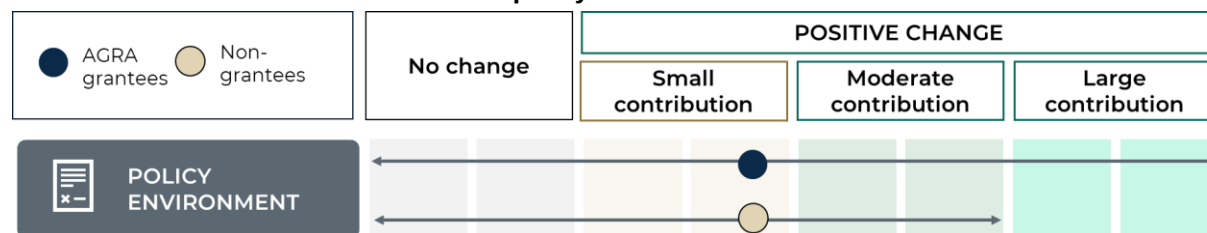
**Systems
changes**

Nearly half of reforms were not implemented in the time frame of the evaluation, which thereby reduced AGRA's impact on the enabling environment during Phase 2. Although AGRA helped initiate 72 policy reforms, nearly half (33 of 72) were not implemented by 2021. This is likely due to resource constraints, COVID-19 delays, and multi-year timelines commonly associated with policy reform. There were some notable exceptions, however, including seed policy reforms in Rwanda, Ghana, and Nigeria that had outsized effects on private sector investment within just two or three years. When enacted policy did not require implementation, we also found positive evidence of contributions to a healthy enabling environment and enhanced private investment, such as changes in taxation of agricultural machinery in Ethiopia.

Grantees and non-grantee partners rated AGRA's contribution to improving the policy environment as small. Over 85 percent of respondents to a structured web survey reported that the policy

environment for agriculture had improved over the past four years, likely reflecting the full constellation of efforts from national governments, multilateral institutions, and donors to stimulate private investment in agriculture through generalized and targeted policy reforms. However, respondents assigned AGRA a small contribution to these changes (Exhibit F.7). This is somewhat surprising, given stakeholder accounts of the catalytic role AGRA played in fast-tracking policy reforms. This relatively low contribution may reflect the fact that nearly half of AGRA-supported reforms had not yet been implemented by the end of Phase 2.

Exhibit F.7. AGRA's contribution to the policy environment



Source: Structured web survey, 2021; N=51

Sustainability

AGRA's success with policy reform has incentivized governments to request more AGRA support, rather than build capacity. A thorough review of monitoring and interview data revealed little evidence that AGRA's support led to increased government capacity to drive policy reforms, at least without continued AGRA support. For instance, we found no evidence of government counterparts beginning to replicate AGRA's reform processes or realign their internal financial or human resources to change their overall approach to policy reform as a result of AGRA's support. Instead, governments have increased their demand for AGRA's continued policy support. In part, this testifies as to AGRA's success during Phase 2 in fast-tracking policy reforms in focus countries. However, governments' reliance on AGRA for policy reform may not bode well for sustainability. While AGRA-financed consultants and seconded staff are available to governments, they are unlikely to build much-needed capacity in analysis, stakeholder consultation, and policy enactment and execution.

2. State capability contribution narrative

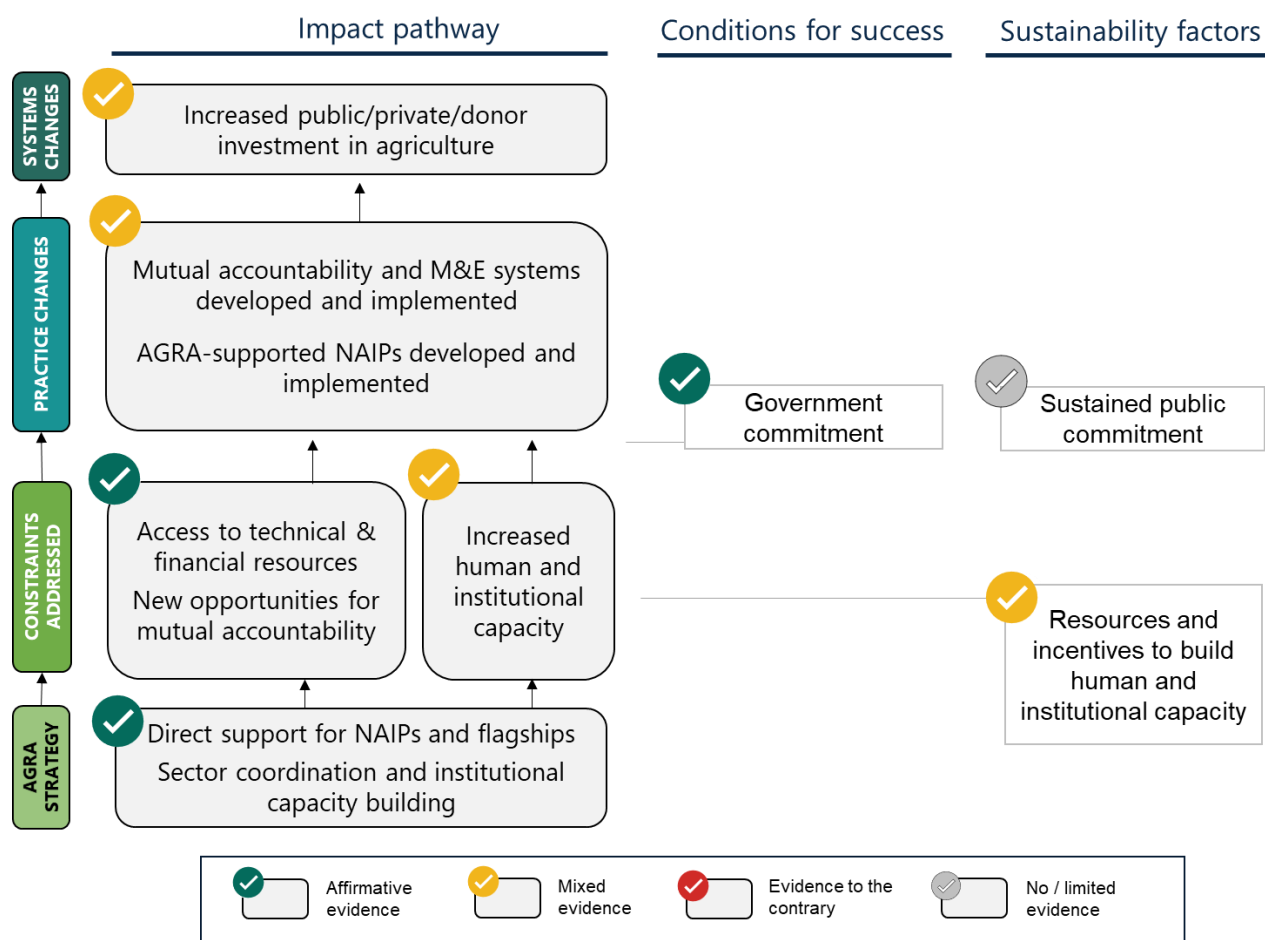
With \$10 million in funding, AGRA supported NAIPs, flagships, and Comprehensive Africa Agriculture Development Programme (CAADP) reporting across all 11 focus countries, with a particularly large investment in flagship development in Burkina Faso (\$3.9 million). In this section, we assess how AGRA's support affected governments' ability to plan and coordinate agricultural programs, among other research questions (Exhibit F.8).

Exhibit F.8. Research questions on state capability

Primary question:	How has AGRA's support to state capability affected government's ability to plan, coordinate, and drive investment?
Secondary questions:	- How is the state capability approach supported by AGRA a relevant tool to facilitate and fast-track NAIP implementation in focus countries? - Are governments buying in to flagships? - How effective has AGRA's input into NAIPs and national development plans been in improving government capabilities for planning and strategy? - How does AGRA's work affect public investment flow and funding? - To what extent have flagships served AGRA's inclusion goals, particularly with respect to women and youth?

TOC overview and overarching findings

AGRA supported NAIP and flagships in an effort to boost agriculture investment. AGRA funded consultants and provided direct technical assistance (TA) to design and support NAIPs and flagships. AGRA also funded meetings, convenings, and agriculture-sector working groups to support these investment policies and programs. In addition, AGRA funded enhancements to ministry of agriculture monitoring and evaluation systems through direct grants, ministry staff trainings, consultations, and equipment donations. Taken together, this support was intended to bypass gaps in public-sector capacity and provide directly the technical and financial resources needed to develop, implement, and monitor bankable investment plans, largely in the form of agriculture flagships that would crowd in large-scale public, private, and donor investment in agricultural transformation (Exhibit F.9).

Exhibit F.9. State capability ToC

AGRA was successful in facilitating and fast-tracking multiple NAIPs and flagships. From 2017 to 2021, AGRA helped develop several flagships, of which six proceeded to implementation. The two countries that began flagships early in Phase 2, Ghana and Burkina Faso, had the most success in leveraging donor and public resources and proceeding to execution at scale by 2021. AGRA had a major role in designing the flagships and mobilizing support and funding for them, most notably through the Planting for Food and Jobs (PFJ) flagships in Ghana. Strong and continued national government commitment to flagships was a key condition to their prompt advancement. This condition was met largely during Phase 2 because AGRA’s support for flagships was responsive to acting administration priorities. Beyond 2021, the fate of flagships depends largely on continued commitment from future political appointees and governing regimes, as well as public authorities’ longer-term incentives to build in-house capacity to develop and execute these complex agriculture programs. (Exhibit F.9)

Detailed findings along the ToC

AGRA strategy

AGRA tailored its capacity work to each country’s needs. AGRA’s support for institutional capacity building started with collaborative needs assessments to identify public capacity challenges. Government counterparts validated these challenges, which formed the basis for country support packages. These support packages included

training for ministry staff on budgeting, coordination, and agriculture topics, as well as agriculture-sector coordination activities such as convenings and agriculture-sector working groups. By 2021, AGRA had also helped design tailored flagships in Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mozambique, and Tanzania through its own staff time and various technical consultancies. AGRA also convened partners around NAIPs and supported consultation, analysis, and planning with consultancies/grants by NAIP stakeholders. In addition, AGRA supported monitoring and evaluation (M&E) systems for NAIPs and flagships in Mali, Nigeria, and Ghana (Exhibit F.10).

Exhibit F.10. Policy support provided by AGRA

State capability support provided by AGRA		BF	GH	MA	NG	MZ	MW	ET	KE	RW	TZ	UG
Sector strategies, plans, and programs	Support to development of national agricultural investment plans or sector strategies	x	x	x	x	x		x	x		x	x
	Support to flagships	x	x	x	x	x	x	x	x	x	x	
Sector Coordination	Coordination platforms, convenings, agriculture-sector working groups		x		x	x	x		x	x	x	
Institutional capacity	Monitoring and evaluation system development and enhancements	x	x	x	x	x	x	x	x	x	x	x
	Training of ministry staff	x	x	x	x	x	x				x	
	Other support (equipment, study tours, consultancies)			x	x	x	x	x	x	x	x	x

Stakeholders cited the quality, responsiveness, and comprehensiveness of AGRA’s support.

AGRA’s support was perceived as high quality and credible, with some stakeholders mentioning that AGRA staff are well known and well connected and possess long-term partnerships with government. Some government counterparts cited their desire to collaborate with AGRA—an African institution—on state capability topics. Government counterparts also valued AGRA’s flexibility and responsiveness to meet their needs, including a perception that AGRA is embedded in government processes and easily reachable for support. AGRA also enjoys respect among high-profile actors, including major donors, regional bodies, and politicians. Government counterparts in three countries also highlighted the value of AGRA’s financial resources in state capability efforts. Combined with AGRA staff time and consultancies, this financial support helps public officials sidestep bureaucratic bottlenecks to develop and execute complex agriculture programs.

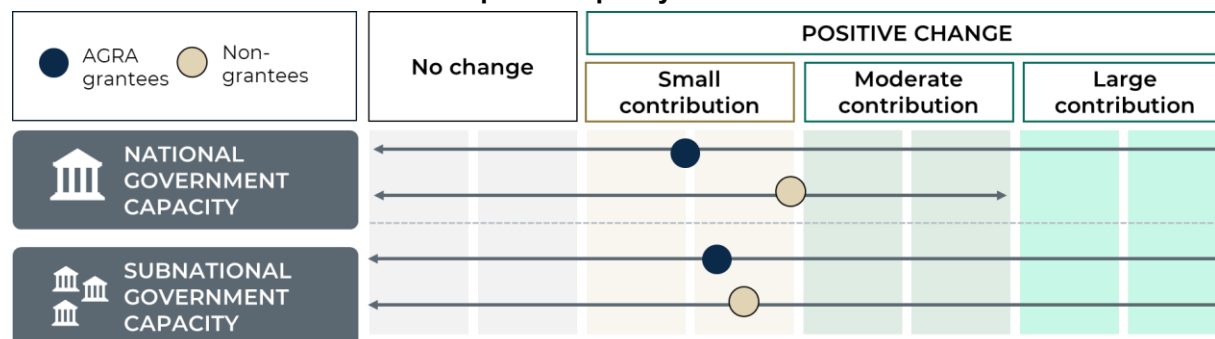
AGRA also has its own bureaucracy, as well as a tendency to fall in line behind government priorities. Stakeholders discussed some challenges working with AGRA, including (1) delayed and often complicated approval processes between AGRA’s head office and country offices, and (2) burdensome grant-level financial reporting requirements. In addition, AGRA seems to engage mostly public officials and development partners in identifying priority investment areas and adopt largely the vision of high-ranking officials and elected leaders. To our knowledge, AGRA leadership and technical staff do not critically vet proposed flagships in light of countries’ current performance toward international agriculture commitments (such as CAADP) or countries’ high-priority agriculture transformation goals.

Constraints addressed

Governments have made some advances in planning and coordinating flagships alongside AGRA, but they lack basic technical and managerial capacity. Government buy-in and ownership of flagships are strong, owing in large part to authorities’ central role in setting the vision for these programs. In

terms of analytic capacity to design flagships and managerial capacity to execute them, however, most governments were still deficient as of 2021. Although most web survey respondents felt that national and subnational government capacity had increased over the past four years, they generally assigned AGRA a small role in these improvements (Exhibit F.11). One reason for this sentiment might be that AGRA is so embedded in the flagship development and implementation process, there appears to be little need for governments to design and implement flagships without AGRA support. Interestingly, AGRA grantees—mostly public officials—rated AGRA’s contribution to public capacity a bit lower than non-grantees did.

Exhibit F.11. AGRA’s contribution to public capacity



Source: Structured web survey, 2021; N=51

Practice changes

Six countries began implementing flagships during Phase 2. Among countries that developed a flagship, nearly all moved to flagship implementation by 2021 (Exhibit F.12). This is a significant achievement in a relatively short time. Flagships in Burkina, Ethiopia, and Ghana are organized around commodities (rice and wheat), whereas the other flagships are organized around e-subsidies (Kenya), gender and youth (Malawi and Mozambique), and agro-industry (Tanzania). Progress on flagships was greatly facilitated by strong political will at the presidential and/or ministerial level, AGRA’s capable convening and mobilization of key stakeholders, AGRA’s international experience and strong relationships, and AGRA-funded TA to draft documents and fast-track processes.

