Soil Health Program end-term impact study report

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Preface

This report was prepared by a team of researchers from the Centre for Sustainable Development Initiatives (CSDI), led by Dr. Abdi Zeila, who led the evaluation team of five specialists and four support staff who handled the data entry and logistical backstopping. The team worked under the overall guidance of Dr. Rebbie Harawa, Head of Soil Health and Fertilizer Systems at the Alliance for a Green Revolution in Africa (AGRA), and under the direct supervision of Dr. Abednego Kiwia, who has been coordinating the Soil Health Program since 2009. Abednego provided appropriate strategic and technical guidance, coordination, and methodological and logistical support. The evaluation also benefited from the assistance of Daudi Sumba, Head of Monitoring and Evaluation at AGRA, Nyasha Mhosva (M&E officer), and Josephine Njau, coordinator of the AGRA's M&E unit. Ms. Dorothy Shivere, Program Assistant, provided logistical support, whenever needed and this enhanced our efficiency in undertaking the study.

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Acronyms and Abbreviations

AGRA	Alliance for a Green Revolution in Africa
CAADP	Comprehensive Africa Agriculture Development Program
CDI Rwanda	Clinton Development Initiative Rwanda
DUS	Distinctness, Uniformity, and Stability (testing of seed)
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO statistical database (www.faostat.fao.org/)
EoPE	End of Program Evaluation
GDP	Gross domestic product
GNI	Gross National Income
Ha	Hectare
IIAM	Instituto de Investigação Agrária de Moçambique
IDSST	Improved Delivery of Seeds and Soil Fertility Technologies
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Centre
ISFM	Integrated Soil Fertility Management
KALRO	Kenya Agriculture and Livestock Research Organization
KNUST	Kwame Nkurumah University of Science and Technology
KU	Kenyatta University
MNCs	Multinational corporations
MSC	Most Significant Change
MSc	Master of Science
NARE	National Agriculture Research Systems
NPK	Nitrogen, phosphorus (phosphate), potassium fertilizer
NSC	National Seed Committee
Ph.D.	Doctor of Philosophy
TUDRIDEP	Tumu Deanery Integrated Development Programme …
OPV	Open-pollinated variety
SARI Ghana	Savannah Agricultural Research Institute (Ghana)
SARI Tanzania	Selian Agricultural Research Institute (Tanzania)
SHFs	Smallholder farmers
SHP	Soil Health Program
SSA	Sub-Saharan Africa
SUA	Sokoine University of Agriculture
UoN	University of Nairobi

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We also gratefully acknowledge the intellectual support of Dr. Rebbie Harawa, Daudi Sumba, Nyasha Mhosva, and Josephine Njau, who were very instrumental in ensuring that the right focus was adopted during the evaluation study. Dorothy Shivere ensured seamless connectivities in our travels and that the right people were available for interviews at the right time, thank you.

Our sincere appreciation also goes to the organizations, businesses, and communities in the five countries where we visited and did a deep dive into the study as well as in the eight other countries where we virtually contacted our respondents. All the study participants that we contacted went out of their way and shared sufficient information that helped to compile the required data to conduct this evaluation study. To all, we say a big **thank you**!

The CSDI team

Nairobi, February 29, 2020

Executive Summary

Launched in August 2008, the Soil Health Program ("the SHP") of the Alliance for a Green Revolution in Africa ("AGRA") sought to increase incomes, improve food security and reduce household poverty by promoting the use and adoption of integrated soil fertility management ("ISFM") practices among smallholder farmers and creating an enabling environment for farmers to adopt the practices in an efficient, equitable and sustainable manner across sub Saharan Africa. The Program sought to (a) create physical and financial access to appropriate fertilizers for about 4.1 million smallholder farmers in an efficient, equitable and sustainable manner; (b) improve access to locally appropriate ISFM knowledge, agronomic practices and technology packages, for around 4.1 million smallholder farmers in an efficient, equitable and sustainable manner; and (c) influence a national policy environment for investment in fertilizer and ISFM.

The program, which comes to an end on October 31, 2019, was the subject of an end-term evaluation, which spanned three thematic sub-programs: (a) ISFM Technology scale-out; (b) Fertilizer supply and policy, and (c) Training and Education, covering interventions in 13 African countries. AGRA commissioned the Centre for Sustainable Development Initiatives (hereinafter "CSDI") to undertake the end-term evaluation of the Program. This evaluation study focused on both programmatic impacts (results delivered) as well as program delivery mechanisms (strategies adopted and their degree of success).

The evaluation employed a mixed methodology of quantitative and qualitative research tools in an integrated design to achieve a more insightful understanding of the program. The evaluation applied the classic end-term evaluation tools/approach in this order: (a) the desk review (qualitative), consisting of an analysis of SHP internal documentation and associated project documents from SHP partners to extract information before conducting the evaluation fieldwork; (b) semi-structured interviews (both quantitative & qualitative), administered at individual meetings in which the interviewers applied a framework of themes to explore the issues openly, thus allowing the interviewees to freely share their views concerning SHP performance and how it influenced their operations and performances; (c) focus group discussions using pre-designed checklist (qualitative) to lead meetings with groups of people in a standardized manner (it was applied mainly to smallholder farmers, who were involved in program interventions); and (d) self-administered surveys (quantitative) using semi-structured questionnaire (sets of questions with closed and open answers), administered to SHP training alumni and other beneficiaries.

The study adopted the use of mixed purposive sampling to quickly reach targeted respondents in five selected countries (Kenya, Tanzania, Mozambique, Ghana, and Burkina Faso) where we did a detailed evaluation, and in the other selected eight countries where we conducted the study virtually. The evaluators sought to establish the most significant changes from smallholder farmers, grantee institutions that were funded under the SHP, representatives of fertilizer companies and agro-dealers as well as officials of relevant government ministries, members of national soil health consortia, trainees (PhD and MSc beneficiaries of the training

component of SHP), universities and other important agencies. A broad range of issues are covered in this study. These included the socio-economic characteristics of the project-supported farming communities and impacts on agricultural productivity and partnerships catalyzed as a result of the project, in addition to a summation of still-pending agricultural challenges in all the focal countries.

The evaluation sources included 41 interviews (28 face-to-face and 13 carried out remotely by Skype, WhatsApp, and phone), six (6) focus groups, 11 site visits, and email exchanges with 135 alumni of SHP training program. A number of potential limitations, assumptions and constraints were identified at the inception stage. In most cases, these were addressed or mitigated with the support of the AGRA backstopping team members and by triangulating information gathered from various sources to provide stronger evidence-based observations and conclusions.

From the evaluation study, we established a strong program performance. Fifteen out of the targeted sixteen milestones were either exceeded or fully achieved, representing 94 percent of the program's targets. This involved working with about 150 State and non-State actors across 13 African countries. The program design was clear, and it was primarily implemented based on clearly articulated sub-programs.

We established that approximately 2.27 million smallholder farmers (114 percent of the program's target number of farmers[1]) had adopted the project's overarching theory of change (agricultural transformation led by the use of improved inputs and supported by adaptation of soil health practices). These farmers are benefiting directly from increase in cereal yields of about 61 per cent, producing approximately 2.8 million MT of cereals and 1 million MT of legumes, worth US$445 million at current international market prices over the last five years.

About 1.8 million ha of land across the thirteen countries in eastern, western and southern regions of Africa are under long-term assorted ISFM farming methods. SHP interventions involved a significant amount of innovation and risk-taking, including learning from missteps and scaling up proven successes. Per capita smallholder farmer incomes rose by $124 annually as a result of adopting ISFM technologies in the zones supported by the program.

We also noted SHP's significant investment in capacity building in the agricultural sector, specifically, through the graduate training of 185 scientists across the continent and in-service training of over 3,700 fertilizer inspectors and laboratory technologists. A massive capacity injection program saw 185 graduates enhancing their academic qualifications with MSc and Ph.D. degrees. A high proportion of graduates (87 percent) have applied the knowledge gained in program development in their respective institutions. These are programs that are both in line with soil health and other natural resource disciplines. A majority of respondents (85 percent) brought in new knowledge in project management to their respective institutions.

The program had catalytic effects on agricultural sciences programs of higher education reforms, with at least three universities reporting significant curriculum enrichments at not only the postgraduate level but also at the undergraduate level due to the effect of the SHP's

[1] 2 million farmers

Training and Education sub-program. Through intensive, long-term facilitation, the SHP generally strengthened the place of the farmer cooperatives as local governance institutions, enabling them to become more democratic and inclusive of marginalized groups (especially women and youth), thereby enhancing the capacity of communities to engage in collective action in agricultural value chains.

The program's achievements were underwritten by a number of success factors. They included the program's flexibility in focus and funding, attention to the needs of smallholder farmers involved, and availability of adequate resources on time, supported by numerous training activities, study tours, and support actions, as well as availability of competent and dedicated technical backstopping. That the program used on an average US$ 65 to reach each of the 2.27 million smallholder farmers with ISFM suite of technologies and practices, is indicative of fairly efficient use of resources. However, although feasible, the program's overall long-term sustainability is not guaranteed, as a lot of challenges remain, including sustainability of interventions by National Agriculture Research and Extension Systems, most of which depend on State funding that focuses mainly on operational support.

Overall rating: **successful**

Structure of the report

The report structure closely follows the AGRA's guidelines for evaluation.

Chapter 1 is dedicated to reporting the main findings

Chapter 2 outlines the SHP program, describing its guiding theory of change

Chapter 3 describes the evaluation methods: its objectives, its rationale, and its scope. The chapter also describes the approach adopted (methodology), the selection of evaluation criteria of relevance, effectiveness, efficiency, impact, sustainability, and ownership. It also introduces a number of additional questions.

Chapter 4 presents findings and conclusions about the assessment against the evaluation criteria of relevance, effectiveness, efficiency, impact, sustainability, and ownership. It first illustrates the main results of the program vis-à-vis the overall and specific objectives, as measured by the progress indicators. Then, it presents the findings in terms of the evaluation criteria of relevance, effectiveness, efficiency, impact, sustainability, and ownership, plus a number of additional evaluation questions.

Chapter 5 presents lessons learned and recommendations about actions that should be considered for better impact going forward in similar project settings.

Main findings of the evaluation

1.1 ISFM Scale-out

- The program's database shows that 5.91 million farmers were made aware of integrated soil fertility management (ISFM) technologies and practices. This was made possible through a total of over 61,000 demonstration plots spread throughout the thirteen countries, showcasing the program's theory of change in practice.
- Approximately 2.27 million smallholder farmers have adopted the project's ISFM-technologies and practices promoted. The evaluation shows an increase in general cereal yields of about 61 percent following the adoption of ISFM practices and technologies on farmers' fields.
- Majority of these farmers use of improved inputs, planting eight different crops, singly and in combinations, and are benefiting from increased agricultural revenues of 19 percent annually.
- About 1.8 million hectares (ha) of farming land across the thirteen countries in eastern, western and southern regions of Africa are under long-term ISFM farming methods. This growing zone produces annually about 1.4 million MT of cereals and 0.3 million MT of legumes.
- This success is attributable to the efforts of the 150 state (including NARES) and non-state actors and, in particular, the efforts of 93,000 lead farmers and 17,000 frontline extension workers who were trained in ISFM and supported by the program's partners in the thirteen countries.
- The SHP has helped create lasting synergies between 21,000 farmers associations and hundreds of partners in the agricultural sector in the 13 countries (spanning the divide between governments, universities, private sector players, and farmers unions, among others): this achievement, built up since the initiation of the program in 2008, remains its most important achievement throughout.