Exhibit F.12. State capability work directly supported by AGRA during Phase 2

	Plans and programs developed and implemented	BF	GH	MA	NG	MZ	MW	ET	KE	RW	TZ	UG
Sector strategies/ NAIPs	Sector strategy or investment plan developed	x	x	x	x		x	x				x
	Sector strategy or investment plan implemented		x					x				
Flagship programs	Flagship programs developed	x	x	x		x	x		x		x	
	Flagship programs implemented	x	x	x			x		x		x	
	Investment mobilized	x	x						x		x	

AGRA was instrumental in fast-tracking flagships and building support around them. Government counterparts and other stakeholders reported that AGRA’s support was critical to flagship advancement, particularly within this time frame. AGRA’s TA to design flagships and convening role were most often cited as AGRA’s greatest value. Notably, AGRA leveraged their international experience to aid flagship design, as was the case when AGRA brought in partners from the successful e-voucher program in Ethiopia to advise Kenyan stakeholders on their own e-voucher flagship. AGRA staff described their biggest contributions to flagships as supporting government to better prioritize investments and to rally other partners around flagships, and advising on or directly executing flagships. Although other institutional actors such as the World Bank and IFAD also played a large role, stakeholders mentioned that AGRA’s support was the main driver of the flagship development and implementation process. AGRA also played a pivotal role in improving country reporting toward international agriculture commitments (Exhibit F.13).

AGRA’s role was critical... They were able to understand this was a crucial time to [act] and were able to mobilize experts in the region and put them in contact with public officials. Thanks to AGRA’s technical support, [the plan] was approved.

—External expert

Flagships do not incorporate gender and inclusion goals, with some notable exceptions. Malawi and Mozambique flagships are centrally focused on promoting women and youth involvement in agriculture, which is commendable. Also commendable are explicit targets for women and youth in the rice flagship in Burkina Faso and the agro-industrialization flagship in Tanzania. However, most flagships outside Malawi and Mozambique reflect no systematic assessment of barriers to participation for women and youth. Furthermore, collection of age- and gender-disaggregated data to track flagship progress is sporadic.

Flagship development could be more inclusive in the future and potentially lead to a wider range of programming. Stakeholders held that AGRA’s flagship development process was high quality and somewhat inclusive. However, as with policy development, AGRA and public officials did not engage key stakeholder groups such as civil society and farmers until programs were already generally conceived. Potentially as a result of this, some AGRA-supported flagships had a somewhat narrow focus on basic grains and subsidies. Conceivably, consulting a wider range of civil society and private sector actors could generate more diverse flagship concepts around sustainable local food and agricultural systems, food and nutrition security, soil management, and suitable financing packages for small and medium-sized enterprises (SMEs) and farmers.

Exhibit F.13. AGRA’s work to support international agriculture commitments

AGRA’s support improved countries’ reporting on, and alignment with, CAADP commitments. AGRA supported joint sector reviews and biennial reviews as part of support to implementing the CAADP commitments. These reviews were designed to support mutual accountability systems to help countries meet their commitments under the CAADP, and ultimately contribute to increased private sector and donor investment. Through their leadership in convenings and agriculture working groups, AGRA staff also enhanced collaboration on CAADP commitments among public actors, private sector representatives, donors, and others. Overall, we found evidence that most of AGRA’s focus countries were better at tracking progress toward their CAADP commitments as a result of AGRA’s support, and half of focus countries had better aligned their national agricultural investments to CAADP commitments. In particular, AGRA’s work in Ghana, Mali, and Rwanda helped these countries improve their trajectory toward meeting their specified agriculture transformation goals. ▲

Systems changes

AGRA has helped crowd in and align donor and public funding through flagships in four countries. In Burkina Faso, Ghana, Kenya, and Tanzania, governments mobilized investment for flagship implementation through public-sector budgets and the larger development community. For example, AGRA’s leadership in writing the strategic plan for Ghana’s PFJ flagship arguably leveraged an estimated \$260 million in leverage from donor and public funds. Similarly, the World Bank credited the investments it made in Kenya’s flagship to the convening efforts of AGRA. In Mozambique and Ghana, stakeholders also noted that flagships provide central frameworks for various actors (including national governments, donors, and AGRA) to align their efforts and coordinate investments. For example, AGRA’s leadership on PFJ helped representatives from the World Bank, Global Affairs Canada, AfDB, FAO, and the USAID-Ghana Mission to align their multiyear agriculture investments.

The amount of private investment leveraged through flagships is hard to quantify. In interviews, public officials and AGRA staff noted that private sector investment is also being leveraged through flagships. However, they provided few tangible examples of this leverage. From a methodological standpoint, estimating the portion of private investment that is truly attributable to flagships is very challenging.

Sustainability

AGRA’s timely and results-focused flagship work has longer-term trade-offs in terms of building public capacity. Some evidence suggests that AGRA’s direct technical and financial support has enabled governments to plan and implement investment programs on their own. For example, improved M&E systems and enhanced public-planning documents now exist in Burkina Faso,

Ethiopia, Ghana, and Nigeria as a result of AGRA’s assistance. However, there are no strong signs of increased capacity of ministry staff to plan and implement complex programs on their own. (The notable exceptions were in Nigeria and Ghana, where public officials have made large strides in planning and administering complex agriculture programs.) Government counterparts and stakeholders rather talked about a “learning-by-doing” approach to capacity building, in which public officials are expected to learn from AGRA consultants as they work. Similar to AGRA’s policy work, this “results-oriented” approach has short-term payoffs in the form of designed and executed flagships. However, it could also encourage government dependency on AGRA to continue designing and executing the next generation of agriculture flagships.

The capacity building that AGRA has done is only when they do workshops or have a consultant who has a methodology; then people are able to learn things from there.

—Public official

Appointee turnover and regime change could also compromise AGRA’s progress on flagships. In noting the strong progress of several AGRA-supported flagships, public officials and donors expressed some hesitation about whether flagships in motion would proceed to full execution and sustainability. Ultimately, support for these flagships by appointees of new administrations, and agriculture more generally, will decide the fate of many of the programs.

Yes, we are on track [to meet flagship goals], but a change in government could jeopardize all this progress.

—World Bank official

3. Partnerships contribution narrative

From 2017 to 2021, AGRA supported strategic partnerships through more than 100 engagements and nearly \$3 million in funding. AGRA also supported the Agrobusiness Deal Room (a matchmaking forum for SMEs, investors, and public officials) and other private sector engagements. In this section, we assess AGRA's success engaging the private sector, among other research questions of interest (Exhibit F.14).

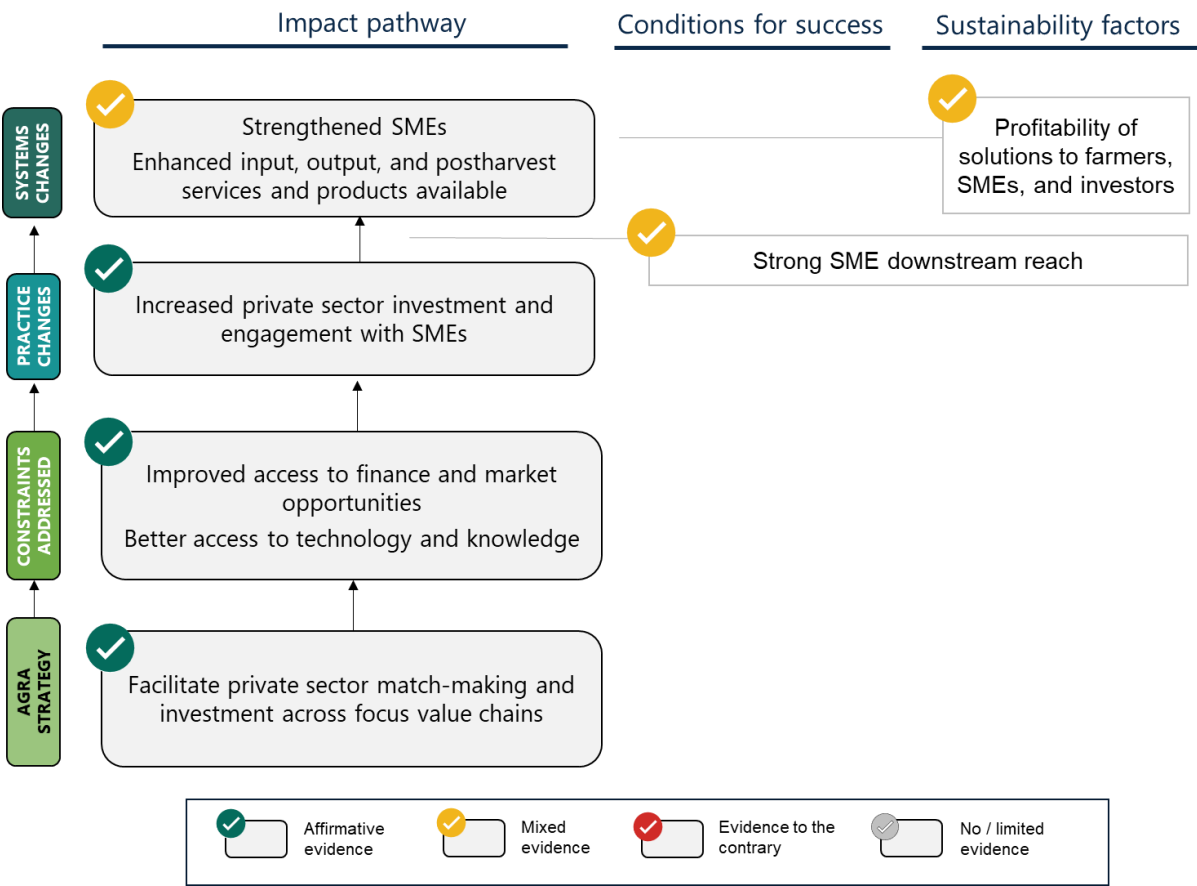
Exhibit F.14. Research questions on partnerships

Primary question:	• How successful has AGRA been in engaging the private sector as a partner?
Secondary questions:	• To what extent have AGRA partnerships supported scaling business models toward increased investments and improving the productivity of smallholder farmers? • How has AGRA's support worked to address bottlenecks in last-mile delivery and cluster development? • What role has the Agribusiness Deal Room contributed to new partnerships and investments across the continent? • What evidence suggests that outcomes are sustainable beyond the life of the intervention?

TOC overview and overarching findings

Through partnerships, AGRA seeks to overcome the agriculture investment shortfall by surfacing and scaling profitable business models. AGRA's partnerships team seeks to address some of the primary constraints to agriculture investment in Africa: information asymmetries and high transaction costs between investors and capital seekers, lack of technology dissemination, and limited linkages between investors and downstream technical partners. Through grants, non-funded partnerships, and the Deal Room, AGRA has attempted to link global off-takers, investors, and technology players with agribusiness SMEs, farmers, and other downstream partners. The goal is increased private sector investment in agriculture, leading to stronger (and more) SMEs and a wider array of services and products available to smallholders (Exhibit F.15).

Exhibit F.15. Partnerships ToC



AGRA has helped leverage investment and promote several service delivery models, with notable success in mechanization but unclear pathways to profitability for other models. Since 2017, AGRA has engaged over 100 partners and has made 40 grants in a diverse set of investments. In terms of investment, AGRA reports that it has leveraged \$141 million in investment from the private sector, surpassing its target of \$100 million. This is also an inherently difficult indicator to verify, given incentives for partners to over-report true leverage. However, stakeholders generally agreed on the direction of the trend and felt that AGRA was successful in leveraging private sector investment, assigning AGRA a small-to-moderate contribution to an overall positive trend in private investment in agriculture over the past five years. Across multiple partnerships, AGRA has helped structure and begin to scale a few profitable models that might ensure long-term private sector engagement—notably tractor rental services. However, the profitability of the larger set of AGRA-supported business models is still unclear, and preliminary results are mixed.

Detailed findings along the ToC

AGRA strategy AGRA has been prolific in partnership development in the past four years, albeit at the expense of vetting and supporting partnerships. Since 2017, AGRA has engaged more than 100 partners and made 40 grants in a diverse set of investments. Most of the partnerships are with private off-takers and input providers, but technology partners, financial institutions, donors, and university partners are also represented. Partnerships focus on

last-mile delivery, mechanization, Deal Room work, inclusive finance, regional trade, COVID-19 mitigation, and gender-inclusive SME services, among other topics. This proliferation of partnerships comes at a cost, as AGRA staff has little bandwidth to support, monitor, and learn from partnerships. AGRA's very diverse set of partnerships also complicates its ability to integrate partnerships with consortia and compile lessons from similar investments.

Constraints addressed

AGRA provides its partners with strong value by linking global players with SMEs and farmers. AGRA leverages its systems development work to make partnerships linkages. For example, AGRA's Microsoft Africa Initiative aims to digitize the work of AGRA-supported village-based advisors (VBAs) in Kenya. AGRA has also partnered with international seed companies and off-takers either to sell to or buy from farmers within consortia arrangements. AGRA staff often play a strong leadership role in helping partners develop viable business models and align interests to ensure healthy partnerships.

The Agribusiness Deal Room has been successful in linking investors with capital seekers, but it overlooks the “hidden middle.” The number of participants and investors has grown dramatically since the forum's inception. AGRA has also recorded over \$300 million in investment commitments linked directly to the Deal Room, and many of AGRA's current partnerships originated in this forum. In interviews, however, stakeholders noted that a mismatch persists in the Deal Room between what investors and SMEs seek, in terms both of products and ticket size. Feedback from those who have participated in the Deal Room suggests that the AGRF should invest more in finding the African “hidden middle” of SMEs and micro-, small, and medium-sized enterprises (MSMEs) that have the most potential to expand operations, yet some of the fewest opportunities for finance. By serving this market segment, AGRA could leverage its in-country access to consortia partners and develop a niche not currently served by other match-making forums. However, serving this segment would require that AGRA provide even more TA to prepare SMEs and MSMEs for interactions with investors.

The Deal Room is business as usual with many actors looking at few deals... AGRA and partners need to invest more in the deal room TA programming and go a tier lower and support the hidden middle [of African SMEs] and make them more attractive to the bigger financiers.

—Private sector partner

AGRA maintains a strong focus on women and youth in its partnership work. In recognition of the challenges women and youth face in accessing investment funds, AGRA partnership staff focus on the participation of these two groups in the Deal Room and promote women and youth networking platforms and knowledge-sharing events. At the 2020 Deal Room, this culminated in 57 percent and 31 percent participation by women and youth SMEs, respectively, in the pipeline presented to investors. AGRA has also introduced VALUE4HER, a service delivery platform for women entrepreneurs, in several countries. The platform is designed to connect women entrepreneurs in agriculture with finance, technology, and other services. VALUE4HER is one of the only examples of gender-intentional programming at AGRA, in which programmatic supports are designed in response to women's unique constraints to growth. Potentially it can serve as an example for future AGRA systems development investments.

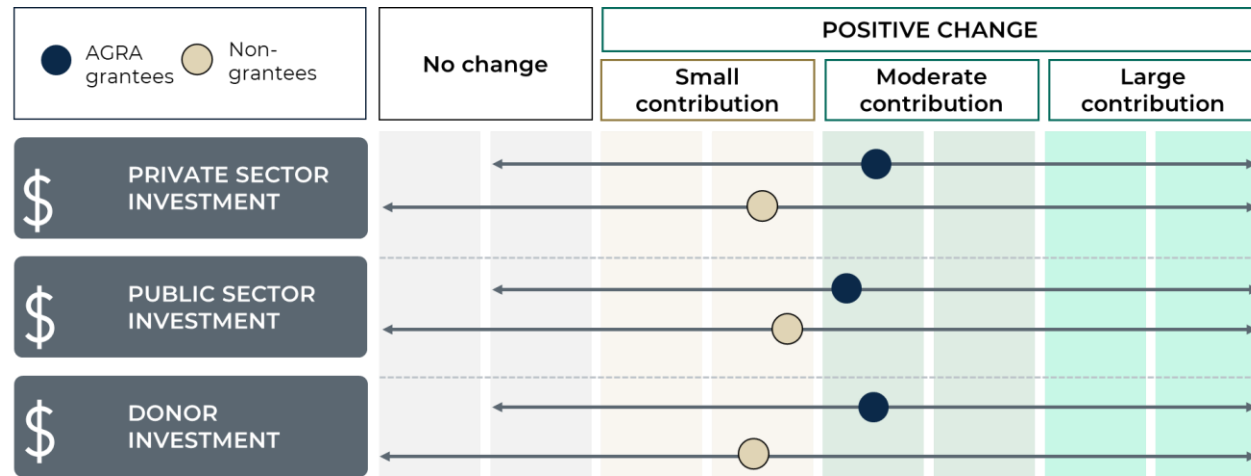
Practice changes

AGRA has leveraged substantial private sector investment, although likely less than reported. AGRA reports that it has leveraged \$141 million in investment from the private sector, surpassing its target of \$100 million. This includes many sources of funds that are not generally considered investment, including partners' ongoing

sales. Because partners have strong incentives to over-report true leverage, this is also an inherently difficult indicator to verify. Several notable examples of outsized leverage stand out. For example, under AGRA’s Covid 19 response program, YARA and Bayer provided an estimated \$32 million to reach over 900,000 farmers with inputs. Similarly, AGRA’s contribution of \$730,000 to Youth Agripreneurship programming helped leverage \$2 million in investment from Nestlé.

AGRA’s partnership work has also generated increased investments by national governments and donors. For example, AGRA provided \$250,000 to start the Farm to Market Alliance (FTMA) in Kenya, which then leveraged additional funding from the Rockefeller Foundation and the Norwegian government. AGRA was also able to attract in-kind support from WFP, NORAD, and Mastercard, together with private sector in-kind contributions from Yara and Bayer. Reflecting this level of investment leverage, stakeholders gave AGRA a small-to-moderate contribution for leveraging private, public, and donor investment in agriculture (Exhibit F.16). Interestingly, AGRA grantees consistently rated AGRA’s contribution to increased investment as moderate, whereas non-grantees rated its contribution as small.

Exhibit F.16. AGRA’s contribution to agriculture investment



Source: Structured web survey, 2021; N=49

Systems changes

AGRA has played a large role in extending mechanization and digital extension to smallholders. Of the entire partnerships portfolio, mechanization models are the notable frontrunner in terms of their ability to de-risk lending, boost the update of mechanization, and earn profits for SMEs and farmers. With thought leadership from AGRA, private sector partners have successfully de-risked tractor purchases with buy-back guarantees. From 2017 to 2021, AGRA successfully scaled mechanization models through Trotro in Ghana, ETC Agro in Tanzania, and Hello Tractor in Kenya, extending their reach to tens of thousands of farmers. Through its partnership with Microsoft, AGRA has also helped extend digital extension services to over 30,000 farmers.

Sustainability

Sustainability and successful scale-up of new models hinges on their profitability, which is unclear at present. Across multiple partnerships, AGRA has helped structure and begin to scale a few profitable

models that might ensure long-term private sector engagement—notably tractor rental services. However, the profitability of the larger set of AGRA-supported business models is still unclear, and preliminary results are mixed. For example, a few digital financial and e-verification service models have demonstrated strong potential for break-even, whereas digital extension for smallholder farmers and VALUE4HER have yet to establish viable business models. It is premature to assess the profitability of AGRA’s full set of partnerships after four years, as five to seven years to break-even is a conventional benchmark. Longer-term private sector engagement with farmers at scale will depend on whether AGRA can help surface and expand models in the realms of input delivery, extension, inclusive finance, mechanization, and output markets—and whether these models can demonstrate profits at scale. It also depends on AGRA’s ability to prioritize partnerships that leverage its strengths relative to other actors in this space, including its strong downstream connections with SMEs, its credibility with public officials, and its growing network of multinationals and investors.

4. Inclusive finance contribution narrative

AGRA has made investments in inclusive finance since 2017, both at national levels and in the context of consortia. Below we assess AGRA’s role in de-risking investments in agriculture across AGRA’s focus countries, the primary research question of interest for Inclusive Finance (Exhibit F.17).

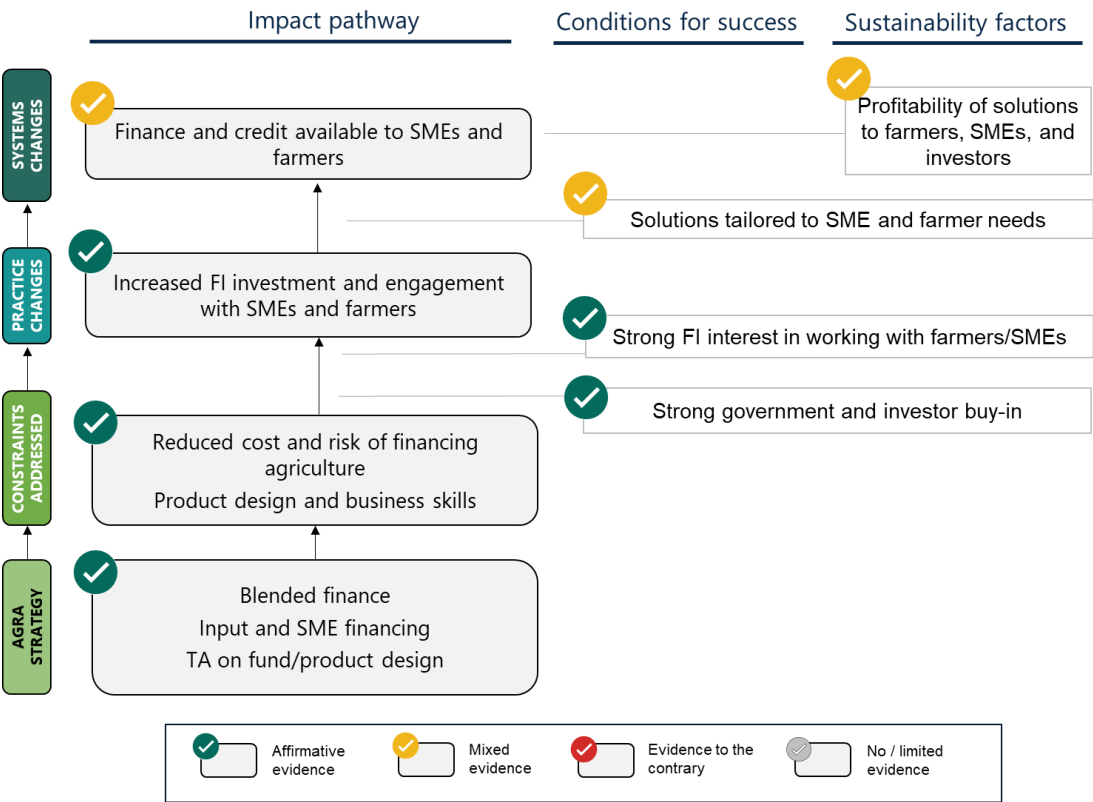
Exhibit F.17. Research question on inclusive finance

Primary question:	What has been the role and impact of DFIs and other innovative financial solutions in de-risking investments in agriculture to MSMEs?
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TOC overview and overarching findings

AGRA is attempting to reduce the cost and risk of financing agriculture. In helping design, fund, and support blended finance models and innovative SME finance approaches, AGRA seeks to lower the cost and risk of financing agriculture, thus extending financial services to SMEs and farmers (Exhibit F.18). AGRA works primarily with development finance organizations, governments, and investors to establish blended finance, whereas it generally engages with banks and funds to promote SME and farmer-level finance.

Exhibit F.18. Inclusive finance ToC



AGRA has helped craft and surface several viable finance models, but many of these have yet to reach farmers at scale. AGRA has increased the investment of financial institutions in agriculture and engagement with SMEs and farmers in recent years, both through legacy projects and new initiatives. Legacy projects include the Programme for Rural Outreach of Financial Innovations and Technologies Program (PROFIT) and the Financial Inclusion for Smallholder Farmers in Africa Programme (FISFAP).⁷ New initiatives include large-scale blended finance investments and innovative SME finance approaches that lower the cost and risk of agriculture lending. Despite their widespread reach across focus countries, AGRA’s inclusive finance investments have not penetrated most consortia at scale. Perhaps with the small overlap between AGRA’s inclusive finance and consortia investments, web survey respondents gave AGRA a low contribution score for its role in enhancing farmer access to inclusive finance.

Detailed findings along the ToC

AGRA strategy

Implemented in Kenya, PROFIT was designed to increase SME and smallholder access to finance. Prior to Phase 2, AGRA launched PROFIT in Kenya with IFAD. The program was designed to provide agriculture SMEs and smallholder farmers with suitable financial services through a blended finance model. It was composed of a guarantee fund designed to leverage millions of dollars in new credit financing for smallholders. The program also featured TA to help farmers and SMEs improve their agricultural output, as well as to help

⁷ PROFIT is funded by the International Fund for Agricultural Development (IFAD) and FISFAP is funded by the Mastercard Foundation. As such, they are not PIATA programs, per se.

financial institutions tailor their products to farmer needs. AGRA played a key role in managing the \$9 million guarantee fund and the \$2 million TA facility. The program ran from 2012 to 2019.

FISFAP helped pilot new ag finance products from 2017 to 2021. A joint venture with Mastercard, FISFAP was designed to improve the productivity and incomes of 728,000 smallholder farmers in Ghana, Kenya, and Tanzania through the provision of innovative financial and non-financial services for smallholder farmers and agriculture SMEs. These services included mechanization, end-to-end platforms, input finance, warehouse receipt finance, ag insurance, and mobile financial services. By project close it had served more than 2.1 million farmers, according to AGRA figures.

AGRA's current inclusive finance agenda is two-pronged, featuring blended finance and SME finance. Through blended finance, AGRA works with governments, DFIs and private investors to increase the availability of capital. However, because additional capital is not sufficient for stimulating lending to SMEs and rural finance institutions, AGRA also works with banks and establishes funds to identify innovative SME finance approaches that lower the cost and risk of agriculture lending. AGRA staff currently de-emphasize the goal of providing farmers with formal credit access, as the risks and consequences of default are too high for farmers. Optimally, farmers could leverage input-on-credit schemes with agro-dealers with whom they have established trust.

Constraints addressed

Through its various initiatives, AGRA is working to reduce the cost and risk of agriculture finance. Through PROFIT, FISFAP, its current blended finance, and its input finance portfolio, AGRA has identified and executed several models that effectively increase the availability of capital reduce the cost and risk of agriculture financing. Besides offering first-loss capital and spreading risk across several actors, AGRA commonly provides SMEs and investees with TA on production, storage, and processing, further de-risking investment. Although they are still in the pilot phases, AGRA claims its SME financing models can lower risk to financial institutions by up to 40 percent if skillfully conceived and executed.

Practice changes

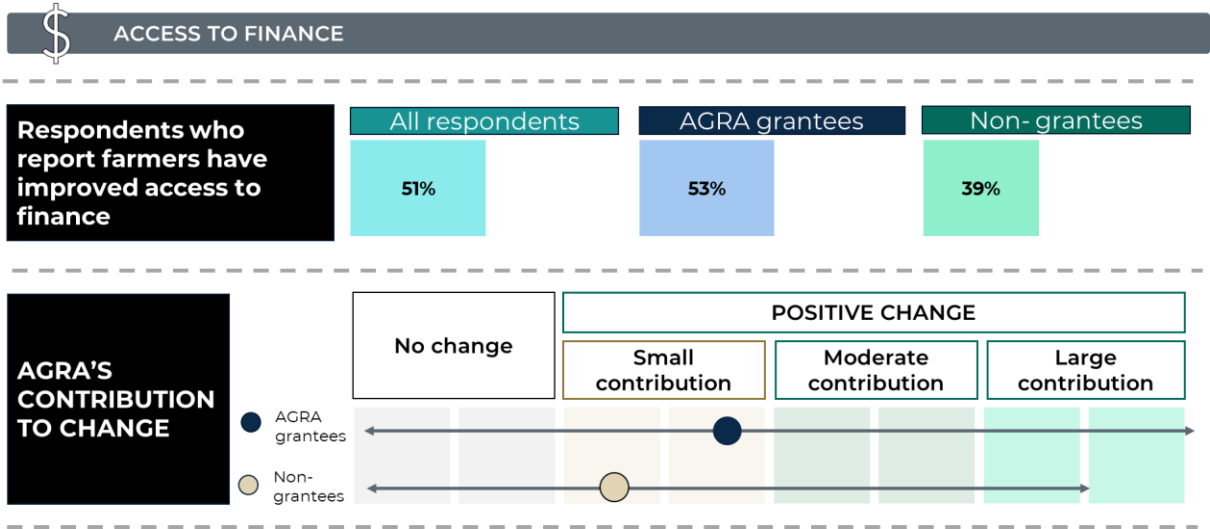
Banks, investors, and SMEs have responded positively to AGRA's blended finance and SME finance schemes. The Agribusiness Capital (ABC) Fund is one of AGRA's most recent investments in blended finance. AGRA invested \$5 million in first-loss capital into the fund and offers TA for investees alongside capital to de-risk investments further. Since 2019, the fund has leveraged three large investors and 11 investments totaling EUR 10.8 million. Similarly, AGRA is working with the Bank of Ghana to establish a guarantee facility called GIRSAL. As of 2021, the fund had crowded in \$14 million in investment from the African Development Bank and stimulated GHS 66 million in lending. With respect to SME finance, AGRA has piloted several input financing models in Burkina Faso, Ghana, and Mali within consortia that spread the risk of finance across MFIs, farmer orgs, input providers, and off-takers. These models have attracted financial service providers at a regional level that are willing to serve SMEs with finance and smallholders with inputs on credit.

Systems changes

AGRA's blended finance and SME finance investments have likely stimulated lending, but they have not yet reached farmers at scale. Given their success in crowding in public, private, and multilateral funding, the ABC Fund and GIRSAL have likely already helped increase the availability of capital for agriculture SMEs and smallholder farmer groups. However, these blended finance investments were still relatively new as of 2021. As such, their ability to de-risk agriculture lending and reach SMEs and smallholders at scale (while securing profits for private partners) is not yet clear. AGRA's blended finance work also occurs far

upstream of consortia in target countries, and thus has few explicit linkages with SMEs and farmers in consortia. In contrast, some of AGRA’s inclusive finance investments were introduced in the context of consortia. However, these inclusive finance programs were largely pilots, and thus not at the scale required for consortia-wide impact. For example, AGRA’s recent SME finance pilots reached only 36,000 farmers linked to consortia in Ghana, Burkina Faso, and Mali, compared to the full population of over 500,000 targeted farmers in these consortia. Perhaps given the small overlap between AGRA’s inclusive finance and consortia investments, web survey respondents gave AGRA a relatively low contribution score for its role in enhancing farmers’ access to inclusive finance (Exhibit F.19).