1.2 Fertilizer Supply and Policy

- The long-term ISFM-adopting smallholder farmers are using approximately 535,000 MT of fertilizers every year, worth about US$25 million, contributing to the enhancement of yields and incomes and the development of a vibrant market value chain for inorganic fertilizers.
- In northern Ghana, approximately 2,300 smallholder farmers are still supported by a revolving fund that was established in 2011, and which has significantly improved access to financing and quality-certified inputs for farmers.
- As a result, in the northern region of Ghana, agrodealers trained and supported by the SHP are reporting an annual year-on-year increase in demand for fertilizers in the

range of 10 percent, with the traded volumes now exceeding 200,000 tons of inorganic fertilizers. This accounts for 48 percent of total fertilizer usage in Ghana in 2019.[2]

- About 80 percent of eastern Kenya farmers are using fertilizer in their farms, 85 percent practice cereals and legumes integration, 93 percent practice crop rotation, and 85 percent are using certified seeds, contributing to a reinvigorated trade in agricultural inputs.
- The program's initial start-up investment in the African Fertilizer Agribusiness Partnership (AFAP) has paid off:
- AFAP continues to value to the agriculture value chains across the continent, through market-driven business solutions that support 5,000 hub agrodealers on the continent.
- The total value of credit facilitated by AFAP in the fertilizer sub-sector on the continent stands at US$264 million.
- AFAP has been key in rendering advisory and technical services to over 2,000 fertilizer stakeholders, SME capacity building, and program management services.
- AFAP has facilitated significant investments in the fertilizer value chain, with financing estimated at US$571 million.
- The volumes of fertilizer financed by AFAP's SHP-supported Credit Guarantee Scheme has reached 680,000 MT.
- SHP, in partnership with AFAP and IFDC, undertook extensive fertilizer market assessments in 9 countries in Africa, the results of which have been used in the development of crop- and area-specific fertilizer blends.

1.3 Training and Education

- Eleven public universities offered context-relevant MSc and Ph.D. training to more than 185 African scientists from 13 countries, including 20 professionals from post-conflict Mozambique: these professional have played an instrumental in advancing soil health research across eleven universities and more than thirty state institutions across Africa.
- Majority of the alumni (54 percent for MSc students[3], and 62 percent for Ph.D. students[4]) completed their programs on time.[5]
- There were generally high levels of completion reported for the two supported programs: MSc and Ph.D., with most alumni reporting having completed on time.
- An exchange initiative with Wagenigen University allowed guest lecturers from the University to technically backstop the program: this subsequently enhanced the skills

[2] See https://africafertilizer.org/blog-post/fertilizer-statistics-overview-ghana-2015-2019/
[3] Meaning completion of the MSc degree program in 2 years
[4] Meaning completion of the Ph.D. program in 4 years
[5] This compares favourably with the average time of 6 years that it takes to complete a Ph.D. in Kenya for the typical student (see https://www.standardmedia.co.ke/article/2001342569/varsities-accused-of-shortchanging-masters-and-phd-students)

of graduates and exposure to what is happening outside Africa, with a majority of SHP alumni (85 percent) reporting that this infusion of new ideas brought in new knowledge on project management, which they have taken to their domicile institutions.

- However, the resources provided were not sufficient, with most alumni (74 percent) having reported that they spent own resources as additional and complementary to the SHP funding.
- Most of the SHP alumni (67 percent) received workplace promotions following the end of their studies: an even greater proportion (74 percent) reported receiving additional tasks and responsibilities in matters related to soil health, indicative of the fact that SHP's funding managed to build a cadre of well-trained professionals in high demand across the continent.
- The majority of the SHP trained alumni (87 percent) have developed new projects after completion of their studies, demonstrating that the technical expertise acquired through the studies was sufficient in enabling institutions and farmers to gain from new projects and programs.

1.4 RESULTS SUMMARY CHART

Table 1: SHP milestones and levels of achievement as at October 22, 2019

#	Indicator	EOP target	Final EOP value	Level achieved
1	Metric tonnes of fertilizers delivered to smallholder farmers through wholesale and retail networks by 2019	187,000 MT	535,050 MT	286%
2	Number of agrodealers trained to improve access to agro-inputs by smallholder farmers by 2019	6,500	11,870	183%
3 (a)	Fertilizer quality regulatory systems established and operational	6	6	100%
3 (b)	Number of fertilizer inspectors equipped with new skills in fertilizer quality control	2,600	3,444	133%
3 (c)	Laboratories equipped to handle fertilizer quality control	3	3	100%
3 (d)	Number of laboratory technicians equipped with new skills in fertilizer quality analysis	150	150	100%
4	Appropriate fertilizer policy implemented in 6 countries by 2019	6[6]	6	100%
5 (a)	Number of smallholder farmers adopting ISFM practices[7]	2,000,000	2,267,092 are still practising ISFM on their farms[8]	114%
5 (b)	Number of smallholder farmers with access to knowledge on 'best-bet' soil health interventions	4,100,000	5,906,666	144%

[6] Ghana, Mali, Nigeria, Mozambique, Tanzania and Ethiopia
[7] During evaluation, this question was evaluated as "the number of smallholder farmers still practicing ISFM as of September 2019"
[8] Practicing ISFM suite of technologies and practices as at September 30, 2019

6	Total hectarage of land under smallholder farmlands put under ISFM	2 million ha	1.8 million	90%
7	Country-level Soil Health Consortia established and linked formally to key content providers	13	13	100%
8	Partnership plan developed to enhance integration and alignment of SHP investments and implementation modalities with other core programs of AGRA and with those at BMGF	1	1	100%
9	Number of postgraduate students supported by SHP who have graduated from African universities in the field of soil science and agronomy	170 120 MSc, 20 Ph.D.	185 (144 MSc & 41 PhDs) have graduated	109%
10	Training curricula revised and updated in 10 African universities involved in the training of soil scientists and agronomists by 2014	7	7	100%
11	A detailed SHP monitoring and evaluation plan developed by December 2011	1	1	100%
12	An integrated AGRA Management Information System (MIS) that facilitates SHP data management and reporting in place by December 2012	1	1	100%
13	Number of special studies per year conducted to obtain an in-depth understanding of particular aspects of soil health program sub-programs	2	2	100%
14	Technical Advisory Committee established by 2011 to provide an external and independent advice to the program that improves its delivery and impacts	1	1	Achieved
15	Program Performance Review Report completed by 2013	1	1	Achieved

16	SHP knowledge-sharing and communication products (newsletters, brochures, websites, etc.) produced by 2011	Targetted to produce books, journal articles, success stories & Newsletters	5 books, 6 Journal papers, 3 success stories, 1 Newsletter ('SoilsMatter') & a program brochure.	Achieved

2.0 Background information

2.1 INTRODUCTION

AGRA is a dynamic partnership working across the African continent to help millions of smallholder farmers move out of poverty. Under its new strategy (2016-2020) AGRA is seeking to catalyze an agricultural transformation in eleven (11) key focus countries (Burkina Faso, Ghana, Mali, Nigeria in West Africa and Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania and Uganda in East and Southern Africa).

AGRA's mission is to trigger an African-led green revolution based on smallholder farmers in Africa with key goals by 2020 being[9]

- Reducing food insecurity by 20% in the focus countries;
- Doubling the incomes of at least 30 million farm households through productivity improvements and access to markets and finance;
- Ensuring all focus countries are on a pathway to attain and sustain an agricultural transformation through sustainable agricultural productivity growth and access to markets and finance.

Since inception, AGRA has focused on improving access, by millions of smallholder farmers, to inputs, chiefly high-quality seeds and properly formulated fertilizers – mineral and organic – that is the foundation of a successful farming enterprise. Trough, the more than a decade of shared success, AGRA has gained significant experience and has been provided with the tools to deploy all its resources – i.e., its range of influential partners, its deep technical expertise, and its extensive pan-African experience – to trigger agricultural transformation on a continental scale.

With 800+ projects funded, worth more than $430m[10], AGRA has evolved into an organization that has a diversified value proposition, playing the role of convener, thought-leader, policy advocate, private sector partner, grantee capability builder, and implementation supporter, in addition to continuing with its vital role as a catalytic grant-maker.

With this capability, AGRA is now positioned to become the go-to partner for government and continental bodies seeking to drive agricultural transformation, providing strategic support for the development of national plans, creation of bankable investment plans, and implementation support to effectively and efficiently deliver results.

2.2 AGRICULTURE IN SUB-SAHARAN AFRICA: A BRIEF SYNOPSIS

Agriculture is the backbone of the African economy, accounting for approximately 20% of the region's GDP, 60% of its labor force, 20% of its total exports, and the main source of income for the region's rural population. However, the low-input low-output systems of

[9] See http://www.fao.org/fileadmin/user_upload/GSP/docs/South_east_partnership/AGRA.pdf
[10] Roughly 1% of the total investments required for agricultural transformation in Africa (AGRA Strategy Overview 2017-2021: Inclusive Agricultural Transformation in Africa)

agriculture, which maintained Africa at subsistence levels for generations, is no longer able to feed the people. Also, there are the associated problems of land degradation accelerated by low-input systems, which in some instances has exceeded the resilience threshold of soils. Naturally low quality and human-induced low-quality soils now characterize much of the African landscape, resulting in low agricultural productivity.

The challenge of African agriculture is not only of enhancing production to meet the increased food demands of the expanding population, but also the judicious use of soils so that their productivity is sustained in the foreseeable future. Previous studies show that continent-wide, 55 % of land area in Africa is unsuitable for agriculture, while only 16 % of land area has high-quality soils which can effectively be managed to sustain more than double its current population. These soils are spread among many countries, making it difficult to develop a continent-level strategy to help all countries equitably. Empirical data on soil health in Africa shows that about 5 million ha of land in the continent is degraded to a point where their original biotic functions have been destroyed completely and resilience reduced to such a level that rehabilitation to make them productive may be economically prohibitive.

As a result, sub-Sahara Africa is the only remaining region of the world where per capita food production has remained stagnant over the past 40 years. About 180 million Africans – up 100% since 1970 – do not have access to sufficient food to lead healthy and productive lives, making them more susceptible to the ravages of malaria, HIV-AIDS, and tuberculosis. Absolute poverty – characterized by incomes of less than US$ 1 per person per day – is coupled with an increasingly damaged natural resource base.

The depletion of soil fertility, along with the concomitant problems of weeds, pests, and diseases, is a major biophysical cause of low per capita food production in Africa. This is the result of the breakdown of traditional practices and the low priority given by governments to the rural sector. Over the decades, small-scale farmers have removed large quantities of nutrients from their soils without using sufficient quantities of manure or fertilizer to replenish the soil. This has resulted in a very high average annual depletion rate – 22 kg of nitrogen (N), 2.5 kg of phosphorus (P), and 15 kg of potassium (K) per hectare of cultivated land over the last 30 years in 37 African countries – an annual loss equivalent to U.S. $4 billion in fertilizer (World Bank, 2017).

2.3 SOIL HEALTH PROGRAM'S THEORY OF CHANGE

Soils are the main resource base for smallholder farmers in Sub-Saharan Africa. With an estimated population growth for SSA from the current ~ 900 million to 1.4 billion in 2030, the region's soils will experience increasing pressure as a natural resource to provide for the needs of its people. With an estimated 65% of arable lands, 30% of grazing land, and 20% of forests already degraded in Africa, the region has the potential to position itself as champion in terms of increasing food production and security, achieving land restoration, and increasing agricultural resilience to climate change. The usage of best-fit soil fertility replenishment practices and technologies became the domain AGRA's flagship Soil Health Program.

AGRA's Soil Health Program was set up in early 2008 and became operational in 2009, with the following primary goals:

- An efficient and economically sustainable supply of fertilizer to farmers in Africa
- Uptake of appropriate ISFM technology packages by smallholder farmers
- Create an enabling environment upon which other organizations can build and engage

The SHP was the second AGRA program after PASS[11] to move into an implementation phase and started to award grants in 2009 with a five-year budget of USD 180 million. The main objectives of the program were:

- To create physical and financial access to appropriate fertilizers for about 4.1 million smallholder farmers in an efficient, equitable and sustainable manner;
- To improve access to locally appropriate ISFM knowledge, agronomic practices and technology packages, for around 3.0 million smallholder farmers in an efficient, equitable and sustainable manner;
- To influence a national policy environment for investment in fertilizer and ISFM.

The main areas of investment include;

- **Fertilizer policy**: Undertook to influence policy change affecting fertilizer production and distribution and support to improving fertilizer regulatory systems.
- **Fertilizer supply**: Agrodealer development and support to private sector fertilizer production and distribution. As noted from the call of proposals for this consultancy assignment, over 530,000 MT of inorganic fertilizers has been sold to smallholder farmers by AGRA- and SHP-supported agrodealers.
- **Extension**: Knowledge exchange and other activities to facilitate scale-up of integrated soil fertility management (ISFM) practices as a means to improve smallholder income and food security. As noted from the call of proposals for this consultancy assignment, over 1.8 million ha of land is farmed using the ISFM suite of practices by more than 2.27 million smallholder farmers who have adopted yield-enhancing technologies and practices.
- **Adaptive research**: Involved primarily simple research that tests broad ISFM recommendations for a local context.
- **Training and Education**: As noted in the call for proposals, the SHP has endeavored to support 10 African universities to develop and deliver MSc and Ph.D. training to 120 and 50 students, respectively, of which 50% were to be women.