Exhibit F.19. AGRA’s contribution to finance access



Source: Structured web survey, 2021; N=161

Sustainability

AGRA has helped surface a handful of viable financial products and models that could be profitable at scale. Over FISFAP’s multiyear tenure, AGRA helped develop and deploy 22 digital solutions that enhance access to finance for smallholder farmers. Several of these solutions failed to engage profitably with smallholders, particularly in the realms of insurance, mobile money, and simple savings accounts. However, around five solutions showed potential to break even and profits within 5 to 7 years. These include income smoothening (Mucoba in Tanzania), goods receipt financing (Success for People in Ghana), and input financing with SME risk sharing (Advans in Ghana), all of which AGRA claims are ready to scale (AGRA, 10 lessons for the FISFAP Investment, 2021). Critical for sustainability is whether AGRA can profitably scale those viable models that emerged from FISFAP and its blended finance and SME finance approaches, while discontinuing work on models that do not demonstrate potential to break even.

5. Input supply systems contribution narrative

AGRA spent more than \$22 million in grants to build private sector capacity in seed production across 10 countries, with concentrated investments in Rwanda and Ethiopia at \$5.9 and \$4.4 million, respectively. In this section we assess the outcomes of AGRA’s seeds systems work, among other research questions (Exhibit F.20).

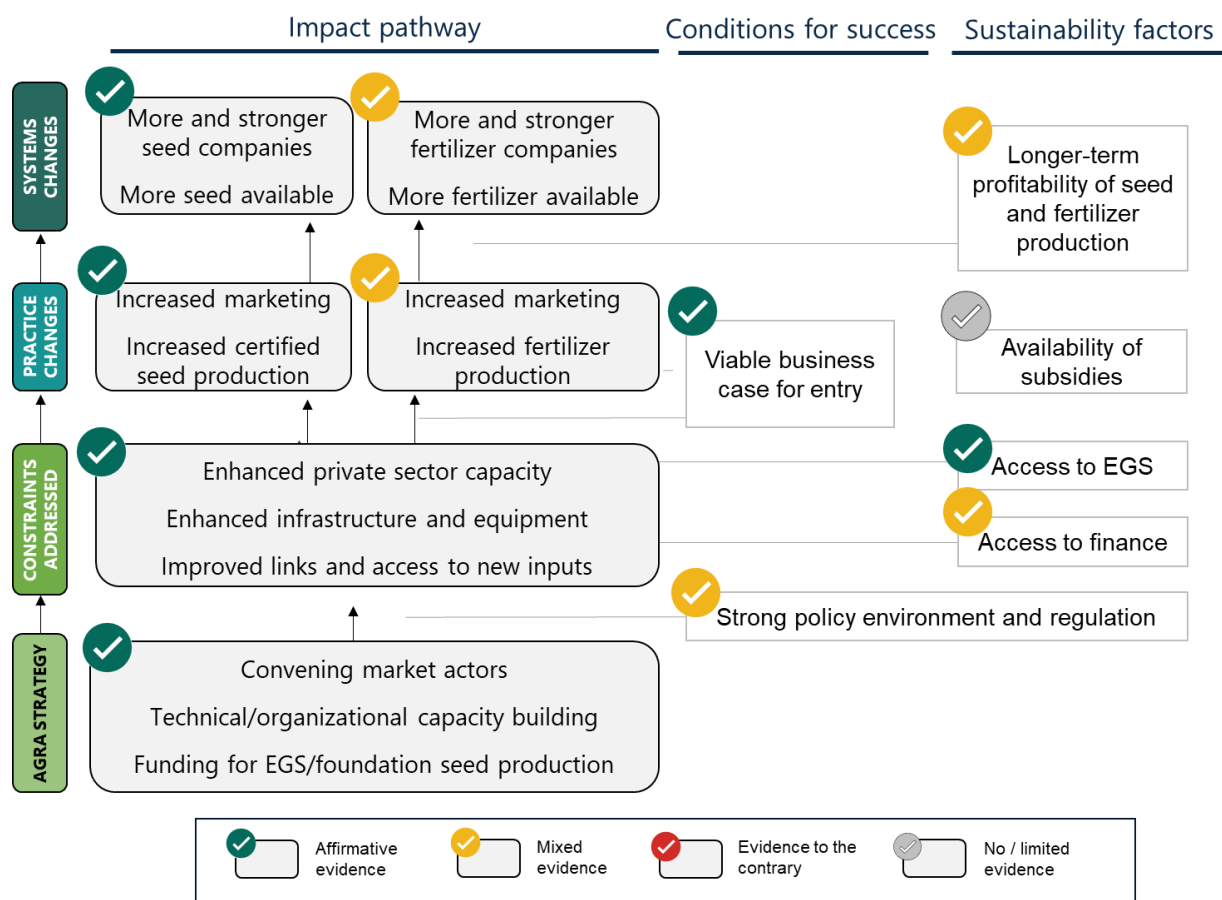
Exhibit F.20. Research questions on input supply systems

Primary question:	• What outcomes has AGRA's seeds systems approach created or contributed to?
Secondary questions:	• How could implementation of the seed sector approach have been improved? • What evidence suggests that outcomes are sustainable beyond the life of the intervention?

ToC overview and overarching findings**AGRA's work in input supply systems focused on increasing the supply of quality certified seeds.**

AGRA provided seed companies with funding, technical support, and business development services to boost their commercial production (Exhibit F.21). AGRA also invested in upstream links in the seed supply system. Notably, AGRA financially supported research institutes' production of early-generation seeds (EGS) and foundation seeds in selected value chains to ensure that seed companies had access to these inputs. AGRA also spearheaded seed and policy reforms to ensure that the private sector had strong incentives to invest in input production, and helped strengthen regulatory authorities to produce much-needed seed verification services. Taken together, these investments were intended to lead to more and stronger seed companies, and greater access to improved seeds by farmers.

AGRA also made modest investments in fertilizer. Citing existing private sector investments in fertilizer from Yara, OCP, ETG and other input suppliers in SSA, AGRA staff decided against making large investments in fertilizer production and distribution. However, they made modest investments in developing regional fertilizer maps, linking private actors to public research institutions working in fertilizer, and providing direct technical and financial support to fertilizer companies in Nigeria, Uganda, Ghana, and Malawi.

Exhibit F.21. Input supply systems ToC

AGRA was successful in increasing the supply of certified seed. AGRA convened market actors, built private sector capacity, and supported EGS production. Through these efforts, AGRA helped seed companies professionalize and expand operations, thus increasing the supply of certified improved seed in focus countries (Exhibit F.21). These efforts were particularly successful in boosting certified maize seed production in Rwanda and Ethiopia, buttressed by strong government support and a viable business case for seed companies to engage. Seed companies appear on a healthy technical and financial trajectory after the grant period. However, companies' access to finance and EGS, potential for profits, and availability of subsidies will all play a large role in determining whether these advancements in certified production are sustained in future years.

AGRA's fertilizer supply chain efforts were less successful than its seeds work, which reflects its strategic decision to focus on seeds. Private and public actors were successful in drafting regional fertilizer maps and validating appropriate fertilizer blends with AGRA's support. However, systematic cost and distribution constraints precluded fertilizer production and distribution at scale in most focus countries. To some extent, these outcomes reflect AGRA's decision to focus on seed production over fertilizer production in focus countries. However, farmers' lack of fertilizer access could have dampened AGRA's impact on yields, as discussed in Appendix E.

Detailed findings along the ToC

AGRA strategy

Private sector seed companies in all focus countries received substantial technical and financial support from AGRA to improve seed production.

AGRA supported private sector seed companies in all 11 focus countries through a combination of technical and financial assistance. Seed companies received training on various topics, including seed production, the use of technology to better track seed production and distribution, and overall management to improve the business operations. Seed companies in all focus countries also received grant funding to support seed production, including funding to support of growers and purchase infrastructure and equipment.

AGRA worked with public and private actors to develop improved fertilizer blends in seven countries. This included financial support for public research institutes to develop regional fertilizer maps, which would help determine what types of fertilizer blends would best serve countries' various agro-ecological conditions and focus crops. AGRA also linked private sector fertilizer companies to research institutes and provided direct technical and financial support to fertilizer companies in Nigeria, Uganda, Ghana, and Malawi. This resulted in the production of new fertilizer blends in seven countries.

According to most interviewed stakeholders, AGRA has the right solution to seed sector development. Private and public actors alike praised AGRA's investment in private commercialization of certified seed, which gives private actors healthy incentives to grow without encouraging dependence. Grantees also praised AGRA's consortia-oriented approach to developing seed company capacity and supporting seed production. For example, AGRA-facilitated seed consortia in Rwanda allowed actors with unique skills and assets to collaborate and successfully meet ambitious production goals.

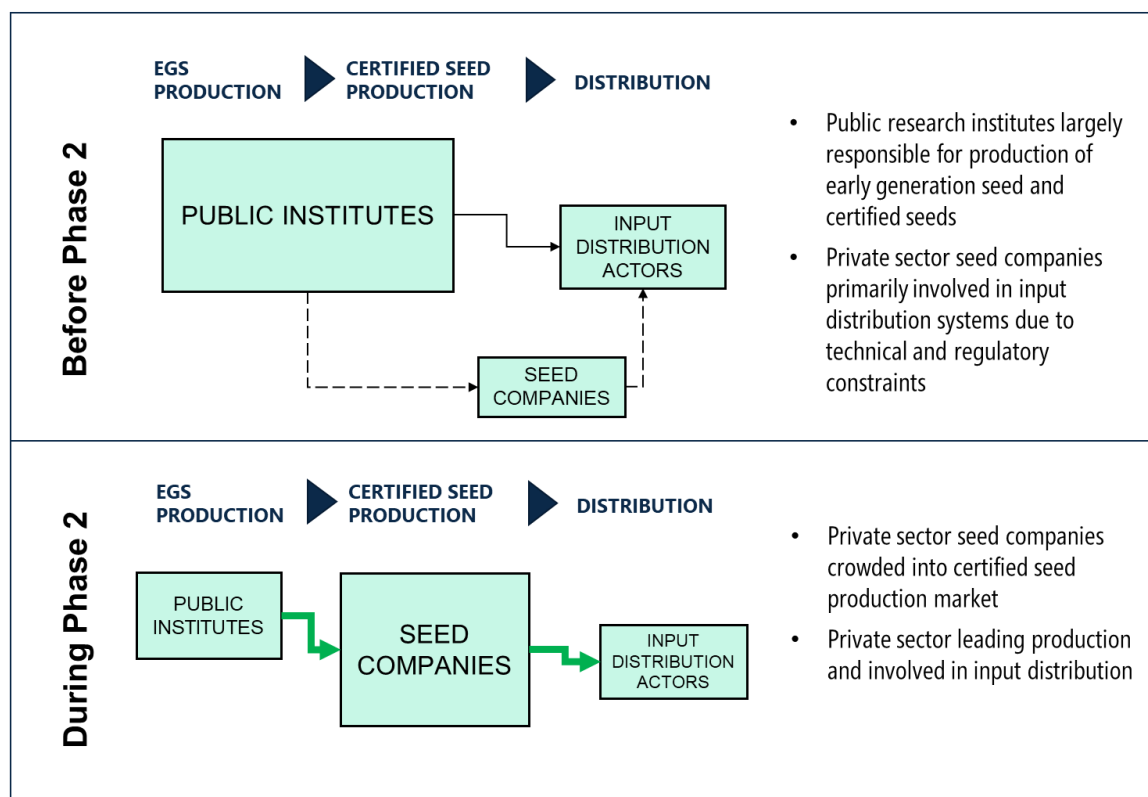
Stakeholders' only criticism of AGRA's seed sector approach is its focus on a small number of basic grains. Seed sector experts noted that AGRA's work across countries was largely focused on maize and rice, thereby missing opportunities to further diversify into legumes, tubers, fruits, and other high-nutrition crops. AGRA technical staff noted that its limited focus on basic grains largely reflected governments' narrow set of high priority crops. Potentially, deeper and more widespread consultation with civil society and smallholders could help stimulate public investment in a wider range of crops in focus countries.

Constraints addressed

AGRA has helped seed companies build capacity, professionalize, and expand operations.

Seed companies reported that AGRA's financial support addressed many of their constraints to increased production. Notably, grant funding helped companies expand their production operations and purchase required equipment. Through training, their staff also built scarce technical skills, which allowed them to specialize and professionalize their work. Seed companies noted that AGRA-funded training was high quality and useful, and some shared that AGRA is primarily responsible for the organization-level improvements they have experienced in recent years.

AGRA investments in public research institutes during Phase 2 set the stage for strong commercial production. AGRA funded public research institutes to produce EGS and foundation seed in maize, rice, and soy chains, among others. AGRA's policy work also helped to transition the role of these public institutes from production of EGS, foundation, and certified seed to focusing on producing new varieties, which could then be passed on to the private sector for production. (See "During Phase 2" panel in Exhibit F.22). This is largely a positive development, as public institutes generally have no comparative advantage in certified seed production vis-à-vis private actors.

Exhibit F.22. System changes in seed systems before and during AGRA support

AGRA also used its influence to support an enabling policy environment and improve seed inspection infrastructure. Through its policy and advocacy work, AGRA has helped lay the foundation for private sector seed production with policy reforms that protect intellectual property, strengthen certification and verification, and stimulate private sector involvement in the sector in other ways. Complementing these policy reforms, AGRA also supported the establishment or strengthening of seed regulatory authorities in most countries where it intervened in seed systems (Exhibit F.23). Rwanda and Ethiopia received the most support for establishing and operationalizing seed regulatory systems, building on their strong work on policy enactment within their policy and advocacy work. Despite these investments, most stakeholders reported persistent challenges with the quantity and quality of seed regulation occurring in focus countries. Commonly, seed companies described continued challenges with counterfeit seed on the market, which weakened their business viability.

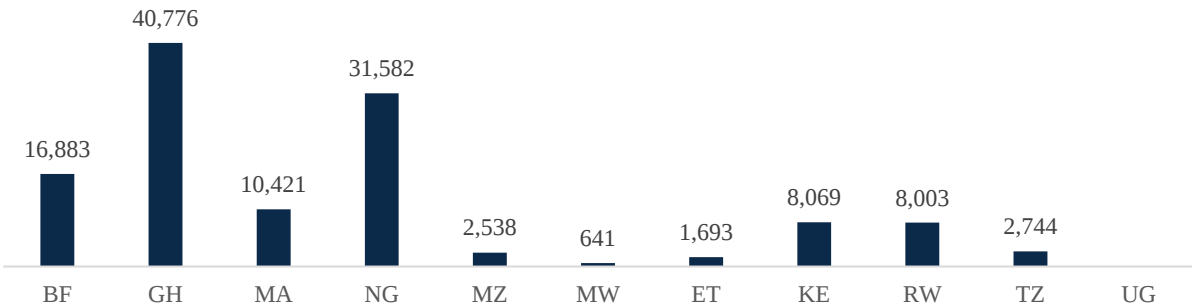
Exhibit F.23. AGRA support to regulatory seed authorities

Type of support	BF	GH	MA	NG	MZ	MW	ET	KE	RW	TZ	UG
Establishment of seed certification authority						X	X		X		
Modernization/digitization of seed tracking systems		X		X			X		X		X
Lab construction/renovation							X		X		
Training of staff and seed inspectors		X	X	X		X	X	X	X		X
Financial support				X	X	X	X		X	X	X

Practice changes

AGRA-supported seed companies have started new production operations and have significantly expanded their certified seed production activities. Seed companies in all countries reported increased seed production as a result of AGRA’s support. Overall, AGRA reported that more than 123,000 metric tons of improved seeds were procured by AGRA-supported seed companies over the course of Phase 2 (Exhibit F.24).

Exhibit F.24. Metric tons of improved seeds produced by enterprises supported by AGRA, 2017-2021



Fertilizer companies did not experience the same success as seed companies. Although AGRA-supported companies produced new fertilizer blends in seven countries, this work seemed to be most successful in Uganda, where private sector fertilizer companies reported building their business, increasing production, and engaging in farmer outreach with AGRA’s support. In other countries, private sector actors failed to experience this same growth. In part, these disappointing results reflect high import taxes on fertilizer inputs; high input costs (and thus lower profit margins); the difficulty repackaging, certifying, and storing fertilizer; and the fact that fertilizer must be tailored to different locales. Several stakeholders also described the role that subsidies played in distorting fertilizer markets, which further discouraged private sector participation. To some extent, these lackluster results are to be expected, given AGRA’s strategic decision to focus on seed supply over fertilizer supply (likely motivated by the structural constraints mentioned above).

Systems changes

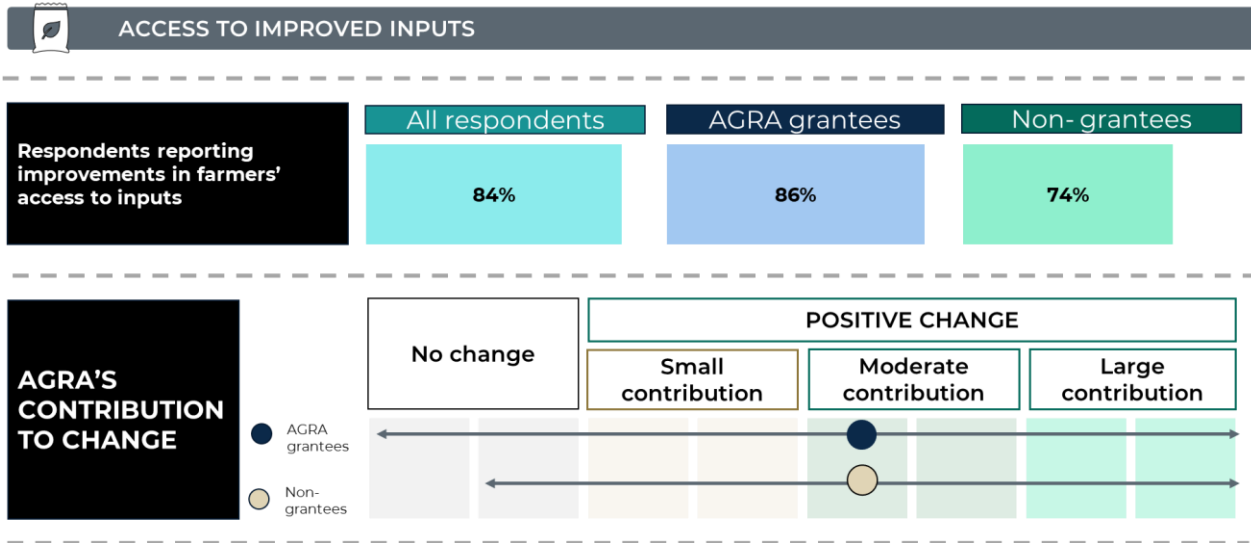
Input supply systems have expanded and strengthened in AGRA’s focus countries. AGRA’s work has helped crowd existing and new seed companies into focus countries, as companies are attracted by the prospect of profits. In Ethiopia, Ghana, Mozambique, Nigeria, Rwanda, and Tanzania, the number of registered seed companies rose dramatically from 2017 to 2021. International seed companies have also entered the seed sector in Ethiopia and Nigeria, hoping to capture a large share of the commercial seed market. In some countries, AGRA-supported seed companies reported that they are beginning to export seeds regionally or are gaining the potential to do so in the future.

AGRA pushed us to go beyond what we thought we could. Now we are at a level two or three times what we thought our potential was.
—Seed company representative

AGRA played a key role in getting more quality seeds on the market. Respondents to our structured web survey mostly agreed that farmers have improved their access to inputs over the course of Phase 2,

with AGRA’s direct grantees reporting a slightly higher percentage than non-grantees. Respondents assigned a moderate contribution of AGRA to changes in increased access to inputs (Exhibit F.25). These findings reflect stakeholders’ impressions of both seed and fertilizer access. Potentially, results would be even more positive if the survey had asked specifically about seed, as opposed to input, access.

Exhibit F.25. AGRA’s contribution to improved inputs



Source: Structured web survey, 2021; N=161

Sustainability

Seed companies and agro-dealers appear to be profiting from new improved seeds, at least under current subsidy arrangements. Seed company capacity and production will be sustained as long as seed companies earn consistent profits. This requires access to finance and EGS, sustained farmer demand, and a conducive policy environment. A potential reduction in subsidies in future years could have an outsized effect on farmers’ demand for improved seeds and fertilizer, as well as on seed companies’ margins, both of which could affect profits heavily.

Additional funding from donors and the public is likely also required for continued upstream seed system investments. This includes ongoing research in foundation and breeder seed. Fortunately, there appears to be donor and public interest in continuing with similar investments across most AGRA-focus countries, owing to the critical role of agriculture in countries’ GDP.

When the subsidy is no more there, actual demand will show its face and the level may not be sufficient to sustain that level of seed production effort.

—Seed expert in Ghana

The government is aware of the importance of the seed system and of supporting it. I think at the national level we will not be alone, with support of the World Bank, ECOWAS, and others.

—Public official in Burkina Faso

6. Input distribution contribution narrative

AGRA invested over \$5 million in input distribution from 2017 to 2021, with particularly large investments in Tanzania and Mozambique. In this section, we assess AGRA’s contribution to input distribution networks through agro-dealer and seed company strengthening efforts, both within and alongside consortia arrangements (Exhibit F.26).

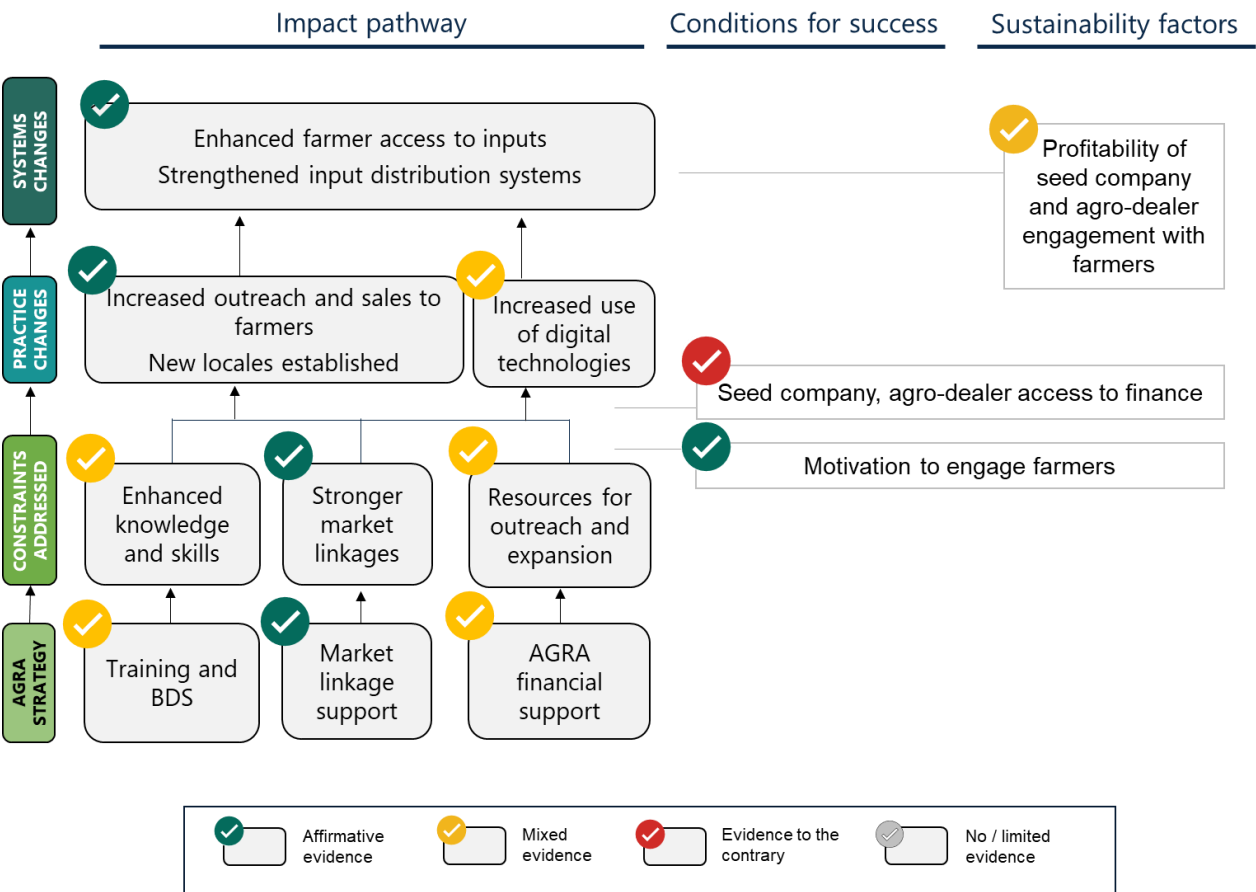
Exhibit F.26. Research questions on input distribution

Primary question:	What outcomes have AGRA’s input distribution investments created or contributed to?
Secondary questions:	- How well did AGRA’s interventions in distribution trigger increased farmer access to quality inputs? - Are outcomes sustainable outside the life of the intervention?

TOC overview and overarching findings

By investing in agro-dealers and seed companies, AGRA aimed to increase farmer access to quality inputs. AGRA grants funded agriculture training and business development services for seed companies and agro-dealers, as well as networking between input suppliers, VBAs, and farmers. This support was meant to increase input suppliers’ ability to engage farmers and market the new products they procured through new, AGRA-supported market linkages. Training and business development services were also intended to improve input suppliers’ business practices, largely through increased adoption of technology. AGRA generally supported existing agro-dealers, but in some countries, AGRA grant funding supported new entrants to the market, particularly at the local or village level. All investments were intended to increase farmer access to quality inputs, with farmer purchases resulting in profits for agro-dealers and seed companies. Motivated by more profits, input suppliers would consolidate and expand their offerings and farmer outreach, thereby strengthening input distribution systems (Exhibit F.27).

Exhibit F.27. Input distribution ToC



AGRA’s input distribution support helped agro-dealers and seed companies boost profits. AGRA supported more than 12,000 agro-dealers and seed companies with TA to boost farmer outreach and improve market linkages. Overall, agro-dealers and seed companies strengthened the quality and quantity of linkages with farmers and fellow input suppliers. They also reported increasing their outreach to farmers, who responded favorably to new seed varieties with increased demand. This has led to increased sales for many agro-dealers and seed companies during and immediately following AGRA grant periods (Exhibit F.27). However, financial constraints pose challenges to the long-term sustainability of these gains.

Detailed findings along the ToC

AGRA strategy AGRA’s provided technical and financial support—but limited business development support—to more than 12,000 agro-dealers and seed companies. AGRA reported having provided support to 12,126 agro-dealers in its focus countries. This support included technical training for agro-dealers on topics of farm management and product use, which they could extend to farmers. AGRA also provided financial support for seed companies and agro-dealers to engage in direct farmer outreach through field days and promotional events. In focus countries, AGRA and its grantees also held meetings and events to facilitate stronger relationships and networks between seed companies, fertilizer companies, pesticide companies, and VBAs, often in the context of consortia. In addition, aspiring agro-dealers in a subset of countries

(including Ethiopia, Tanzania, and Mali) received matching grants to assist them in starting their enterprises. In interviews, input suppliers verified this support and noted that it was largely relevant and useful. Some agro-dealers and seed companies discussed the need for more training on technical topics to provide better advice to farmers on proper input use. Although most agro-dealers reported receiving technical training, few agro-dealers and seed companies reported receipt of business development services (Exhibit F.28).

Exhibit F.28. Technical and financial support provided to agro-dealers

		West Africa				Southern Africa		East Africa				
		BF	GH	MA	NG	MZ	MW	ET	KE	RW	TZ	UG
Agro-dealers supported by AGRA in Phase 2		197	580	312	615	251	4,311	55		2,292	1,537	1,976
Type of support provided in case study countries	Training		x			x		x	x		x	
	Business development services										x	
	Facilitation of linkages		x			x		x	x		x	
	Financial support		x			x		x	x		x	

Constraints addressed

Agro-dealers and seed companies strengthened their market linkages through direct AGRA support. Overall, agro-dealers and seed companies reported strengthened market linkages with other input suppliers, including other dealers and seed companies, in addition to fertilizer and chemical companies.

Agro-dealers mentioned that the direct linkages to seed companies were particularly important, as this gave them more authoritative information about new seeds characteristics and requirements. This increased their confidence in selling these inputs to farmers. Seed companies and agro-dealers also reported stronger linkages with VBAs, which they leveraged to promote sales in rural areas. In Kenya, for example, seed companies provided improved seeds directly to VBAs, who in turn sold them at relatively low prices to farmers, thereby “cutting out” agro dealers. In other countries, however, input suppliers relied more heavily on hub dealers and agro-dealers to distribute their inputs to farmers.

Seed companies also reported positive changes in their organizational capacity due to AGRA. Seed companies described using grant funding to expand their outreach operations and upskill their staff on topics such as packaging and marketing activities. Many seed companies also described the positive effects of the new market linkages they made through AGRA support, particularly to agro-dealers and in some cases VBAs.

In most countries, financial constraints limited input suppliers’ ability to leverage new linkages, particularly when trust had not yet been established. Finance was a key constraint for agro-dealers and seed companies to generate profits in the high season. According to AGRA’s Geopoll, most agro-dealers across six countries reported difficulty getting financial assistance for their businesses. In interviews with agro-dealers and seed companies, both discussed issues about the paucity of lenders willing to lend to their businesses and the extremely high interest rates they encountered with the few who were willing to lend. This meant that, in many cases, even though new input supply linkages were made, agro-dealers often were unable to purchase the inputs required up front to stock them on their shelves.

The key mechanism by which this was resolved was through input credit arrangements between input suppliers and agro-dealers. However, when trust was not yet established between parties, suppliers were reticent to extend credit.