[11] Program for African Seed Systems

3.0 Methodology

3.1 OBJECTIVES OF THE EVALUATION

The main objective of this end-term evaluation was to determine the impacts of the Program, which will mainly focus on the medium-term impacts of the program interventions since its inception in August 2008 to date. In this regard, the evaluation looked at:

- **Programmatic impacts** – what results have been delivered, what changes (outcomes, both intended and unintended) have occurred among the beneficiaries, the relevance of program interventions, return on investments and the sustainability of the achievement to-date.
- **Program delivery mechanisms** – the approach adopted by the program to achieve the results highlighted above, e.g., models/best practices employed by the program; e.g. agrodealer network; "going beyond demos"; partnerships developed (e.g., Country Soil Health Consortia); fertilizer business; legume seed production; micro-dosing technology, cropping systems etc. How successful these models have been, lessons learned, and whether these results are likely to be sustainable.

The evaluation covered the broad objectives and the 16 milestones of the SHP[12] as well as the extent to which the Program responded to the changed implementation context to achieve its objectives, the impacts of the Program among the stakeholders (especially smallholder farmers, farmer organizations, universities, and the private sector) and the overall Program performance and lessons learned for future improvements. It examined the coherence of SHP's continent-wide portfolios in line with national objectives and national priorities, organizational context, procedures, governance structures, and management issues, including Program management as well as strategic partnerships.

The specific objectives of the end-term evaluation were as follows:

- Critically assess to what extent, if any, the sub-program interventions, yielded the expected impacts (*focusing on the sub-programs as below*):
  - ISFM Technology scale-out;
  - Fertilizer supply and policy, and
  - Training and Education
- Assess the efficacy of the different models utilized by the program, for instance, in scaling-up ISFM practices-the value chain approach dubbed "going beyond demos"; the agrodealer models for fertilizer supply and fertilizer regulatory frameworks, and the short-term technical and post-graduate training in soil and related fields.

[12] These 16 milestones are captured in AGRA's TORs for this evaluation

3.2 EVALUATION METHODOLOGY

In our evaluation procedures, we used the DAC[13] criteria for evaluating development assistance, as postulated by the European Union. This evaluation criterion has long been identified as a strong foundation for international development evaluation since 1991. The DAC evaluation procedures entail critical assessments of five (5) key planks, viz:

- **Relevance and appropriateness**: The extent to which the SHP as a program was suited to the priorities and policies of the beneficiary communities in Africa (mainly smallholder farmers, national government, academic institutions, and the private sector) will be evaluated.
    - To what extent were the objectives of the original Soil Health Program valid?
    - Were the activities and outputs of the Soil Health Program consistent with the overall goal and the attainment of its stated objectives?
    - Were the activities and outputs of the Soil Health Program consistent with the intended impacts and effects?
    - How relevant were the program planning, design, and implementation with regards to the delivery of the expected interventions?
- **Effectiveness**: This is a measure of the extent to which the Soil Health Program attained its objectives. In evaluating the effectiveness of Soil Health Program so far, it will be useful to consider the following questions:
    - To what extent were the objectives achieved?
    - To what extent did the program design contribute to the achievement (or otherwise) of the program's objectives?
    - Were the program activities implemented well?
    - What change was brought about by the SHP by comparing before and after SHP scenarios in each of the countries?
    - Were there better ways of program implementation that, if adopted, could have led to improved outcomes?
    - To what extent did the external assumptions in SHP's theory of change hold true, and how well were the mitigating measures put into use?
    - Establish how appropriately the SHP documented lessons learned from its interventions
    - What were the major factors influencing the achievement or non-achievement of the objectives?
- **Efficiency**: This measures the outputs – qualitative and quantitative – in relation to the inputs. It is an economic term which signifies that the Soil Health Program

[13] Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD)

investment by the Bill and Melinda Gates Foundation (BMGF) and their partners use the least costly resources possible to achieve the desired results. This generally requires comparing alternative approaches to achieving the same outputs, to see whether the most efficient process has been adopted. Among other things, the assignment evaluated:

- The involvement of stakeholders in the design of the Soil Health Program,
- The involvement of women and men equally in interventions funded by the Soil Health Program, implementation, and benefits accruing thereof,
- The subsequent sustainability of physical infrastructure constructed under the Soil Health Program by the groups (NARS, NGOs, FOs, etc.) supported,
- The efficiency of working with local stakeholders, including government bodies.

- **Impact (Outcome and Medium-Term)**: This evaluated both the positive and negative changes produced by the Soil Health Program intervention, directly or indirectly, intended or unintended. This involved outcome and medium-term impacts and the effects resulting from the Soil Health Program on the local economic and other development indicators, across all the five countries selected for this end-term evaluation. The examination was concerned with both intended and unintended results and will include the positive and negative impact of external factors, such as changes in improved productivity, capacity building, and income stability at the community level.
  - What had actually happened as a result of the Soil Health Program? Numbers, and what they mean in the real world of agricultural development? Retail figures? Productivity increases?
  - Networks created and supported?
  - What real difference has the activity made to the beneficiaries?
  - How many people (men, women, youthful persons, disabled persons, etc.) have benefited in the target countries?
- **Sustainability**: Sustainability is concerned with measuring whether the benefits of Soil Health Program are likely to continue after the official end of the program on September 30 2019, especially in the light of the new AGRA revised five-year strategy (2017-2021).

3.3 SAMPLE SELECTED FOR EVALUATION

Sampling methods: Of the thirteen countries where SHP has invested in 143 projects, AGRA had already selected five countries for a deep dive study based on the resources available and the intended timeframe to complete the study. We randomly selected specific projects per country, based on a list of SHP sub-programs (sampling frame) that has already been provided by AGRA, across SHP's three thematic areas. Therefore, a number of projects were evaluated

per country, coming to a total of thirty-four (34) projects: (a) ISFM Scale-Out (19 projects); (b) Fertilizer Supply and Policy (6 projects); (c) Training and Education (6 projects) (*see Table 1*). This accounted for 23% of all projects funded by the SHP.

Table 2: The SHP grantees ("respondents") interviewed for this evaluation

SHP- sub-program	Five country to undertake a deep-dive impact study				
	Kenya	**Tanzania**	**Burkina Faso**	**Ghana**	**Mozambique**
ISFM Scale-Out Projects	Kenyatta University - 2009 SHP 022 & 2013 SHP 014	SNV - 2013 INT 001	SICAREX - 2013 MKT/SHP 003 (Market & SHP co-funded rice project)	Savanna Agricultural Research Institute (SARI) – Tamale - Maize and beans project - 2009 SHP 005	IIAM Beira - 2010 SHP 021
	KALRO- Kakamega 2009 SHP 030 & 2013 SHP 013	Selian Agr. Research Institute (SARI-Arusha) - 2009 SHP 014 & 2013 SHP 022	Réseau MARP- 2013 SHP 020	SARI -Rice project - 2013 SHP 015	ADEM-led project 2011 SHP 016
	Anglican Dev. Services Eastern 2011 SHP 010 & 2015 SHP 001	Agr. Research Institute (ARI) Uyole - 2009 SHP 023, 2011 SHP 013 & 2012 SHP 013	ABAC - 2013 SHP 023	1) SARI- Inoculant production project - 2013 SHP 025	UCAMA - 2013 FOSCA/SHP 009 (FOSCA & SHP co-funded extension project
		FAIDA Mali - 2011 SHP 008		UDS - 2011 SHP 001 & 2014 SHP 009	Concern Universal led project - 2012 BBTE 005 (Co-funded by SHP, MKTS and PASS)-
				2010 SHP 014 - Cassava project in Kumasi region	
Training and Education Projects	Kenyatta University – 2010 SHP 024	Sokoine University of Agriculture PhD & MSC programs 2009 SHP 027 (PhD) & 2013 SHP 009 (MSC)	University of Bobo-Dioulasso – 2010 SHP 011	KNUST PhD and MSC training grants – 2009 SHP 028 (PhD) and 2011 SHP 019 (MSC)	University of Eduardo Mondlane (EMU MSc program – 2013 SHP 011
	University of Nairobi - 2010 SHP 009				

Fertilizer Policy and Supply Projects	Government of Kenya – 2013 SHP 001	TEFERA (Dar) – 2009 SHP 013	IFDC grant - 2010 PASS/SHP 030 (PASS and SHP co-funded agrodealer development project) DGPV grant - 2012 SHP 001 (Fertilizer Regulatory project)	Fertilizer Policy Nodes implemented by CSIR-SRI in Kumasi - 2010 PPP/SHP 003 and Fertilizer regulatory project implemented by Plant Protection and Regulatory Services Directorate (PPRSD) - 2010 SHP 015	DNSA-led grant on fertilizer regulation - 2010 SHP 004
Regional SHP Projects	OFRA (CABI) IPNI & IITA (Soil Health Consortia) AFAP	2013 SHP 003 (OFRA project across the 13 SHP-focus countries), 2012 SHP 017 (Soil Health consortia in 8 ESA countries) & 2013 SHP 005 (IITA-led SHC in 5 W.A countries 2012 SHP AI 012 - Visit and talk to the AFAP country Managers in Tanzania, Mozambique and Ghana on this project that was supposed to address both fertilizer supply and demand constraints			

Mixed approaches: To assess and document the outcome and medium-term impacts that SHP work has made, its effectiveness against set outcomes targets, replicability, value for money and sustainability of outcomes of the systems work and lessons learned for future programming, we used a mixed-methods approach which utilizes both the qualitative and quantitative data. Besides quantitative data collection, sentinel indicators, including most-significant changes and outcome harvesting was recorded using quantitative (by way of forty-one Key Evaluation Questions (KEQ) interview schedules for ISFM Scale-Out, Fertilizer Supply and Policy, Training and Education, and Tracer Study for SHP alumni) and qualitative instruments (including FGD schedule for farmers). Both the qualitative and quantitative data collection endeavored to answer all the questions under each of the three SHP focus sub-programs thematically.

This was complemented by a desk review of all the relevant key technical documents provided by AGRA for the assignment at the onset. "Deep dive" qualitative data collection through focus group discussions sought to understand facilitators and barriers to the adoption of the ISFM technologies scaling out initiatives in the five selected countries. Interviews were also held with partners in the other eight SHP-supported countries. The first step of the study was, therefore, to undertake comprehensive consultations with stakeholders and hold key informant interviews (KII), guided by the SHP focus sub-programs key questions (*Table 3*).

The key stakeholders consulted include government officials in the ministries of agriculture in each country (at least 11 KIIs in each country) and national- and regional-level private sector institutions including the target agribusinesses staff and beneficiaries (by way of 8 FGDs in every country with smallholder farmers; agrodealers, postgraduate students, lab technicians), selected grantees, as well as selected AGRA staff to capture opinions, expectations and vision about the contribution of the SHP towards the achievement of its objectives. Specifically, we interviewed the following categories of stakeholders:

- Extension staff from ministries of Agriculture and any other private extension service providers within the jurisdictions of the SHP-funded projects (at least 8 KIIs conducted per country),
- Universities and CG centers, where MSc, Ph.D. training and technicians' capacity-building efforts were concentrated (all alumni will be contacted by SurveyMonkey method),
- Extension officers from NARS,
- Lead farmers,
- local leadership,
- Financial institutions involved in the SHP projects,
- Agrodealers (especially those stocking fertilizers), and
- Any other relevant stakeholder in the project area or as may be advised by AGRA for inclusion during the preparatory phase.

3.4 KEY EVALUATION QUESTIONS

These were structured to solicit information on how the various SHP program players view the success and failure, assess the practical implementation of the projects, and their involvement and lessons learned. The team used a combination of FGD schedules, KEQ interview schedules, and evaluators' own notes to collect information from stakeholders. Moreover, results and findings from the desk review, stakeholder discussions, FGD, and KII were analyzed, synthesized, and used to address the last two components of the assignment: Program performance and lessons learned, and everything incorporated into the final report.