Practice changes

Agro-dealers and seed companies increased their farmer outreach and were rewarded with increased sales and profits. Overall agro-dealers reported increasing their marketing and outreach activities to farmers through several mechanisms, including distributing free samples, conducting outreach to communities directly, providing training and TA from their shops, and working with VBAs to extend their service area. (Seed companies, however, were mixed on the effectiveness of VBAs in generating farmer demand.) Seed companies in all countries reported providing farmers with information on new products and varieties as well as distributing more free samples for farmers than in previous years. In interviews in Ethiopia, Mozambique, Ghana, and Tanzania, agro-dealers and seed companies reported more sales and higher income as a result of these efforts. AGRA's Geopoll survey corroborates these findings, with agro-dealers reporting increased seed sales across most of AGRA's focus countries and increased fertilizer sales in about half.

Village agro-dealers have emerged with AGRA's help. In Tanzania, Ethiopia, Mali, and other focus countries, matching grants and training from AGRA helped farmers and VBAs in villages to establish their own small-scale locales, thus bringing inputs geographically closer to farmers in villages and rural areas. Farmers appreciated these new village agro dealers' advice and products, as well as the fact that dealers' close proximity saved them time and transportation costs.

These village agro-dealers were not there before 2017, and having them in this village is beneficial in terms of advice. Transport costs are reduced because instead of going to town, you simply buy the inputs from the village, just a walking distance.

—Farmer in Tanzania

Systems changes

Strengthened outreach has enhanced farmers' demand for quality inputs. Seed companies and agro-dealers described how their increased farmer outreach has led to more informed choice among farmers, as well as greater demand for their products. Agro-dealers in Kenya and Ethiopia discussed increased demand for new varieties from farmers as a result of farmer outreach. One company in Kenya described how the increased demand from outreach has led to increased production. Given the virtuous circle among outreach, enhanced farmer demand, profits, and greater production, a minority of interviewed companies pledged to continue engaging in farmer outreach activities.

New and existing input actors have improved last-mile delivery to farmers. In response to profits, several existing seed companies and agro-dealers expanded operations, particularly in Mozambique and Kenya. These new market players offer farmers competitive prices for inputs. Perhaps more important for smallholders, village agro-dealers supported by AGRA have dramatically improved last-mile delivery of seeds and chemicals to farmers.

Sustainability

Financial constraints pose challenges to the long-term sustainability of AGRA’s support. The reported profits of seed companies and agro-dealers bode well for the sustainability of improvements in AGRA-supported input distribution, as increased sales and profits could further strengthen linkages and sustain outreach activities. However, financial issues pose risk to long-term sustainability. Although seed companies noted the benefits of increased farmer-level engagement, overall they did not feel that they would be able to finance this increased outreach in the absence of AGRA support. In addition, most farmers lack the financial means to purchase inputs up front. As a result, agro-dealers often provide inputs to farmers on credit, putting a substantial amount of risk on them if farmers default. Thus without effective financial mechanisms established between suppliers and agro-dealers and between agro-dealers and farmers, it is unclear the degree to which these strengthened linkages will be sustained in the long term.

We have tried to open four shops to reduce the distance for farmers, but we need more financial support to expand the business.
—Hub agro dealer in Mozambique

We sellers face capital challenges; we have a lot of customers, but serving them on time becomes impossible due to shortage of capital.
—Agro-dealer in Tanzania

A credit guarantee scheme should have been available for participating agro dealers... That would have deepened the impact of the project.
—Implementing partner in Ghana

7. Extension contribution narrative

In nine countries, AGRA invested over \$25 million in extension from 2017 to 2021, with particularly large investments in Ethiopia (\$5 million), Mozambique (\$4 million), and Ghana (\$3.4 million). In Ethiopia, AGRA strengthened the public extension services. Across the other eight focus countries, AGRA implemented the VBA model of extension, whereby village leaders were trained to act as community extension workers and market facilitators. In this section, we assess AGRA’s contribution to extension and market systems, largely through the VBA model. (See Exhibit F.29 for the research questions addressed.)

Exhibit F.29. Research questions on extension

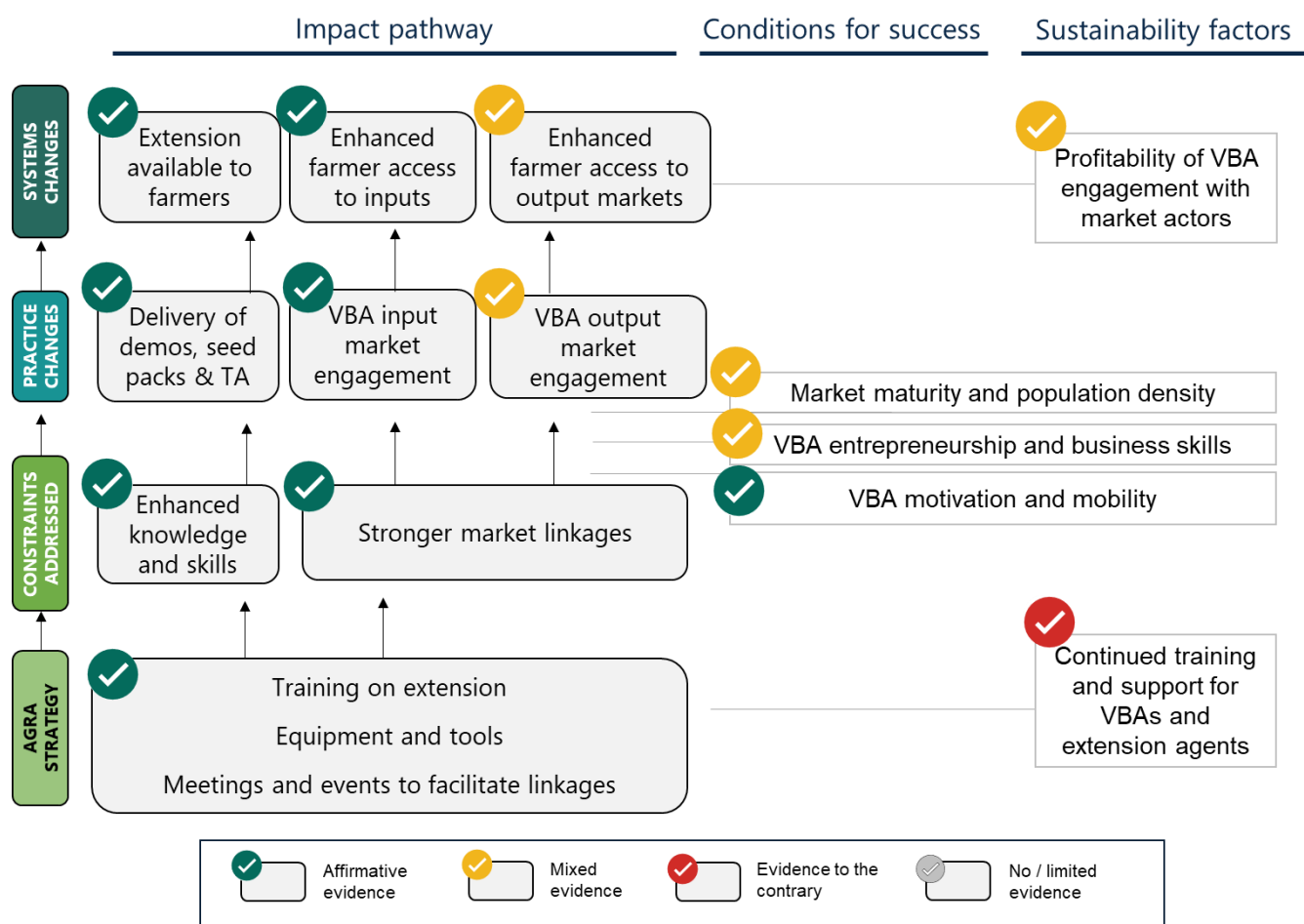
Primary question:	• What outcomes have AGRA's extension investments created or contributed to?
Secondary questions:	• How well did AGRA's interventions in extension trigger increased farmer access to quality inputs? • To what degree did the VBA approach allow for innovation in extension (for example, digital)? • Are outcomes sustainable outside the life of the intervention?

TOC overview and overarching findings

VBAs were trained to provide extension and facilitate market linkages. Under the VBA model, AGRA grantees selected established village leaders to be VBAs and trained them on good agronomic practices (GAP), improved inputs, and post-harvest practices. VBAs were then expected to establish demonstration plots in their communities to demonstrate the value of GAP and improved inputs. VBAs would also deliver farmer training, provide on-demand advice to farmers, and distribute free inputs as

samples. The goal was to build farmers' skills and stimulate their demand for improved seeds and fertilizer (Exhibit F.30). VBAs would also leverage newly established relationships with seed companies and agro-dealers to provide farmers with low-cost and timely inputs. As a result, farmers would begin purchasing inputs through VBAs, whereby VBAs would earn commissions on these sales. Within the consortia model, VBAs were also meant to take on a role in output markets, serving as aggregators among the farmers they served.

Exhibit F.30. Extension ToC



VBAs were successful in providing farmers with extension and access to inputs, but less successful in linking farmers with output markets. AGRA trained over 30,000 VBAs on good agriculture practices and improved inputs and fostered VBAs' linkages with seed companies, agro-dealers, and output market actors (AGRA Program Performance Report Q4, 2020). VBAs reached over 7 million farmers with demonstration plots and seed packs, providing them with opportunities to make informed decisions on inputs and practices. In focus groups across multiple countries, farmers noted that VBA-led training was very insightful, viewed VBAs' advice as highly practical, and thought highly of their VBAs. Although most VBAs appeared to deliver sound extension and improve farmers' access to improved seeds through samples and sales, VBA involvement in output markets varied widely by country (Exhibit F.30). According to AGRA's 2020 Geopoll phone survey of nearly 1,000 VBAs across six countries, only a small portion of VBAs in Burkina Faso and Tanzania reported aggregating production, whereas most

VBA in Mozambique reported doing so (AGRA 2020). This variation was likely driven by more mature output markets in some focus countries (like Mozambique) versus others (like Burkina Faso).

Detailed findings along the ToC

AGRA strategy

AGRA invested heavily in the VBA approach, creating more than 30,000 VBAs in eight countries. To provide sound extension, VBAs received training on good agricultural practices covering topics such as improved varieties of crops, planting methods, fertilizer application, and chemical application. In interviews, VBAs reported strong satisfaction with the quality of technical training they received. VBAs also participated in AGRA-funded meetings and events to introduce them to input and output market actors, often in the context of consortia. In Ethiopia, AGRA did not introduce the VBA model, opting instead to strengthen the public extension system (Exhibit F.31).

Exhibit F.31. AGRA's investments in strengthening extension in Ethiopia

In contrast with the focus on VBAs in other countries, AGRA invested in strengthening the public extension system in Ethiopia. The Ethiopian extension system is grounded in farmer training centers (FTCs), which have designated extension agents. These agents provide farmers with training on improved farming techniques and market information and advisory services. With \$5 million in investments, AGRA provided FTCs and agents with motor bikes, furniture, computers, printers, and projectors. AGRA also funded enhanced training for extension agents in good agricultural practices, post-harvest handling, and market linkages. In addition to the advisory services, AGRA funded the distribution of improved seeds, fertilizer, and post-harvest handling bags to lead farmers in targeted villages.

According to interviewed stakeholders, AGRA's support for extension workers in Ethiopia was well designed and aligned with the government's plans and priorities for extension. In buying motorbikes and projectors and training extension workers in GAP and inputs, stakeholders reported that AGRA has improved both the quality of extension and the quantity of farmers reached. According to farmers and agents, the result is improved adoption of GAP and inputs in Ethiopia among those farmers in enhanced agents' catchment areas, accompanied by enhanced production and sales. Stakeholders' single complaint about AGRA's support in Ethiopia is that it was limited to a small number of districts and farmers in need. Fortunately, the Ethiopian government is in deliberations to expand AGRA-funded improvements more widely. ▲

Constraints addressed

Trained VBAs and extension agents reported enhanced knowledge and skills as a result of training, despite some unmet training and equipment needs. In focus groups, farmers reported that their assigned VBAs possessed strong technical knowledge and skills. However, both VBAs and farmers felt that the training VBAs received was insufficient and that refresher training was needed to ensure updated skills. In an attempt to respond to the COVID-19 pandemic, some VBAs received digital tools to facilitate their delivery of extension activities and integration with input and output markets. The provision of this equipment seemed to be inconsistent across countries, with VBAs reporting receiving and using digital tools in a minority of the eight countries. Perhaps for this reason, stakeholders very rarely cited VBAs' provision of digital services.

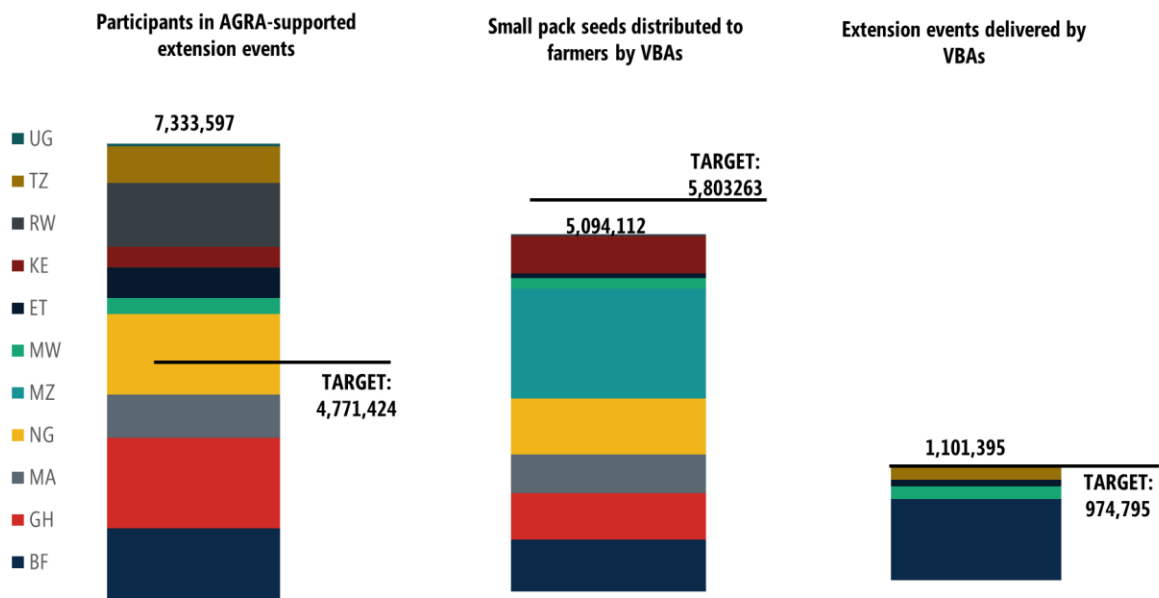
Financial constraints and business skills deficits remain. According to AGRA’s Geopoll survey, most VBAs reported difficulty getting financial assistance, particularly in West African countries. In interviews, VBAs reported that this lack of finance or credit inhibited their ability to stock up on inputs and buy output during peak seasons, which in turn affects their profits. Also according to Geopoll, only a minority of VBAs reported receiving business and development services. Such services could feasibly help them strengthen their business models with respect to selling inputs and aggregating production.

Practice changes

VBAs reached millions of smallholders with production-focused extension. The VBA model has led to an increased number of extension events, technical trainings, and demo plots being delivered to farmers, as well as the distribution of free small-pack inputs to farmers. Overall, AGRA reported that VBAs delivered over 1.1 million extension events (surpassing their target), which reached over 7 million participants (again surpassing their target). During these events, VBA distributed over 5 million small packs of inputs for free trials (nearly meeting their target; Exhibit F.32). VBAs offered farmers training on GAP, seeds, pesticides, and in some cases business principles and post-harvest practices. During qualitative interviews, many farmers reported increased understanding of GAP, improved seed, and fertilizer, as well as tangible skills with respect to seed spacing, applying chemicals, and applying fertilizer as a result of VBA engagement. Overall, farmers perceived VBA-led trainings to be very insightful, viewed VBA advice as highly practical, and thought highly of their VBAs.

Of everyone that comes to the community, the VBA is the most helpful—especially their training.
—Farmer in Kenya

Exhibit F.32. Extension and input dissemination against targets



Successful VBAs reported trusting relationships with the farmers they serve, strong links with public extension, and good transport access. Selecting trusted leaders and experienced farmers as VBAs served AGRA’s extension goals well, as VBAs leverage their trust and expertise to motivate fellow farmers to adopt GAP and improved inputs. In addition, VBAs with strong relationships with government extension agents were effective in elevating farmers’ concerns to extension agents and returning with recommendations. VBAs with motorcycles and bicycles had the means to conduct regular outreach to farmer plots, which farmers described as invaluable.

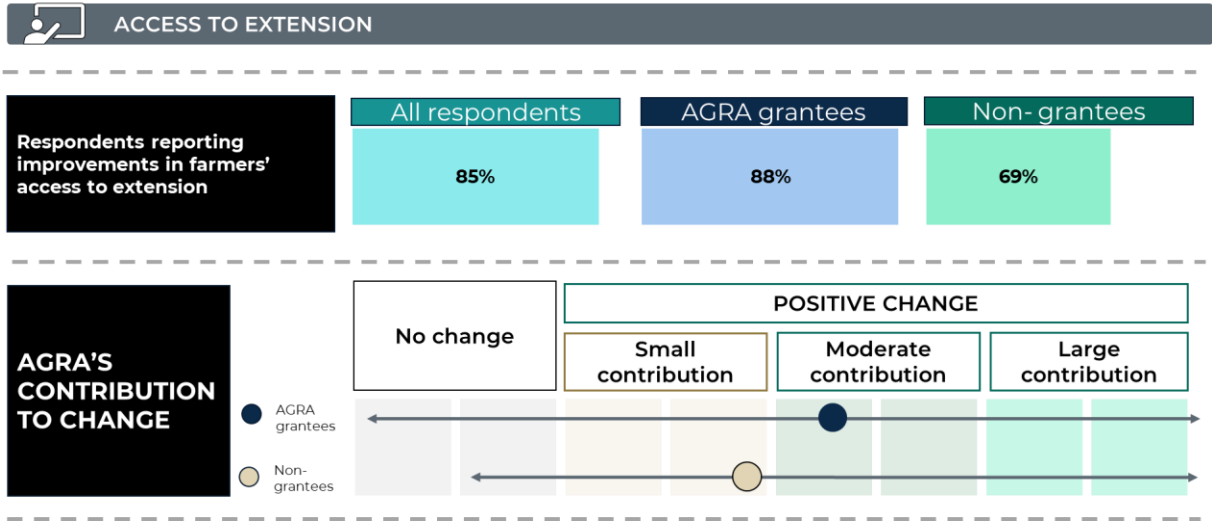
Systems changes

In addition to delivering sound extension, VBAs have strengthened farmers’ access to seeds. Farmers consider VBAs’ access to low-cost, quality inputs as critical to their value. According to AGRA’s Wave 1 Geopoll phone survey, 37 percent of VBAs across 7 countries reported selling inputs to farmers. Even when VBAs do not sell inputs, they often direct farmers to accredited agro-dealers to acquire quality inputs. In Kenya, Mozambique, and Tanzania, for example, VBAs have excelled in distributing improved seeds from seed companies and ag dealers to farmers in rural settings. In interviews and focus groups, farmers and SMEs alike reported benefiting from improved input linkages fostered by VBAs: farmers benefit from enhanced access to inputs, and SMEs benefit in the form of increased sales.

VBAs involvement in output markets varies widely by country. According to AGRA’s Geopoll, most VBAs across 7 countries reported aggregating products for output markets. However, there was high variation across countries, with nearly all VBAs in Mozambique but very few in Burkina Faso and Tanzania aggregating production. Some of this variation is likely explained by the higher maturity of output markets and presence of strong off-takers in Mozambique versus other countries. However, the lack of VBA engagement in output markets in some countries might also reflect VBAs’ lack of access to finance and business development services.

AGRA had a sizable contribution to extension improvements in its focus countries. Most web survey respondents agreed that, overall, farmers increased their access to extension services during AGRA Phase 2, which likely reflects increased public, donor, and AGRA investments in extension across focus countries in recent years. AGRA grantees assigned AGRA a moderate contribution to these changes, whereas non-grantees rated AGRA’s contribution as small-to-moderate (Exhibit F.33). Potentially, non-grantees had less firsthand knowledge of AGRA’s extension work through VBAs.

Exhibit F.33. AGRA’s contribution to extension access



Source: Structured web survey, 2021; N=161

Sustainability

Most VBAs report a strong interest in continuing their work with farmers. According to Geopoll, most VBAs across focus countries hope to continue serving their communities with extension. Interviews with VBAs suggest they are often motivated by a mix of personal commitment to their communities, indirect financial benefits from their enhanced agriculture knowledge, and direct financial benefits from commissions. In Ghana, VBAs believe that the interactions they have with farmers are mutually beneficial, as both the farmers and VBAs profit in applying the knowledge, skills, and lessons they learn together. In Mozambique, from the nearly 600 VBAs created, about 500 continue to provide extension and fulfill some commercial functions in the post-grant period. All this evidence points to a strong appetite on the part of VBAs to continue their work.

VBAs’ weak profitability case threatens their longer-term sustainability. Despite most VBAs’ motivation to continue serving their communities, most VBAs do not appear to have enough opportunities to earn consistent profits from their engagement with farmers (Exhibit F.34). In Kenya, for example, VBAs reported making profits from commissions only during the planting season. In Ghana and Tanzania, interviewed VBAs generally reported little to no income from commissions. (Mozambique may be an exception to this trend, as interviewed VBAs reported healthy profits from aggregating various crops.) Consortia partners and public officials validated VBAs’ general lack of profitability, noting that some adjustments to VBA compensation or income streams would be needed to strengthen the model’s sustainability.

Exhibit F.34. VBA perceptions on the profitability of their work

'Overall, it is not worth the time invested.'	VBA in Kenya
'It is profitable because I always get a margin, though very small.'	
'I can say the most benefit I have received by becoming a VBA is being closer to society. I can say the only benefit is the education I got.'	VBA in Tanzania
'The benefit is the knowledge and satisfaction I get from teaching farmers.'	VBA in Ghana
'I think that I need to register all the costs associated with my work, but I what I can tell you is that I have bought myself a motorcycle as a result of sesame sales this season.'	VBA in Mozambique

The VBA-to-dealer transition has good prospects for sustainability, although it is not explicitly encouraged through VBA selection and supports. With support from AGRA and other organizations, VBAs in Mali and other focus countries have established input stores and sell quality inputs such as seeds, chemicals, and fertilizers to farmers. However, VBAs' general lack of access to finance likely inhibits their transition to an agro-dealer role, as they lack working capital to stock up on seeds, fertilizer, and chemicals.⁸ In part, the low portion of VBAs that transition into agro-dealer roles might also reflect the profile that AGRA targeted for VBAs: trusted farmers who were not necessarily entrepreneurs. Entrepreneurship was not a core VBA selection criterion in most countries. In fact, VBA selection criteria in Tanzania might even have discouraged entrepreneurs in the agriculture space from participating, as VBAs were required to have alternate income streams and were asked to commit to volunteer work for the community as opposed to for-profit work.

Assessing the VBA model

VBA extension is a strong public good that deserves support. VBAs address an acute problem in most countries: the fact that public extension services are overstretched to the point of very high farmer-to-agent ratios. VBAs help complement public extension efforts with hands-on demonstrations, TA, and free seed samples. This experiential approach to extension empowers farmers to make informed decisions. VBAs also leverage social capital and trust within communities to promote adoption of inputs. Over and above their valuable role in extension, VBAs are also well positioned to coordinate with dealers and provide delivery of inputs, as well as to play a role in output markets.

VBAs are not a substitute for extension officers. Across all countries in which they were introduced, VBAs did not acquire the level of skill or experience required for them to take the place of public extension agents. In Kenya, VBAs require close interaction with extension agents given their limited technical expertise. Similarly in Ghana, VBAs take farmers' technical problems to extension agents and then return with recommendations. Overall, VBAs serve as capable liaisons between farmers and overstretched extension agents or as strong complements to public extension, as opposed to substitutes.

⁸ VBAs discussed overcoming this finance gap by engaging in input credit schemes with agro-dealers or third parties such as One Acre Fund. However, these were isolated cases, and for the most part, VBAs cited access to credit as a barrier to engaging in market opportunities.

VBAs are unlikely to remain effective unless they are absorbed by existing institutions or transition to agro-dealers. VBAs’ valuable extension services appear somewhat unsustainable, given that these services are generally uncompensated and unsupported. Either a public or a private entity must assume the responsibility of compensating VBAs, offering them booster training, replacing VBAs who have exited, and continuing to link VBAs with other market actors. There are few instances of VBAs being absorbed by larger private players (that is, becoming agents of seed companies or agro-dealers). VBAs trained from 2017 to 2021 are also unlikely to be incorporated into the public sector, given scarce public resources and a lack of strong public-sector buy-in and co-creation from the outset. Therefore, VBAs’ core extension work will likely remain uncompensated, despite the strong value the provide to extension agents and farmers. Without annual booster training and formal events, a nontrivial portion of VBAs will likely abandon their responsibilities within two or three years.

We need refresher training to keep us updated... We sometimes forget, but also there are new technologies coming in every now and then.
—VBA in Tanzania

8. Consortia contribution narrative

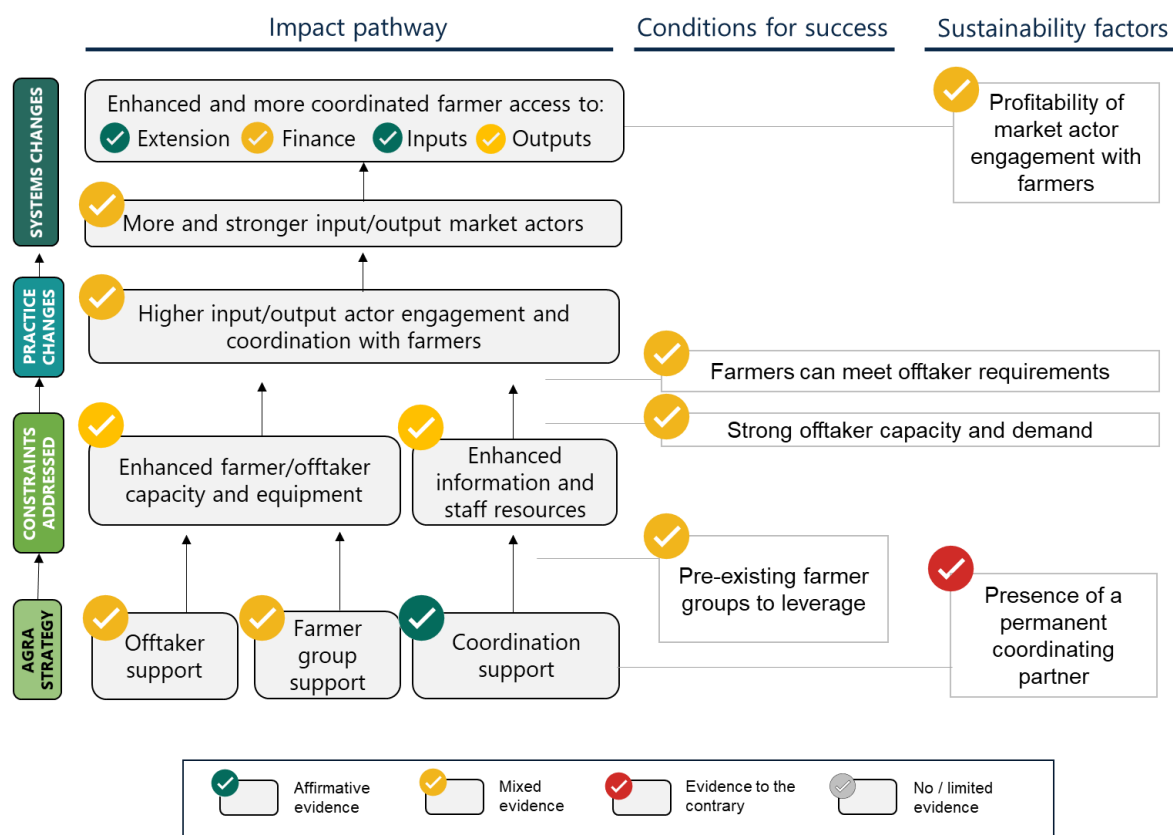
While AGRA’s other systems development work focused on national-level investments, their consortia approach focused on strengthening the interconnected systems within sub-country regions. Overall, AGRA spent \$45 million on consortia among seven countries, with particularly large investments in Mozambique (\$11 million), Burkina Faso (\$10 million), and Ethiopia (\$7 million). Consortia in Tanzania and Mozambique had some of the most balanced investments across input supply, extension, and market access, whereas consortia investments in Burkina Faso were highly focused on enhancing output markets, and consortium funding in Ethiopia was focused on extension. In this section, we assess the overall contribution of consortia to system actors’ access to finance, inputs, and output markets (Exhibit F.35).

Exhibit F.35. Research questions on consortia

Primary questions:	How effective has AGRA been in driving integrated approaches to systems development?
Secondary questions:	- Have consortia helped increase farmers’ access to finance and output markets? - To what extent have consortia “crowded in” new market actors and investments? - What evidence suggests that consortia are sustainable beyond the life of the intervention?

TOC overview and overarching findings

AGRA’s large-scale investments in consortia were designed to address farmers’ and market system actors’ binding constraints to agricultural transformation. Most consortia involved investments in (1) strengthening farmers’ access to input markets, (2) offering farmers extension services, and (3) strengthening farmers’ output market access. To boost farmers’ linkages with off-takers, AGRA provided both farmer groups and off-takers with training and equipment and coordinated their entry into structured markets. Some consortia in Ghana, Tanzania, Burkina Faso, and other countries also made large investments in finance and mechanization. The overarching objective of all these measures was to mitigate farmers’ and SMEs’ fundamental constraints to growth, including access to extension, finance, and markets, thus stewarding farmers into commercial production (Exhibit F.36).