Details of individual methods to be used in answering each question per thematic SHP focus sub-programs are shown in Table 3.

Table 3: SHP focus sub-programs key evaluation questions (KEQs) by the DAC evaluation domains

Evaluation Domain				
Relevance	**Effectiveness**	**Efficiency**	**Impact**	**Sustainability**
ISFM Scale-Out				
a-1: How well-placed was ISFM as a guiding framework for increasing agricultural production in your project area?	**b-1:** To what extent was the ISFM theory of change adaptive to the needs of the focus clientele, the smallholder farmers?	**c-1:** What were the particular features of SHP's ISFM strategy that made a difference in your area of operation?	**d-1:** Please give details on the overall adoption by SHFs of the ISFM technologies you piloted in your project?	**e-1:** What is the place of ISFM in agricultural planning frameworks at local, regional and national levels?
a-2: What were the most effective extension approaches for disseminating ISFM technologies to SHFs in your area?	**b-2:** Which ISFM technologies developed by SHP were scaled up in your area of operation?	**c-2:** Please comment on the level of technical backstopping support that you received from AGRA's SHP	**d-2:** Please highlight the impact that ISFM had on yields and overall agricultural productivity of SHFs in your area of operation	**e-2:** What is the role of farmer cooperatives in sustaining the message of ISFM in your areas of operation?
a-3: In your *Going Beyond Demos* strategy, what interventions worked best in the transition from plot to landscape-level agricultural intensification?	**b-3:** To what extent have smallholder farmers replicated and scaled out ISFM technologies through the *Going Beyond Demos* approach?		**d-3:** Please share details on how the concept of revolving funds helped smallholder farmers in your area of operation improve access to farm inputs	**e-3:** How are you applying as an organization the lessons learned in the course of your partnership with SHP?
a-4: What strategies, innovations, mechanisms, **a-5:** and	**b-4:** Please highlight important barriers to adoption of ISFM		**d-4:** Of the smallholder farmers who adopted the project's ISFM practices	

support were most effective in increasing adoption of ISFM technologies in your area of operation?	practices in your project area and how your project worked to mitigate them		on their land, how many are still practising them?	
	b-5: How effective was your partnership with the country national soil health consortium in enhancing uptake of ISFM technologies by smallholder farmers?		**d-5:** Comment on the potential of your project poverty and hunger through sustainable rural development	
	b-6: Please comment on the effective of demonstration plots as mechanism for increasing smallholder productivity		**d-6:** Effect of original assumptions on project achievements?	
Fertilizer Supply and Policy				
a-6: How was the fertilizer inspectors training curriculum developed, and how was it related to the unique needs of fertilizer quality regulation in your country?	**b-7:** Please share the extent of increase in the use of inorganic fertilizers by smallholder farmers in your project area (baseline, end-term figures)?	**c-3:** How did the agrodealer training and development impact access and uptake of fertilizers by farmers in your project area?	**d-7:** How many tons of fertilizers did your project catalyze in supply to farmers over the project's lifespan?	**e-4:** What is the overall plan for improving fertilizer supply and policy environment in your country?
a-7: Please comment on the nexus between your	**b-8:** What new fertilizer quality policy,	**c-4:** What were the particular features of	**d-8:** Please relate any changes noted in	**e-5:** To what extent were agrodealers engaged in

work and fertilizer policy, given the expanded capacity in human resources and equipment.	regulation or ordnances has your project (or org.) supported or formulated under the SHP grant?	SHP's fertilizer scaling up strategy that made a difference in your area of operation?	productivity (e.g., yield increases) of SHFs in your area of operation, as a result of the fertilizer scaling up strategy	providing soil health extension services to farmers in your area?
a-8: Highlight the appropriateness of your project objectives to the existing policy environment at the start of your project	**b-9:** Please specify the role of agrodealers in scaling out fertilizer use by smallholder farmers (if any) in your project area	**c-5:** In what ways did your project link up with the national Soil Health Consortium in your country?	**d-9:** What has been the impact of the capacity enhancement of fertilizer inspectors on the fertilizer sub-sector in the country?	**e-6:** What reforms still need to be supported in the country to improve scaling up of quality fertilizer production, delivery and usage by smallholder farmers?
	b-10: What worked best for your project during the period of implementation?		**d-10:** What has been the impact of the capacity enhancement of lab. technicians?	**e-7:** How do you track the performance of the newly trained fertilizer inspectors or laboratory technicians?
			d-11: Please relate the impacts noted as a result of enactment of fertilizer quality policy, regulation or ordnances	**e-8:** Following the end of your project, what aspects are still ongoing as part of the agricultural transformation agenda you started with AGRA's SHP?
			d-12: Effect of original assumptions on project achievements?	
			d-13: What has been the strategic impact of your project on the fertilizer	

			sub-sector in your country?	
Training and Education				
a-9: Please give details on the student attrition rate in the programs undertaken in your university (MSc or PhD)	**b-11:** Please highlight if the postgraduate research experience was able to enhance students' personal and professional skills and competencies in agriculture	**c-6:** Please share details of whether the university undertook curricula reforms for the postgraduate course supported by SHP and what it entailed	**d-14:** Comment on how far the SHP training facility went in enhancing the students' intercultural skills in an international academic and research setting	**e-9:** How far has the joint postgraduate training partnership with SHP influenced your institution in as far as training of agricultural scientists and technicians is concerned?
a-10: Please comment on whether there were linkages between AGRA-supported students and agribusinesses for industry-level practical experience	**b-12:** Have you undertaken curricula reforms in the course of your partnership with the SHP?	**c-7:** What was the average number of supervisors in the supervision panel per postgraduate student?	**d-15:** Effect of original assumptions on project achievements?	**e-10:** How does the university maintain links with the SHP alumni?
	b-13: How well did the AGRA-supported students integrate in your academic programs and among your traditional student populace	**c-8:** What were the particular features of SHP's Training and Education component that your institution appreciated?	**d-16:** In what ways did your institution benefit from your partnership with the SHP under the Training and Education component?	**e-11:** What are the plans of your university in consolidating the gains achieved in the program and for its continuation in the future?
		c-9: What was the student attrition rate in their respective		**e-11:** Going forward, what changes will you recommend if such a

		programs, and to what do you attribute this?		training program were to be undertaken in the future?
Program Performance				
	b-14: How effective was the SHP coordination unit in Nairobi in communications with you as a grantee?	**c-10:** Please comment on the adequacy of the funds made available for your grant		

4.0 Program performance: findings

4.1 PROGRAM STRATEGY AND DESIGN

Background

- Agriculture in Africa has a massive social and economic footprint. More than 60 percent of the population of sub-Saharan Africa is smallholder farmers, and about 23 percent of sub-Saharan Africa's GDP comes from agriculture. Despite recent analysis, showing that Africa could produce two to three times more cereals and grains, the continent's full agricultural potential remains untapped.[14]
- With land expansion unlikely to play a major role in growing Africa's agriculture, international development experts agree that increased smallholder productivity will be the biggest growth driver.[15]
- The imperative for an eight-fold increase in fertilizer use has been an outstanding recommendation. A 2015 World Bank study determined that except in Ethiopia, Malawi, and Nigeria, the proportion of households using chemical fertilizers is too low to maintain or restore soil nutrients removed by plants in the other ten countries.[16]

Program design

- Designed in support of Africa's damaged soils, the Soil Health Program was an iterative intervention birthed through research and consultations, with an initial design that was subjected to testing and redesigned continuously over the decade of operation, incorporating both the public (mainly NARES) and private sectors (small-scale rural enterprises as well as larger corporations, including MNCs).
- SHP program design was clear and it was primarily implemented on the basis of clearly articulated three sub-programs, which were aimed at supporting enhanced primary agricultural production ("ISFM Scale-out"), while at the same time looping in an enabling environment ("Fertilizer Supply and Policy"). Care was exercised by also improving the skills and competencies of human resources ("Training and Education").
- Interviewees generally confirmed very positive opinions of the program.
- This evaluation has established a clear, logically valid 'means-end' relationship between the overall program objective and the three specific objectives for which

[14] Goedde, L., Ooko-Ombaka, A., and Pais, G. 2019. "Winning in Africa's agricultural market." McKinsey article available at https://www.mckinsey.com/industries/agriculture/our-insights/winning-in-africas-agricultural-market

[15] Ibid.

[16] See "Is African Agriculture Intensifying? The Status in Six African Countries?", available at https://www.worldbank.org/en/programs/africa-myths-and-facts/publication/agriculture-in-africa-agricultural-intensification-the-status-in-six-african-countries

funding was procured from the BMGF and by which grants were designed and invested across Africa.

- The choice of grantees was generally pragmatic and driven by circumstances on the ground.

Profiling SHP's investment in African soil systems

- In general, the program's funded interventions were designed to counteract the low-input low-output systems of subsistence agriculture prevalent in most of the target countries, which are no longer able to feed the rapidly growing populations (*see Figure 1*).

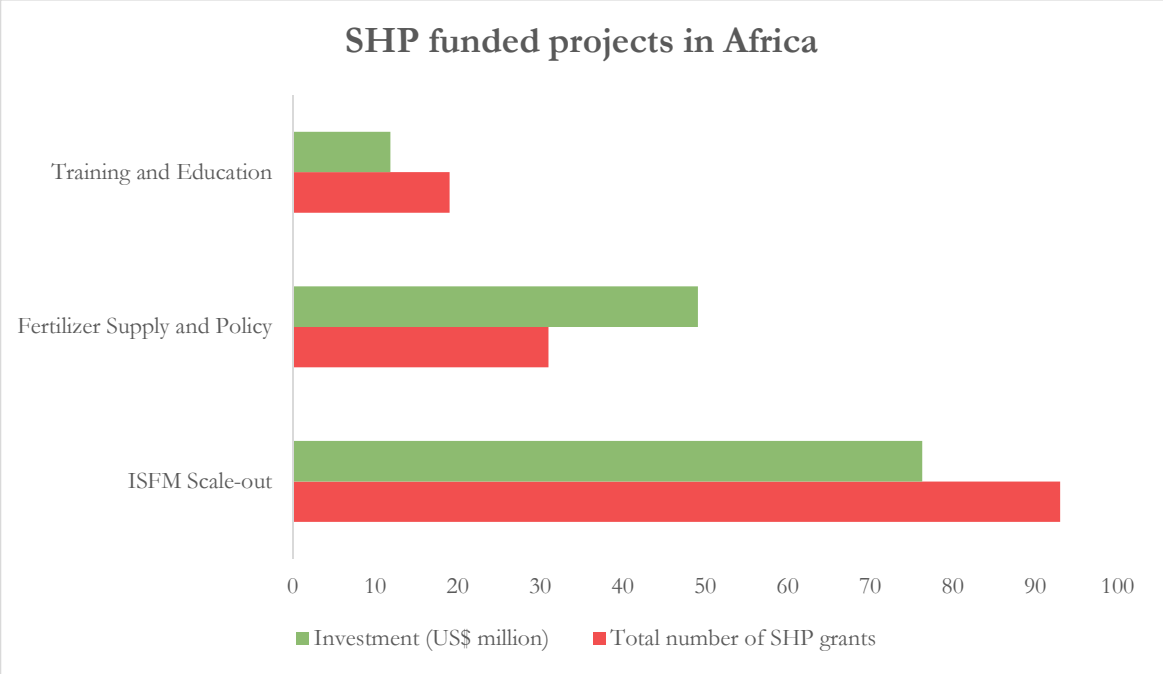

Figure 1: SHP-funded projects in Africa, by sub-program

- The program invested a total of US$127 million in 143 projects, spread across the 13 focus countries. The resources were evenly spread across the countries, with emphasis on funding in Mozambique (formerly an FCV country) and Ghana (a politically stable and economically growing powerhouse in west Africa – *see Figure 2 below*).