Exhibit F.36. Consortium ToC

Overall, consortia had general success strengthening extension services and input markets, but less success in output and finance markets. Stakeholder discussions and AGRA surveys suggest that large AGRA investments in VBAs and extension systems enhanced the knowledge and practical skills of farmers in consortium target areas, as well as their demand for improved inputs. Similarly, AGRA-funded support for seed companies and agro-dealers in consortia areas helped these SMEs strengthen their input linkages and leverage VBAs to meet growing demand. AGRA also had success strengthening output and finance markets through consortia, but in a smaller subset of countries and regions. For example, in Mozambique, AGRA-funded coordination between buyers, VBAs, and farmers significantly strengthened output market linkages. And in Burkina Faso, AGRA was particularly successful in providing finance to farmers in consortia. Across all countries, however, stakeholders generally noted that improvements in extension and input markets reached more farmers and SMEs than improvements in output markets and finance. In the structured web survey, for example, 61 and 51 percent of AGRA grantees reported that extension and input market improvements had widespread farmer reach, respectively.⁹ In contrast, only 27 and 22 percent of grantees reported that output and finance market improvements had widespread farmer reach, respectively.

Consortia's sustainability hinges on their ultimate profitability for all key actors and the presence of coordinating partners. Consortia will remain intact while they generate profits for input actors, output

⁹ Widespread farmer reach is defined as at least half of farmers in grantees' geographic area experiencing enhanced access.

actors, and farmers. Currently, profits appear healthy for input actors but more varied for output actors and farmers as they work to establish sustained structured agreements. As farmers' primary conduit to other actors, VBAs also play a critical role in maintaining and consolidating farmers' new input and output linkages. However, the weak business case for VBAs and their lack of continued support may drive most VBAs to discontinue their activities across established consortia within five years. Furthermore, in only a few consortia in Ghana, Mozambique, and Ethiopia do public or private authorities appear to be taking ownership of the consortia's vital coordination function. This is particularly worrisome, as constant coordination and leadership are required to ensure that buyers' quality and quantity requirements are upheld and to resolve price disputes between farmers and buyers.

Detailed findings along the ToC

AGRA strategy

Multiple service providers made up each consortium, and lead consortia partners played a vital coordination role.

Operationally, AGRA funded service providers to implement the consortia model in each geographic location.

These service providers were predominantly local or national non-governmental organizations (NGOs) or larger international development organizations. Service providers offered specialized technical and financial support to market system actors, including farmers, within AGRA's defined system components. Some providers specialized in seed production, others trained VBAs, others worked with input providers, some specialized in securing output markets, etc. In each consortium, a lead or anchor service provider would typically play a coordination role. In this role, they tracked farmers' receipt of services and often facilitated collective purchasing and selling agreements between farmers and input and output market actors. Unfortunately, lead service providers did not have adequate resources dedicated to coordination and had no authority over other service providers.

Agribusiness SMEs received a range of technical and financial support through consortia to improve their engagement with farmers. Consortia partners provided both technical and financial support to agribusiness SMEs involved in output market activities, including aggregators, off-takers, and processors. TA included training on processing and marketing, assistance on farmer engagement, and general business development services (such as bookkeeping and inventory control). In four of seven countries with consortia, SMEs also reported receiving financial support for storage and aggregation, including funds to build warehouses and storage facilities. Agribusinesses were generally satisfied with quality and quantity of support provided.

Constraints addressed

Consortia support helped agribusinesses address many of their organizational, technical, and information constraints to reaching farmers.

Agribusinesses attributed their improved operations to AGRA-funded trainings and business development services, and they credited AGRA machinery and warehouse donations as vital to recent improvements in productivity and storage capacity. In Tanzania, for example, SMEs attributed their increased capacity to work with farmers to AGRA-funded training. Agribusinesses in consortia consistently reported that farmer contact information they obtained through consortia meetings enhanced their marketing activities. Some agribusinesses also reported using online systems to improve operations as a result of AGRA-funded training.

Access to finance remains a constraint for output market SMEs in the post-grant period, despite AGRA’s work to infuse consortia with finance.

In Burkina Faso, AGRA established blended finance with two large banks to increase finance access to farmers in consortia areas. In addition, AGRA’s recent inclusive finance pilots reached 36,000 farmers linked to consortia in Ghana, Burkina Faso, and Mali. In Tanzania and Ghana, AGRA also helped farmers linked to consortia access loans and extended finance to SMEs through revolving funds and blended finance. Despite these efforts, only a minority of targeted off-takers and farmers reported having access to credit in 2021, according to AGRA’s Geopoll surveys. In interviews and focus groups in Tanzania, Ghana, Mozambique, and Kenya, agro-dealers, off-takers, and farmers widely reported little progress with access to finance since 2017, and often cited a lack of finance as their primary constraint to growth.

Lack of SME credit is a real weakness to this consortium.

—Implementer in Ethiopia

Practice changes

As a result of increased coordination and the capacity improvements, more agribusinesses engaged in structured markets with farmers. In interviews, agribusinesses in all consortia described entering into new structured agreements with farmers, for which they credited AGRA and lead consortia partners. Through coordination meetings and consortia events, market actors had a forum to present their product preferences and requirements, which in turn motivated farmers to work collectively to fulfill large orders.

Farmers still struggled to honor agreements and meet buyers’ specifications. Stakeholders in several countries noted instances of farmers not honoring their structured agreements with agribusinesses when output price fluctuations resulted in more competitive prices on the open market. AGRA service providers noted that this was a consistent problem and that lead consortia partners had to intervene to broker an outcome that was acceptable to all parties. In some consortia, farmers also struggled with quantity and quality issues that precluded their ability to fulfill large orders. Many consortia attempted to address this condition directly through technical and financial support to farmer organizations. This consisted of increasing their storage capacity through the construction and/or enhancement of storage facilities as well as targeted trainings for farmer unions on post-harvest handling techniques.

Systems changes

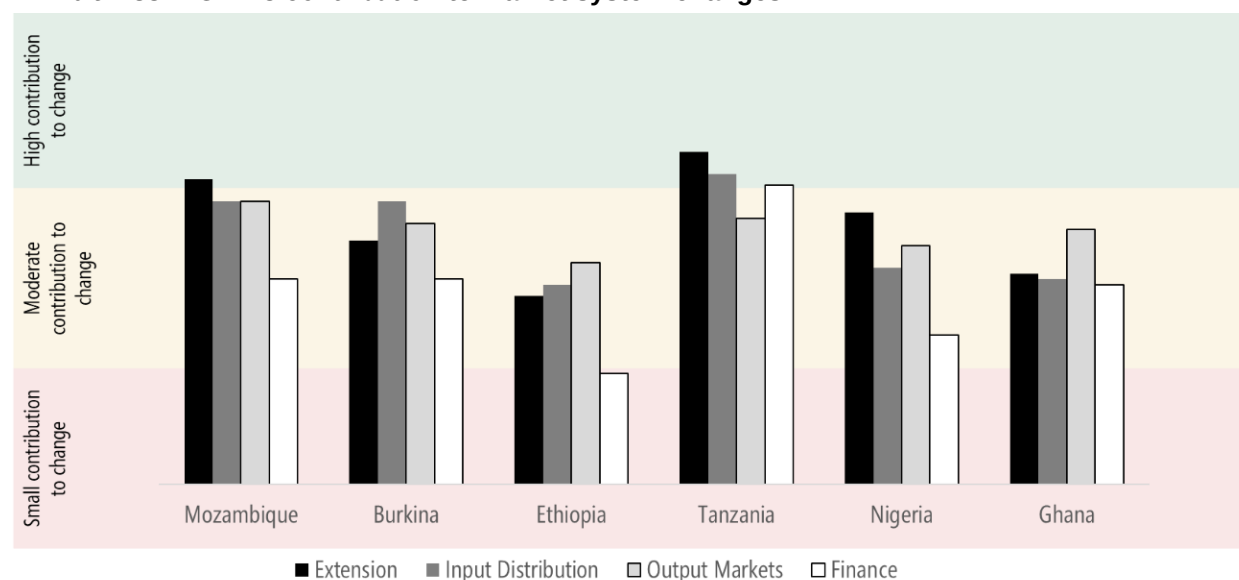
New private sector actors in input and output markets have crowded into consortia, attracted by potential profits. In Mozambique in particular, AGRA’s consortia investments appear to have triggered private investment from input suppliers. For example, Yara invested \$725,000 on fertilizer, Bayer has injected improved maize seeds (120 tons valued at \$282,000), and Klein Karoo Seed Marketing established a locale in Mocuba to sell inputs to hub-agro-dealers. In interviews and presentations, stakeholders cited the role of cassava, rice, and maize consortia in Ghana crowding in aggregators and large processors as well (Exhibit F.37). The Geopoll survey suggests that these moves may be profitable: off-takers in Mozambique reported an increase in the profitability of maize (and rice in the case of Burkina) in 2020 compared to 2017.

Exhibit F.37. Examples of crowding in output market actors

Ghana cassava	The consortium has attracted many players like the Josma company, which processes cassava. Before, the consortium was processing 1 ton per month; now they process 4 tons, according to AGRA. Output market actors previously worked with 1,000 farmers, and the number has since increased to 30,000 following consortium activities. In addition, the number of cassava factories has increased from 6 to 23 since 2018, and the area planted under cassava has increased from 1,614 to 30,611 since 2018 according to AGRA. (PDI presentation, March 2020)
Ghana rice	The number of rice mills has increased from 12 to 27, the number of aggregators increased from 31 to 110, and farmer reach has increased by 97 percent according to AGRA. Two seed companies, Sparkx and Volta City Farms, have increased their seed production by 44 percent within 2 years, based on their own reports.
Ghana maize	The number of aggregators who are getting produce from farmers to processors has increased by 67 percent, according to AGRA.

Consortia had varied success across countries and regions. There was high variation in consortium investments and successes, a result of varied AGRA supports and a wide range of existing market integration and public capacity across countries. In Tanzania, AGRA reported that consortia strengthened both input and output markets, buoyed by strong agro-dealer capacity and newly established farmer-to-miller linkages. In Ethiopia, stakeholders reported that consortia enhanced input and output linkages by leveraging strong government ownership and existing farmer groups. In Burkina Faso, stakeholders reported that consortia were particularly successful in improving access to finance, a result of targeted investments in blended finance and revolving-fund models. In Nigeria, seed companies and warehousing businesses grew more dramatically than in other countries, according to AGRA technical staff. These varied successes highlight the fact that there is no single formula for success with respect to consortia, and that successes often build upon regional and in-country assets and institutions.

Overall, stakeholders felt that AGRA made a moderate contribution to recent improvements in extension and market access. Despite wide variation in consortia successes across countries, general trends across countries and consortia emerged in qualitative data collection and the stakeholder survey. In interviews and focus groups in Kenya, Mozambique, Burkina Faso, Tanzania, and Ghana, respondents noted strong advancements in extension and input market linkages, but more variation in the strengthening of output markets. Across all consortium countries, respondents of our structured web survey generally felt that extension and input and output market systems improved over the past four years, and assigned a moderate contribution of AGRA's direct work to these improvements (Exhibit F.38). Respondents reported AGRA's contribution to be higher in extension and more moderate in input and output market linkages.

Exhibit F.38. AGRA's contribution to market system changes

Source: Structured web survey, 2021; N=161. Because the number of respondents is fewer than 10, no results are presented for Mali.

Inclusive finance investments appeared to penetrate some consortia, but not others. Despite AGRA's efforts to extend input finance and loans to consortia actors, web survey respondents rated AGRA's contribution to finance systems as low compared to its extension and input-output market work (Exhibit F.38). However, stakeholders assigned AGRA a moderate to high contribution to improved finance in Tanzania, likely linked to AGRA's blended finance and revolving fund work with SMEs.

Assessing the consortia model

The theory behind consortia is sound, and consortia are an improvement over the status quo.

Consortia leverage members' relative expertise and assets to meet actors' multiple constraints. When executed well, consortia can also crowd in input and market actors, thus initiating virtuous circles of increased production, demand generation, and profits.

The consortia model could be further improved upon with longer timelines and stronger incentives for collaboration. Consortia could be improved even further, according to partners, with longer grants (for example, of up to 5 years) and stronger incentives and resources for partners to get acquainted, plan together, coordinate activities, and collaborate. Consortia could also feature modifications to their accountability structure. Notably, the fact that all grantees have direct agreements with AGRA reduces the ability of the lead consortium member to hold other consortia members accountable. Exhibit F.39 contains a larger set of proposed improvements to consortia.

Exhibit F.39. Suggestions to improve consortia

Technical changes	Structure consortia members and activities even more centrally around output markets. Perhaps explore building upon the “empowered off-taker as key consortium member” model as in the Smallholder Inclusive Productivity and Market Access (SIPMA) consortium in Ghana. Future consortia could structure all extension and input distribution supports to serve output market requirements, under the guidance of engaged off-takers.
	Conduct more-focused needs assessments for farmers and the SMEs that serve them. Consider contracting service providers only after these needs assessments are completed, as assessment findings may dictate the nature and level of support required.
	Mobilize in-country partnerships to assess and address critical constraints more systematically in finance and mechanization at the outset.
	Engage local market players and existing structures from the design stage onward. Mapping these actors could serve project design.
Administrative changes	Solicit innovative ideas for consortia structures, members, and activities from a wide group of potential partners, as opposed to engineering consortia with existing grantees.
	Make consortia grants five years to allow time to do proper actor assessments, build rapport among partners, and consolidate and expand successful activities. Potentially, only those consortia that demonstrate success after three years could enter into an additional two-year “consolidation and expansion” phase.
	Include funding for planning and coordination between partners.
	Consider making lead members more accountable for consortia outcomes, but with enough resources and authority to influence those outcomes.

Sustainability

Consortia’s sustainability hinges on their ultimate profitability and the presence of coordinating partners. Consortia will remain intact while they generate profits for input actors, output actors, and farmers. Currently, profits appear healthy for input actors but more varied for output actors and farmers as they work to establish sustained structured agreements. As farmers’ primary conduit to other actors, VBAs also play a critical role in maintaining and consolidating farmers’ new input and output linkages. However, the weak business case for VBAs and their lack of continued support may drive most VBAs to discontinue their activities across established consortia within five years. Furthermore, only in a few consortia in Ghana, Mozambique, and Ethiopia do public or private authorities appear to be taking ownership of consortia’s vital coordination function. This is particularly worrisome, as constant coordination and leadership are required to ensure that off-takers’ quality and quantity requirements are upheld and to resolve price disputes between farmers and off-takers.

Business-led consortia may have the most promise for sustainability. AGRA plans to invest more heavily in business-led consortia in future years, as opposed to NGO-led consortia as in past years. (Arguably, business-led consortia are feasible only in some geographies after NGO-led consortia have done initial farmer engagement and market integration work.) In these business-led consortia, off-takers (including traders and processors) could feasibly manage their supply chains from end to end, supported by NGOs and other services providers. The success of Yedent and Advans in Ghana and Luteari in Mozambique can provide insight into how to structure business-led consortia in the future.

References for Appendix F

AGRA Program Performance Report Q4, 2020.

AGRA 2020/2021 Geopoll survey of farmers, SMEs, and VBAs

AGRA, 10 lessons for the FISFAP Investment, 2021.

Michie, S, MM van Stralen, R West. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Sci*, vol. 6 (1). doi:10.1186/1748-5908-6-42.

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