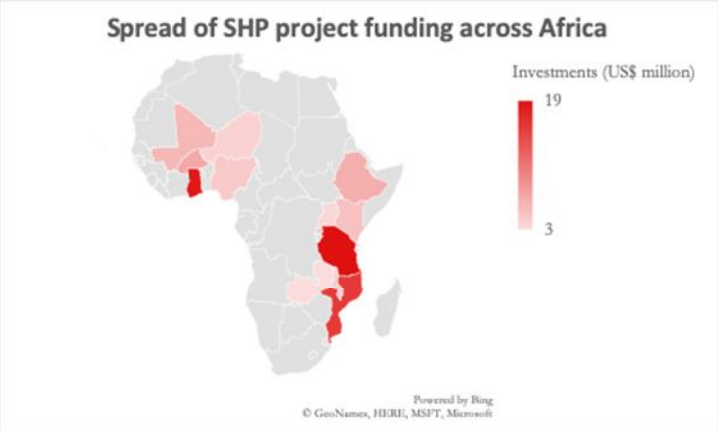

Figure 2: Geographic spread of SHP funding across Africa

- With an average of 0.1 percent investments in the agricultural GDPs of the 13 target countries, the Soil Health Program made a significant contribution to improving agricultural production in the geographies selected.

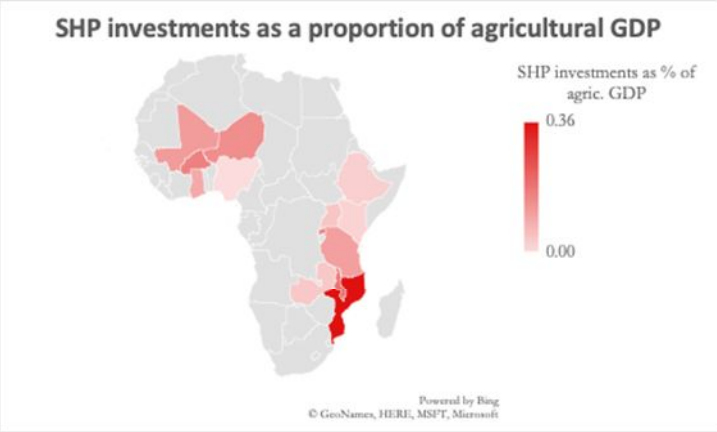

Figure 3: SHP investments in the 13 focus countries and correlation to agricultural GDPs

- Investment as a proportion of agricultural GDP was the highest in Mozambique at 0.36 (*see Figure 3*), not only showing the program's commitment to investing in an FCV state but one with a promise as a breadbasket region for the southern Africa belt. Soil health and training projects in Mozambique accounted for 15 percent of the program's overall investments (*see Table 4*).

Table 4: SHP investments and correlation to agricultural GDPs in focus countries

Country	SHP Investments (US$ million)[17]	agric. GDP (US$ billion)[18]	SHP investments as % of agric. GDP	Proportion of total SHP funds invested[19]
Tanzania	19	17.22	0.11	16
Ghana	18	19.65	0.09	13
Mozambique	16	4.32	0.36	15
Ethiopia	7	25.29	0.03	5
Mali	6	5.13	0.12	4
Nigeria	5	119.1	0.00	2
Burkina Faso	7	4.32	0.16	4
Kenya	5	26.37	0.02	4
Malawi	4	2.1	0.20	4
Rwanda	5	2.85	0.17	5
Niger	4	2.76	0.14	4
Uganda	4	8.25	0.04	4
Zambia	3	8.01	0.04	3

Program and perceptions

- Overall, interviewees contacted for this evaluation generally averred and confirmed very positive opinions about the program, with the general level of satisfaction of beneficiaries with the program being high.

[17] SHP investments as at 2013
[18] Estimates calculated using data obtained from SHP grants database and permutations using World Bank 2018 GDP data, obtainable from https://data.worldbank.org/country/ (caveat: assumption made of 30 percent agricultural sector contribution to overall economic GDP)
[19] Figures do not add up to 100; excludes 20 percent investment in Global Public Goods

- Of the grantees supported by the program, 91 percent expressed satisfaction with the level of technical backstopping support that they received from the SHP team in Nairobi, with the only grouse being mentioned being the short project lifespan of 3 years.
- Incorporation of the private sector was significant at both program and field operational levels: agrodealers, seed companies, fertilizer companies, and off-takers were involved in project interventions at field-level.

4.2 RELEVANCE OF THE SHP

Program relevance

- Overall, the relevance of the program is evident and is evaluated as "**strong**."
- There is a broad international consensus that sub-Saharan Africa is facing a soil health crisis.
- More than four decades of research and development work in Africa has not resulted in the 3-5% annual increase in agricultural growth necessary for most African countries to ensure the sustainability of agriculture and the promise of food security in the next decade.
- The program's theory of change was well articulated, focusing on improving ailing African soils and arresting the trends towards low crop yields and low household capital, which have been responsible for pushing millions of smallholder farmers into hunger and the poverty trap.
- As a result, on average, 91 percent of the program's overall investments went into supporting scaling out of soil health projects across the continent through the duopoly of ISFM and fertilizer market interventions, translating into US$114 million (*see Figure 4*).

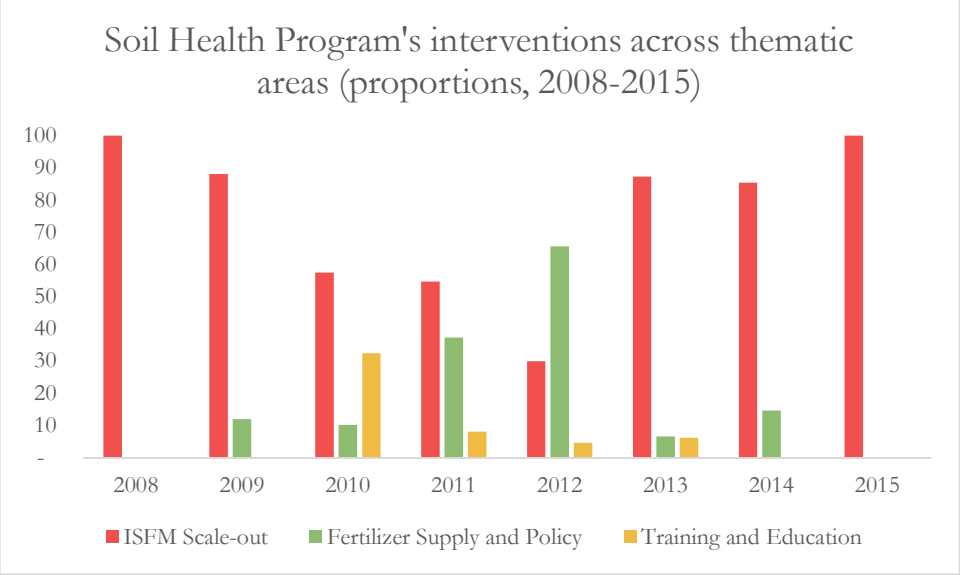

Figure 4: Soil Health Program's interventions across thematic areas (proportions, 2008-2015)

- Interviews with multiple stakeholders at both national and sub-national levels have confirmed that the program was relevant to the needs of smallholder farmers in the focus countries.

- Although there are areas for improvement, in general, the program was relevant and was aligned with continental soil health problems, at both regional and country levels, as defined by the African Union, regional economic commissions, and international agencies responsible for food and agriculture.

4.3 PROGRAM EFFECTIVENESS AND IMPACT

Program milestones

- 11 program milestones were substantially or fully achieved, representing 69 percent of the targets set under the SHP milestones (*see Table 1*).
- Overall, the program has achieved its objectives and milestones: only three indicators are short of target value.

Program impact: ISFM Scale-out

- With the highest proportion of program funds set aside for ISFM Scale-out, many of the interventions undertaken by the program were related to improving primary production at grassroots levels.

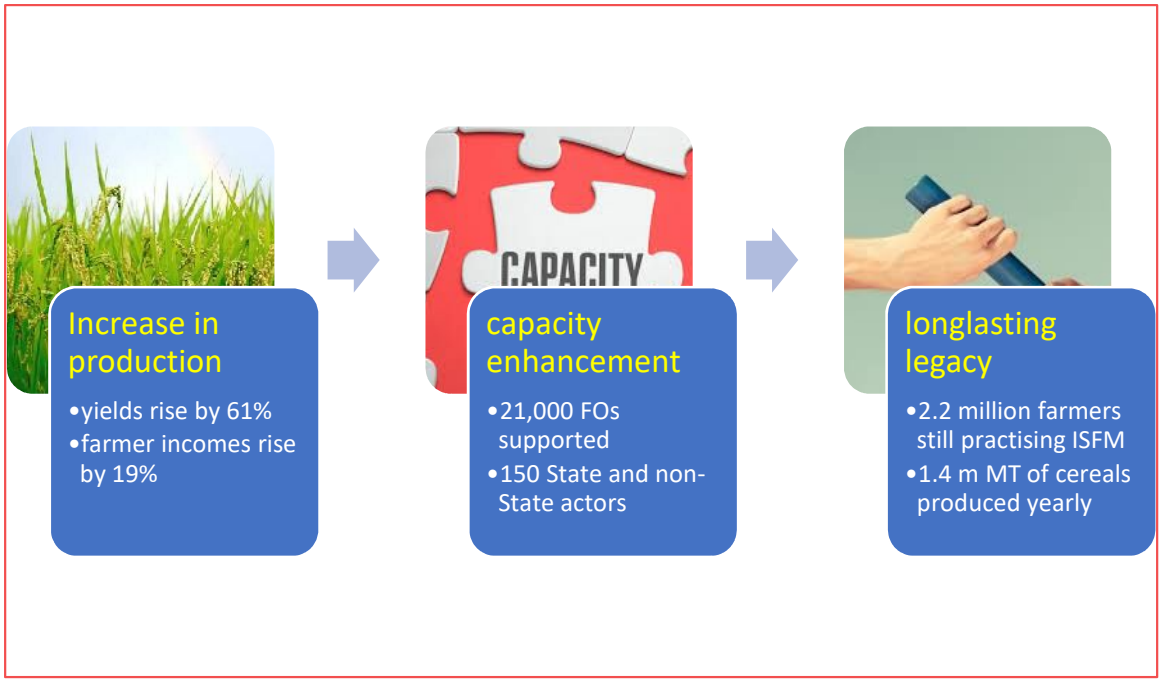

Figure 5: Snapshot of the overall impact of ISFM Scale-out component of the Soil Health Program

- The program's overall goal was to reach 4.1 million smallholder farmers across 13 African countries (Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Uganda, Tanzania and Zambia) with Integrated Soil Fertility Management (ISFM) technologies.

- The program's database shows that 5.9 million farmers were reached with the technologies and practices. This was made possible through a total of 61,000 demonstration plots spread throughout the thirteen countries, showcasing the program's theory of change in practice.
- Approximately 2.27 million smallholder farmers reached and trained have, long-term, adopted the project's ISFM-based agricultural transformation (*see Figure 6*). The evaluation shows an increase in general cereal yields of 61 percent following the adoption of ISFM practices and technologies on-farm.

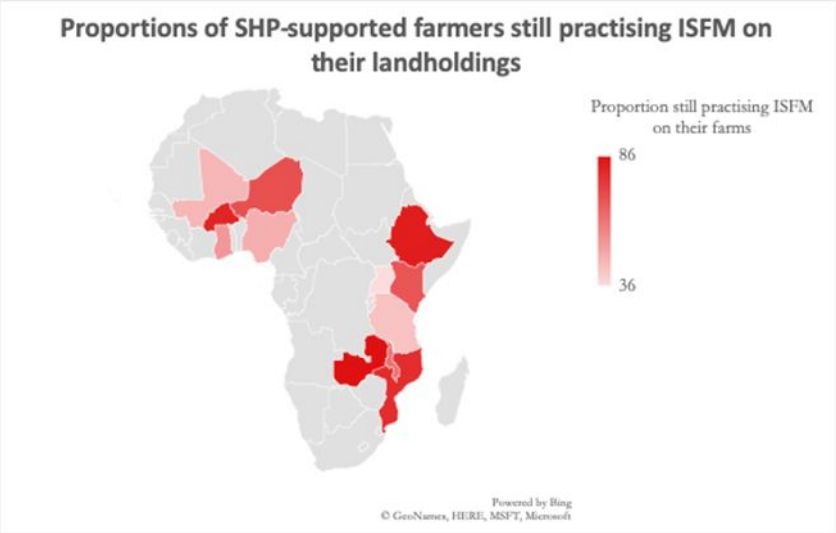

Figure 6: Long-term adoption of ISFM technologies and practices by smallholder farmers across the 13 SHP-supported countries in Africa

- Majority of these farmers use of improved inputs, planting eight different crops, singly and in combinations, and are benefiting from increased agricultural revenues of 19 percent annually (*see Figure 7*).

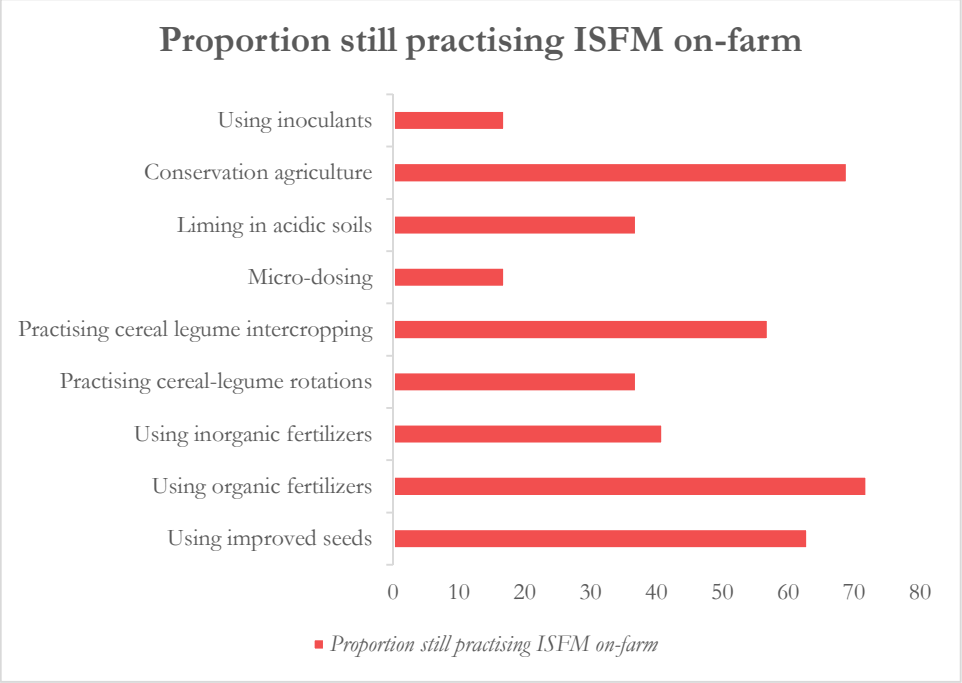

Figure 7: Former SHP-supported smallholder farmers still practising ISFM practices on-farm (data source: grantee records and SHP database)

- About 1.8 million ha of farming land across the thirteen countries in eastern, western and southern regions of Africa are under long-term ISFM farming methods. This growing zone produces annually about 1.4 million MT of cereals and 0.3 million MT of legumes (*see Figure 8*).
- This success is attributable to the efforts of the 150 state (including NARES) and non-state actors and, in particular, the efforts of 93,000 lead farmers and 17,000 frontline extension workers who were trained in ISFM and supported by the program's partners in the thirteen countries.

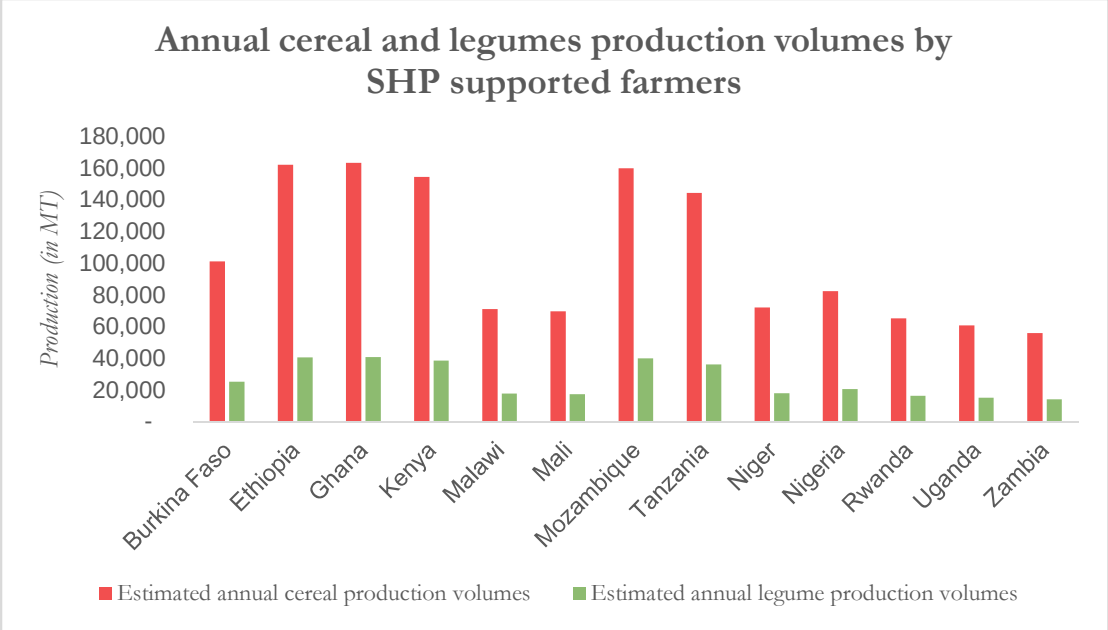

Figure 8: Annual production estimates by 2.27 million smallholder farmers formerly supported by the Soil Health Program (data source: SHP database, grantee interviews, and provincial production data sourced from the countries)

- Records held by the program as well as its former grantees show that SHP-supported farmers produced approximately 2.8 million MT of cereals and 1.0 million MT of legumes, worth US$445 million at current international market prices[20] over the last five years (*see Figure 7*).

[20] See https://www.indexmundi.com/commodities/?commodity=corn&months=60 – estimates used are: (a) US$159 per MT of cereals and (b) US$333 per MT of legumes produced

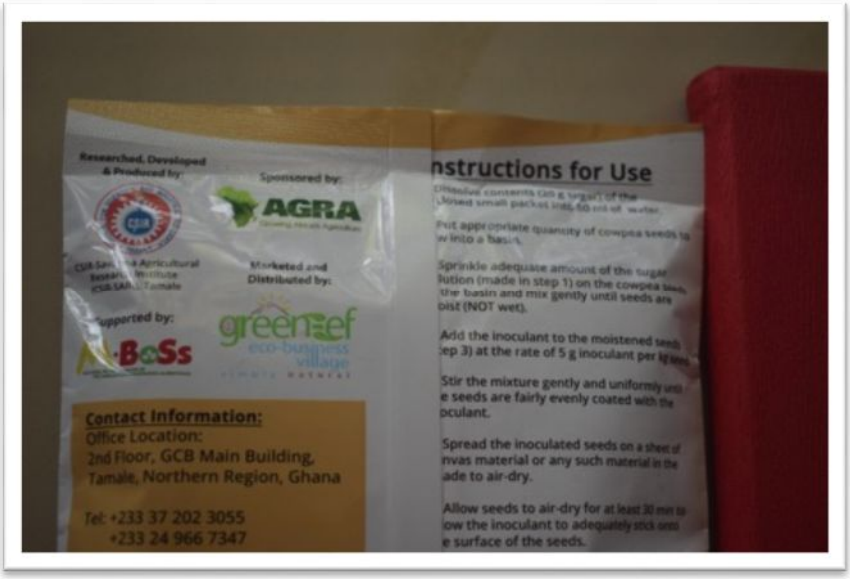

Figure 9: Farmers in northern Ghana are benefiting from the use of "Sarifi"TM inoculants in cowpea production. The SHP funded the construction of an inoculant plant in Tamale city, which is now run under a PPP model by a private sector player.

- In addition, a total of 245,000 farmers (93,000 of them being lead farmers) were trained in ISFM suite of technologies (*see Figure 10, showing a lead farmer in Tanzania*) and practices over the eleven years of project implementation and are now benefiting from the results of their adoption of the low-cost, yield-enhancing agricultural improvement technologies, practices, and principles, including for the first time the use of inoculants.

Figure 10: Ms. Rose Fratern, a smallholder farmer in northern Tanzania, who was supported by an SHP grantee to improve her maize and pigeon peas cultivation methods.

***Ms. Fratern**: I have benefitted immensely from ISFM farming methods, thanks to Selian Agricultural Research Institute. This season, I have harvested 120 bags of maize and 45 bags of soybean using ISFM methods, earning myself Tanzania Shillings 15 million (equivalent to US$6,500) in one season. I have bought from the proceeds of my sales three mass transit three-wheelers, meaning I have morel income and I can even withstand production shortfalls due to droughts.*

- The SHP has helped create lasting synergies between about 21,000 farmers associations and hundreds of partners in the agricultural sector in the 13 countries (spanning the divide between governments, universities, private sector players, and farmers unions, among others): this achievement, built up since the initiation of the program in 2008, remains its most important achievement throughout (*see Figure 11 for an example of this public-private-smallholder farmer interactions midwifed through SHP project interventions in Tanzania*).

Figure 11: SHP-supported hub agrodealer in northern Tanzania, stocking significant volumes of maize and pigeon pea germplasm for purchase by 11,000 smallholder farmers in the region

- The program was effective in demonstrating to smallholder farmers that productivity of degraded soils can be restored and that crop yields for both cereals and legumes can be significantly boosted when ISFM practices are implemented on a sustainable basis.
- There is a visible impact across Africa:
  - In Sissili region of Burkina Faso, the average turnover of the typical smallholder farmer has arisen by 220 percent[21] and now stands at US$1,697, with maize and soybean yields increasing by 34 and 16 percent to stabilize at 2.7 and 0.9 tons per ha respectively[22]: this is significantly higher than the national GDP per capita of about US$670 (World Bank 2017 data).[23]
  - The increase in incomes is attributed in part to an improvement in the selling price induced by the warrantage system promoted by the program in the region, on the back of an increase in the productivity of farmers and enhanced marketing of surplus produce by farmer organizations representing 26,000 smallholder farmers.
  - In northern Tanzania, about 11,000 SHP-supported smallholder farmers are benefiting from improved production of maize and pigeon peas, contributing to

[21] A rise of farmer incomes between 2014 (315,000 CFA at baseline) and 2017 (1,009,000 CFA at end-term)
[22] The results are based on (a) discussions with former grantees and government officials, (b) analysis of M&E records held by the Association Burkinabè d'Action Communautaire (ABAC, a former AGRA grantee), (c) interviews with 140 smallholder farmers, (d) two focus group discussions held in Sissili region with smallholder farmers, and (e) key informant interviews conducted with officials of the Direction Générale des productions végétales (DGPV) du Burkina Faso in Ouagadougou.
[23] See https://data.worldbank.org/country/burkina-faso

food security not only in this region but also exporting significant volumes to southern Kenya, earning incomes of $2.5 million annually.[24]

- In part due to the robust capacity enhancement support that SHP extended to the principal agricultural research institute in Mozambique (IIAM), there is a cohort of well-trained agronomists and soil scientists in the country with the skills and competencies required to sustain ongoing agricultural growth in the breadbasket regions.[25]
- SHP in collaboration with partners including IIAM, SNV, and ADEM made extensive investments in the Beira Corridor and effectively engaged smallholder farmers in the region and other agribusiness actors.
- Today, smallholder farmers in Manica and Tete provinces have the highest use rates of improved maize seeds in the country (11 and 21 percent respectively) and accounted for 36 percent of the maize produced in 2017.
- In Ghana's Upper West region, 7,600 smallholder farmers supported by the SHP have seen their maize grain yields rise from 0.9 tons per ha to 2.9 tons per ha, as a result of appropriate fertilizer application, and crop rotation with soybeans, combined with the use of organic and mineral fertilizers.[26]
- In eastern Kenya, ISFM project interventions had reached 35,000 smallholder farmers between 2012 and 2018, who are tilling 25,000 ha, with a suite of ISFM technologies, techniques and best-bet practices.[27]
- Project evaluation data shows that these farmers are now earning about US$3.9 million annually from the improved yields of sorghum, maize, cowpeas, and pigeon peas.
- In Rwanda, farmers are already reaping the benefits of the ISFM interventions, as shown by newly inaugurated merchants brought into the maize and soybeans value chains by SHP partners.

[24] The results are based on (a) interviews conducted with Agricultural Marketing Cooperatives (AMCOs) and their smallholder farmer members in Babati, Manyara and Arusha regions, (b) pigeon-pea off-taker agency ETG, as well as (c) analysis of production and marketing data supplied by former AGRA grantees including the Selian Agricultural Research Institute.

[25] Interviews with Dr. Ricardo Maria (scientist at the Instituto de Investigação Agrária de Moçambique, former SHP grantee) and Dr. Daniel Chongo (professor at the Faculdade de Agronomia e Engenharia Florestal, at the University of Eduardo Mondlane, former SHP grantee).

[26] Results based on analysis of the following: (a) interviews with 170 smallholder farmers in Tamale, Wale Wale, and Nyankpala areas, (b) interviews with field representatives of Ganorma Agro-Chemical Ltd and Durga Agriculture Limited (suppliers of inputs, especially seeds and fertilizers, to AGRA-supported farmers), (c) interviews with officials of the Centre for Agricultural and Rural Development, (d) analysis of M&E data held by former AGRA grantees including CSIR – Savanna Agricultural Research Institute and Tumu Deanery Integrated Development Programme (TUDRIDEP).

[27] Results based on (a) analysis of end-term evaluation report conducted at the end of Phase I and Phase II of AGRA-funded ISFM project by the Anglican Development Services Eastern Kenya, a former AGRA grantee, (b) discussions with input suppliers in the region including Dryland Seeds Limited and Mwailu Enterprises, and (c) discussions with project team.

- In 2017, SHP partners facilitated the **market-level connection** between six smallholder farmer cooperatives in producing Grade 1 and Grade 2 maize with premium-grade buyers such as Africa Improved Foods Limited (AIFL).[28]
- This 2017 connection resulted in the **purchase of produce totaling more than 2,500 metric tons**, worth nearly $0.5 million at the current maize commodity exchange price in Kigali, purchased by AIFL, over the last 3 years.

- The SHP had a significant impact on the level of appropriate farming competencies and behavior change achieved among 2.27 million smallholder farmers, the improved skills and attitudes of agricultural professionals, and successful empowerment of agricultural institutions in the 13 countries.

Program impact: Fertilizer Supply and Policy

- The long-term ISFM-adopting smallholder farmers are using approximately 535,000 MT of fertilizers every year, worth about US$25 million, contributing to the enhancement of yields and incomes and the development of a vibrant market value chain for inorganic fertilizers.
- In northern Ghana, approximately 2,300 smallholder farmers are still supported by a revolving fund that was established in 2011, and which has significantly improved access to financing and quality-certified inputs for farmers.
- As a result, in the northern region of Ghana, agrodealers trained and supported by the SHP are reporting an annual year-on-year increase in demand for fertilizers in the range of 10 percent, with the traded volumes now exceeding 200,000 tons of inorganic fertilizers (*see Figure 12*).

[28] The results for Rwanda are based on (a) key informant interviews with Africa Improved Foods Limited and Kumwe Harvest, both of which are established maize off-takers in Kigali and who engage AGRA-supported farmers in eastern Rwanda, (b) discussions with former AGRA grantee Clinton Development Initiative (CDI Rwanda), and (c) an analysis of an end-of-project evaluation report supplied by CDI Rwanda.

Figure 12: Ganorma Agro-Chemicals, a mid-size distributor of fertilizers and other agro-inputs, worked with SHP's grantees in northern Ghana and has seen a 10 percent increase in year-on-year fertilizer usage and demand by smallholder farmers in the region

- About 80 percent of eastern Kenya farmers are using fertilizer in their farms, 85 percent practice cereals and legumes integration, 93 percent practice crop rotation, and 85% are using certified seeds, contributing to a reinvigorated trade in agricultural inputs.
- The program's initial start-up investment in the African Fertilizer Agribusiness Partnership (AFAP) has paid off:
  - AFAP continues to value to the agriculture value chains across the continent, through market-driven business solutions that support 5,000 hub agrodealers on the continent.
  - The total value of credit facilitated by AFAP in the fertilizer sub-sector on the continent stands at US$264 million.
  - AFAP has been key in rendering advisory and technical services to over 2,000 fertilizer stakeholders, SME capacity building, and program management services.
  - AFAP has facilitated significant investments in the fertilizer value chain, with financing estimated at US$571 million.
  - The volumes of fertilizer financed by AFAP's SHP-supported Credit Guarantee Scheme has reached 680,000 MT.

- SHP, in partnership with AFAP and IFDC, undertook extensive fertilizer market assessments in 9 countries in Africa, the results of which have been used in the development of crop- and area-specific fertilizer blends.

- The SHP interventions a significant amount of innovation and risk-taking, including learning from missteps and scaling up proven successes through such initiatives as *Going Beyond Demos*.
  - The *Going Beyond Demos* initiative in many ways catalyzed an agricultural transformation in SHP-supported regions through innovation-driven and sustainable productivity increases, combined with access to markets, affordable financing, and better policies that have contributed to improving the livelihoods of smallholder farmers.

Program impact: Training and Education

- Eleven public universities offered context-relevant MSc and Ph.D. training to more than 185 African scientists from 13 countries, including 20 professionals from post-conflict Mozambique: these professional have played an instrumental in advancing soil health research across eleven universities and more than thirty state institutions across Africa.

- Majority of the alumni completed their programs on time[29] (*see Figure 13*): 54 percent for MSc students[30], and 62 percent for Ph.D. students[31]
  - In addition, there were generally high levels of completion reported for the two supported programs: MSc and Ph.D., with very low attrition rates.
  - However, the resources provided were not sufficient, with most alumni (74 percent) having reported that they spent own resources as additional and complementary to the SHP funding.

[29] This compares favourably with the average time of 6 years that it takes to complete a Ph.D. in Kenya for the typical student (see https://www.standardmedia.co.ke/article/2001342569/varsities-accused-of-shortchanging-masters-and-phd-students)
[30] Meaning completion of the MSc degree program in 2 years
[31] Meaning completion of the Ph.D. program in 4 years

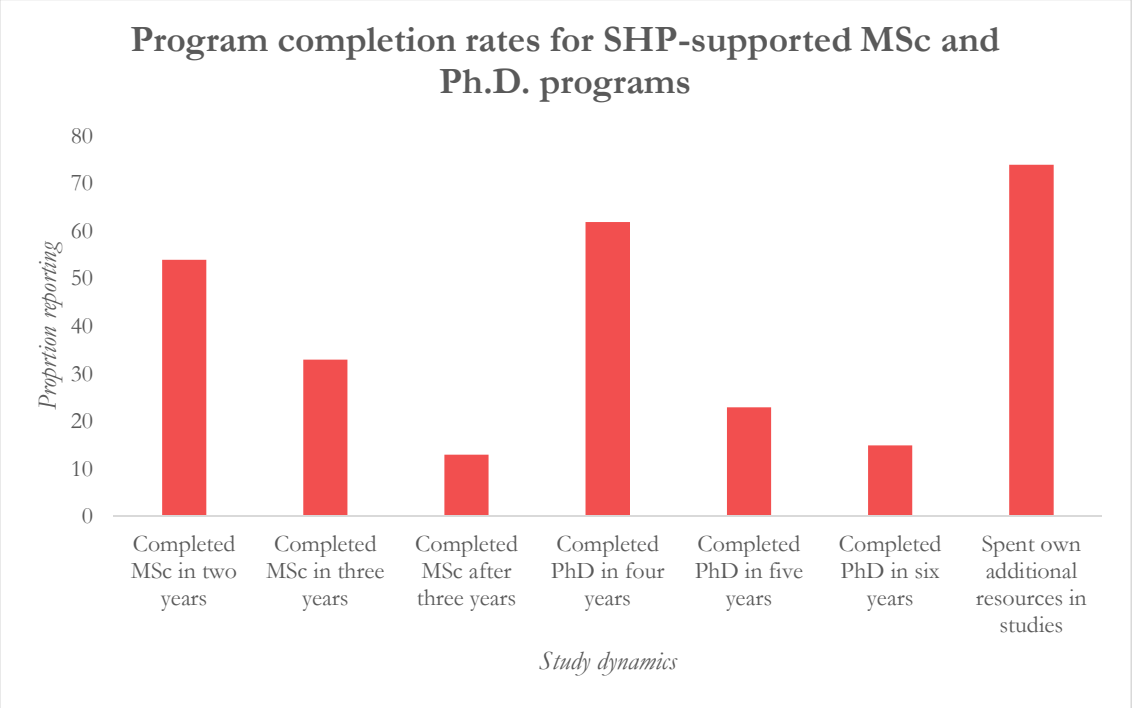

Figure 13: Soil Health Program's Training and Education component – program completion rates

- Technical backstopping was arranged via Wageningen University, which has trained specialists (BSc, MSc, and Ph.D.) in life and social sciences and which focuses its research on scientific, social, and commercial problems in the field of natural sciences and natural resources.
- The Program had catalytic effect on higher agricultural sciences education reforms, with at least three universities (Kenyatta University, University of Eduardo Mondlane and Sokoine University of Agriculture) reporting significant curriculum enrichment at not only the postgraduate level but also at undergraduate level due to the effect of the SHP's Training and Education sub-program.
- Most of the SHP alumni (67 percent) received workplace promotions following the end of their studies: an even greater proportion (74 percent) reported receiving additional tasks and responsibilities in matters related to soil health, indicative of the fact that SHP's funding managed to build a cadre of well-trained professionals in high demand across the continent (*see Figure 15*).

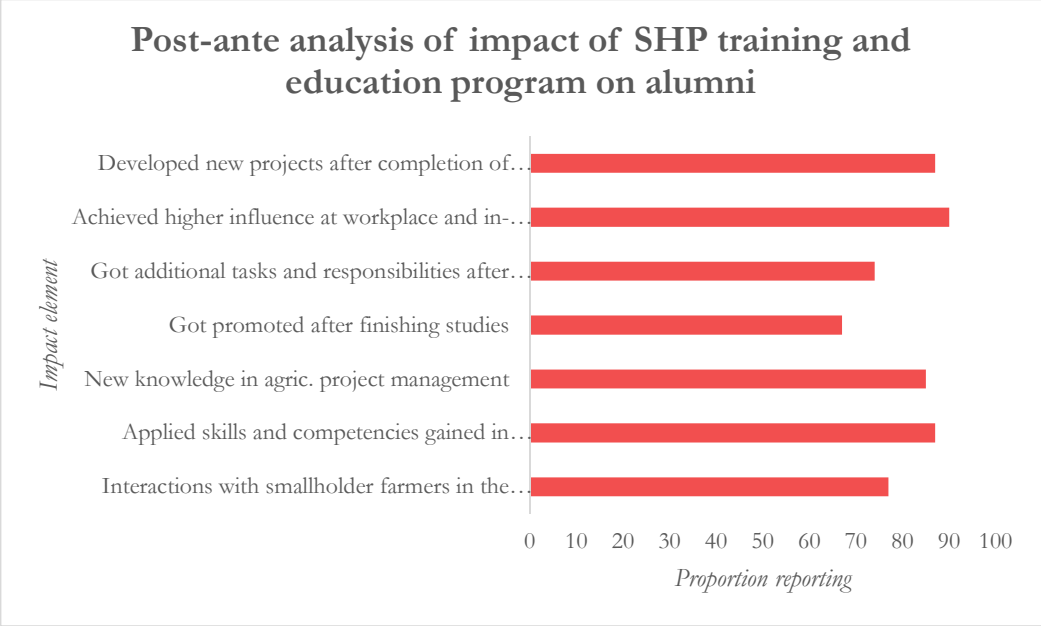

Figure 14: Impact of SHP training on career and professional growth of SHP-supported alumni

- The majority of the SHP trained alumni (87 percent) have developed new projects after completion of their studies, demonstrating that the technical expertise acquired through the studies was sufficient in enabling institutions and farmers to gain from new projects and programs.
- SHP achievements were underwritten by a number of success factors, including program's flexibility in focus and funding, attention to the needs of smallholder farmers involved and availability of adequate resources on time, supported by numerous training activities, study tours, and support actions, as well as the availability of competent and dedicated technical backstopping
- Gender and environmental issues were generally taken into account, with attention given to women participation and qualitative production standards at the demonstration farms.
- Broadly, the program is evaluated as effective in the use of scarce resources;
  - the program achieved its objectives and planned results;
  - the project improved market linkages for smallholder farmers and their associations in the 13 countries;
  - the program improved levels of access to agricultural finance for smallholder farmers through *Going Beyond Demos* initiative;
  - the program enhanced the capacity of farmer cooperatives and organizations and other counterparts;

- at both the local and national levels the project contributed to enhancing the policy environment to benefit the competitiveness of agricultural goods from smallholder farmers; and
- the program improved the overall competitiveness of the agricultural sector, at least in the targeted sectors in the thirteen focal countries in Africa.

- Success is also attributed to the high level of ISFM dissemination among the target smallholder farmers by a network of 61,000 well-distributed demonstration plots and to relatively good access to extension services (rendered by 17,000 newly trained extension agents, supported by 93,000 lead farmers, both cadres of which were trained in ISFM) as a result of the choice of partners.
- The program has, in addition, enhanced the capacities of the participating partners to a point where they are now able to handle issues of soil and agricultural intensification much better than at baseline.
- The relatively well-designed program benefited from the solid technical expertise of the program backstopping team in Nairobi managers and the relative stability of program staff, many of whom have been with the program since inception.
- The program contributed to expected and unexpected results, and in general, was effective in terms of completing the activities and in terms of contributing to the goals and objectives outlined for the SHP in its guiding milestones.

4.4 PROGRAM'S INSTITUTIONAL, SOCIAL AND ENVIRONMENTAL CONSIDERATIONS

Farmer institutions

- Through intensive, long-term facilitation, the SHP generally strengthened the place of the farmer cooperatives as local governance institutions, enabling them to become more democratic and inclusive of marginalized groups (especially women and youth), thereby enhancing the capacity of communities to engage in collective action in agriculture.
- An important public-private partnership was midwifed by the program in Ghana, where a private entity was given authority to set up stop in a government-owned SHP-financed inoculant laboratory and continue its commercial operations (*see Figure 16*).

Figure 15: The SHP funded the construction of an inoculants production laboratory in northern Ghana, which is now run by a private company in conjunction with the government of Ghana. The facility supports thousands of smallholder farmers with the yield-enhancing soil amendment.

Environmental considerations

- In all the SHP focus countries, there are the associated problems of land degradation accelerated by low-input systems, which in some instances has exceeded the resilience threshold of soils.
- As a result, innate low quality and human-induced low-quality soils now characterize much of the farming landscape on the continent, where the farmers eke out a living.
- No grants were issued for the management of environmental affairs, which was an oversight.

4.5 PROGRAM EFFICIENCY, MANAGEMENT, AND MONITORING

Program efficiency and transactional costs

- To measure the relative efficiency of the SHP, the evaluation study cross related the program transaction costs – i.e., overall funding – with the value of the benefits from those activities now accruing to smallholder farmers in the supported locations continent-wide.

- Program management was very good, and program governance improved knowledge-sharing to a great extent among SHP partners across the targeted geographies.
- Collaborations, partnerships, and coordination mechanisms were generally well thought out, although hobbled by lack of adequate staff at headquarters level for timelier technical backstopping.
  - However, the national soil health consortia have proved to be ineffective in ensuring knowledge dissemination, sustained conversations, and partnership among country partners in ISFM.
- Given the scale of the challenges, activities were implemented in a reasonable timely and reliable manner, according to the priorities established by the program.
- Per capita smallholder farmer incomes rose by $124 as a result of adopting ISFM technologies in the zones supported by the SHP.
- This means that every dollar spent on the program has leveraged an additional US$4.35 in terms of improved agricultural production in the thirteen countries over the last five years.
- The SHP programmatic investment has, therefore, contributed to an increase in the annual incomes of 2.27 million beneficiary smallholder farmers by 19 percent.[32]
  - Fairly efficient use of resources is headlined by the fact that the program used **US$65[33] to reach each of the 2.27 million smallholder farmers** with ISFM suite of technologies and practices.

[32] These projections are based on World Bank (2018) data showing that the current Gross National Income per capita (Atlas method) for all the thirteen countries (average) standing at US$600.
[33] This is a factor of the relationship between total program investments in grants (US$137 million) and the total number of farmers reached with ISFM (2.2 million).

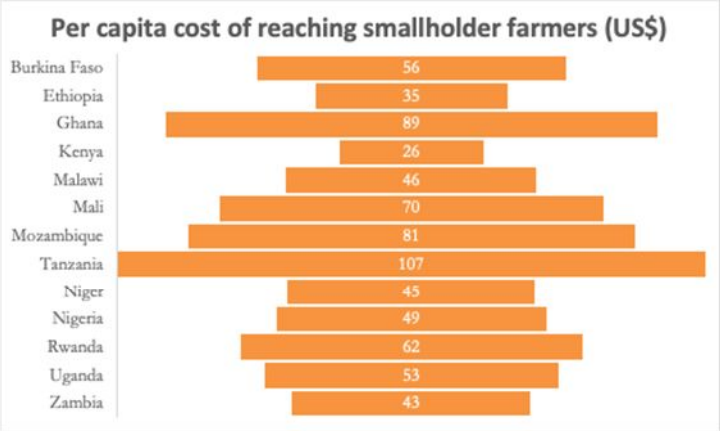

Figure 16: per capita costs of reaching smallholder farmers with soil-enhancing technologies, practices, and support

- This figure (of US$65) is somewhat higher than the SHP's established estimate of US$40 as the cost of ISFM knowledge extension per capita for projects that is supported[34] but is still reasonable given the vast challenges faced by the program in extending its message across the 13 countries.
- The program has had a visible catalytic effect on the three sub-programs in terms of not only market gains that have been felt in increases in production and sales, but also a cohort of well-trained 185 postgraduate agricultural scientists.
- This evaluation determines that the program was efficient in delivering the planned results and economically worthwhile.

4.6 SHP'S POST-ANTE SUSTAINABILITY AND NATIONAL OWNERSHIP

Program sustainability

- The SHP has achieved strong results in all three focus areas of the project.
- The program's core theory of change (scaling out ISFM in Africa) is now in the hands of 21,000 farmer associations, supported by nearly 150 state and non-state actors.
- A measure of sustainability was infused into the program through significant capacity building and enhancement of actors: over 17,000 extension agents were equipped with the knowledge and skills of disseminating ISFM, supported by 93,000 lead farmers, who, between them, are the primary vision carriers.

[34] See report titled "Impact scoping and characterization report on AGRA's soil health investments in Africa", prepared by Abdi Zeila for the Soil Health Program in 2011

- The program's overall sustainability is in question, as a lot of challenges remain, including sustainability of interventions by NARES, most of which depend on State funding that focuses mainly on operational support.
- At the design stage, some elements that would have contributed to sustainability were not included (such as more robust private sector involvement from the outset instead of the primary focus on NARES) while other elements (such as the *Going Beyond Demos* initiative) were devised but not implemented fully.
- Individually and combined, the results are assessed as contributing strongly to the project objective of improved agricultural production and economic growth for smallholder farmers in Africa.

4.7 CHALLENGES, LESSONS LEARNED AND FUTURE OPPORTUNITIES

- The program has had visible impact on beneficiary smallholder farmers, as shown by quantitative indicators, particularly in improved market linkages for a number of farmers, increased production data at the grassroots' levels, and increased number of smallholder farmers now with greater and more reliable access to finance, and evidence of increased technical capacity and skills in soil fertility management and general good agricultural practices at the grassroots in the countries supported.
- Benefits of a project supporting agriculture cannot be just measured in terms of "returns on investment": social benefits (more cohesion amongst cooperatives, better business linkages), as well as rural development (more agrodealers shops, e.g.), are also, in the end, visible durable benefits.
- However, despite the laudable performance of the project, some of the needs of smallholder farmers, national agricultural institutions, food processors, and other stakeholders will remain after the program ends.

4.8 CONCLUSIONS AND RECOMMENDATIONS

- This evaluation established that approximately 2.27 million smallholder farmers (114 percent of the program's target number of farmers) have adopted the project's overarching theory of change (agricultural transformation led by the use of improved inputs and supported by adaptation of soil health practices).
- These farmers are benefiting directly from increase in cereal yields of about 61 per cent, and are producing approximately 2.8 million MT of cereals and 1.0 million MT of legumes, worth US$445 million at current international market prices over the last five years.
- About 1.8 million ha of land across the thirteen countries in eastern, western and southern regions of Africa are under ISFM farming methods. SHP interventions involved a significant amount of innovation and risk-taking, including learning from missteps and scaling up proven successes.

- Per capita smallholder farmer incomes rose by $124 annually as a result of adopting ISFM technologies in the zones supported by the program.
- Significant investments were made in capacity enhancement in the agricultural sector, headlined by graduate training for 185 scientists across the continent and in-service training for thousands of fertilizer inspectors and laboratory technicians.
- The program had catalytic effects on higher agricultural sciences education reforms, with at least three universities reporting significant curriculum changes at not only the postgraduate level but also at an undergraduate level due to the effect of the SHP's Training and Education sub-program.
- Through intensive, long-term facilitation, the SHP generally strengthened the place of the farmer cooperatives as local governance institutions, enabling them to become more democratic and inclusive of marginalized groups (especially women and youth), thereby enhancing the capacity of communities to engage in collective action in agriculture.
- The program's achievements were underwritten by a number of success factors, including program's flexibility in focus and funding, attention to the needs of smallholder farmers involved and availability of adequate resources on time, supported by numerous training activities, study tours and support actions, as well as availability of competent and dedicated technical backstopping.
- Fairly efficient use of resources is headlined by the fact that the program used US$62 to reach each of the 2.27 million smallholder farmers with ISFM suite of technologies and practices.
- However, the program's overall long-term sustainability is not guaranteed, as a lot of challenges remain, including sustainability of interventions by NARES, most of which depend on State funding that focuses mainly on operational support

5.0 Evaluation work-plan

Table 5: Evaluation work-plan

Activities and deliverables	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Phase 1: Desk review and baseline design								
Introductory meeting 1 at AGRA HQs in Nairobi (global)								
Follow-up meeting 1 with M&E team								
Review of project documents								
Preparation of end-term tools + validation with AGRA								
Inception report and its presentation								
Phase II: Fieldwork								
Field missions – Kenya, Tanzania, Mozambique, Ghana, Burkina Faso								
Key informant interviews (auxiliary)								
Phase III: Data analysis								
Data analysis in Nairobi								
Data integrity checks								
Phase IV: Reporting								
Draft report submission								
AGRA review								
Final report submission								

6.0 The team

Table 6: Composition of the evaluation team

Name of team member	Qualifications	Role in the team	Comments
Abdi Zeila	Ph.D. in Soil Science and experience in soil fertility analysis Experienced in project and program evaluation: has conducted baseline surveys in 8 countries on behalf of AGRA, supporting 16 projects in the process Has familiarity with the grant support process in AGRA, having developed a total of 36 grants for funding by AGRA	Team leader Overall coordination and reporting Designing surveying instruments and overall quality control Will assist in impact evaluation in Mozambique, Tanzania, Ghana, and Burkina Faso	Overall reporting and communication with AGRA Linkages with selected grantees
Felix Ngetich	Ph.D. in Soil Science Will be responsible for coding and structuring the ODK digital tools for collecting primary information Also responsible for data collection and supervision of the surveys	Institutional capacity assessment Designing surveying instruments and overall quality control	Will also be in charge of data analysis and will contribute to report writing.
Milka Kiboi	Ph.D. in Agro-Ecosystems and Environmental Management specializing in soils Will be responsible for developing evaluation tools and data integrity Will also be responsible for tool testing and survey planning	Data analysis and statistical permutations	Will be responsible in the compilation of the biweekly reports during the assignment period
James Aucha	MPhil in Natural Resource Management Will be responsible for the socio-economic and educational aspects of the impact evaluation. Will also bring in the expertise in scholarship management in the analysis of the SHP grants management process for efficacy.	Responsible for socio-economic aspects of the impact assessment Responsible for tracer studies of past educational beneficiaries Will support impact evaluation in Kenya	

Nascimento Nhantumbo	Ph.D. in Agricultural Sciences, with special focus on improving resource use uptake and efficiency in nitrogen-deficient soils, under smallholder farming systems	Responsible for data quality checks for all countries Also responsible for data collection and impact evaluation in Mozambique	