

MID-TERM PERFORMANCE EVALUATION OF THE SCALING SEEDS AND TECHNOLOGIES PARTNERSHIP (SSTP) IN AFRICA: WAVE TWO SURVEY REPORT

SMALLHOLDER FARMERS' ADOPTION OF IMPROVED SEEDS IN PROGRAM AREAS

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ABSTRACT

The Scaling Seeds and Technologies Partnership (SSTP) was a five-year, \$46.8 million project implemented by the Alliance for a Green Revolution in Africa in Ethiopia, Ghana, Malawi, Mozambique, Senegal, and Tanzania (2013-2018). This report analyzes the findings from the second wave of the longitudinal panel survey undertaken as part of the broader evaluation (Longley, Kamiri, and Remington, 2017). The panel survey tried to reach the same set of randomly sampled direct and indirect beneficiary smallholder farmers (as trackable over time) to assess and track their application and adoption (or not) of improved seed and other technologies. Farmers themselves, through interactions with relatives and neighbors, were found to be the greatest influence in motivating farmers to apply and adopt SSTP-promoted improved varieties (as identified by the farmer), while motivation from agro-dealers and seed companies was less important, especially among the indirect beneficiaries. Beneficiaries chose not to adopt varieties for reasons relating to the varietal characteristics, or if they could not sell the output after harvest. Future efforts to encourage smallholder farmers to both try out and continue to use improved varieties should: encourage farmer-tofarmer learning; ensure that appropriate varieties are selected for promotion; support linkages to output markets; support seed companies to enhance their marketing and distribution channels (including their relationships with agro-input dealers and the use of free varietal "tester packs"); and encourage more inclusive extension approaches that include women and poorer and socially marginalized groups.

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LIST OF ABBREVIATIONS

Acronym	Description		
AGRA	Alliance for a Green Revolution in Africa		
ARI	Agricultural Research Institute		
ASA	Agricultural Seed Agency		
CABI	Commonwealth Agricultural Bureau International		
CAPI	Computer-Assisted Personal Interviewing		
CDM	Cervejas de Moçambique		
CIAT	International Center for Tropical Agriculture, Tanzania		
CSPro	Census and Survey Processing System		
DC	District Council		
ECoSIB	Entrepreneurship for Commercial Seed Incubation Business		
EQ	Evaluation Question		
ET	Evaluation Team		
ESRF	Economic and Social Research Foundation		
FARA	Forum for Agricultural Research in Africa		
FGD	Focus Group Discussion		
FIPS	Farm Input Promotions Africa Ltd.		
FRI	Farm Radio International		
GPS	Global Positioning System		
ICT	Information and Communications Technology		
IFDC	International Fertilizer Development Center		
IIAM	Institute of Agricultural Research, Mozambique		
IVR	Interactive Voice Response		
kg	Kilogram		
KII	Key Informant Interview		
km	Kilometer		
M&B	M&B Seeds and Agricultural Services		
MAP	Modern African Productions		
MOA	Ministry of Agriculture		
NGO	Non-Governmental Organization		
PEEL	Program Evaluation for Effectiveness and Learning		
ΡΙΑΤΑ	Partnership for Inclusive Agricultural Transformation in Africa		
QDS	Quality Declared Seed		

Acronym	Description
SBCC	Social and Behavior Change Communication
SMS	Short Message Service
SRI	Sugarcane Research Institute
SSTP	Scaling Seeds and Technologies Partnership
SWET	Story Workshop Educational Trust
USAID	United States Agency for International Development
VBA	Village-Based Agent

GLOSSARY OF TERMS

Term	Definition			
Adoption (of a variety or other technology)	Adoption takes place when a farmer decides to incorporate a new ¹ variety or technology into his or her long-term planting repertoire or management practices. Adoption usually occurs after a period of testing or "application" (see below). In general, there is a blurred line between application and adoption, but when a farmer has grown a variety for more than three years, he or she can generally be considered to have adopted it.			
Application (of a variety or other technology)	When a farmer "tries out" or tests a new variety or technology to determine whether to adopt it. Application generally takes place over two or three seasons, allowing a farmer to test it under different agro-ecological conditions. Application may or may not lead to adoption (see above).			
Certified seed (quality or improved seed varieties)	Certified seed is produced by registered seed growers by multiplying foundation seed to meet genetic and physical purity quality requirements as prescribed by a Seed Certification Authority or Agency. Certified seed is recognized by a label issued by the Certification Authority.			
Complementary technologies (other improved agricultural technologies)	Improved agricultural technologies and management practices that complement improved varieties promoted by the Partnership. Complementary technologies also referred to as "other," "associated," or "alternative technologies" in the SS documentation. They can include fertilizer, crop protection produ mechanization, irrigation, etc.			
Crop protection products (CPPs)	Active substances and compounds used to control pests, diseases, and weeds. CPPs include pesticides, fungicides, herbicides, weedicides, <i>etc.</i> The term is most commonly used to refer to pesticides. Also known as plant protection products.			
Direct farmer beneficiaries	Smallholder farmers who have participated in grantee activities such as demonstration plots or short-term trainings, or who receive or purchase inputs or services such as seed, fertilizer, or mechanized services directly from the grantee. Direct beneficiary farmers may or may not be members of a farmer group or community-based organization. The quantitative survey identified direct farmer beneficiaries as those who had heard of improved varieties and recalled taking part in activities promoting these varieties within the last three years.			
Indirect farmer beneficiaries	Smallholder farmers who have not had direct contact with SSTP-supported activities such as demonstration plots, trainings, or input/service provision, although they may have seen the variety/technology on a neighbor's farm or obtained it from sources besides the SSTP grantee. The survey identified indirect farmer beneficiaries as those who heard of improved varieties but had not taken part in activities promoting these varieties within the last three years.			
Poverty levelFor the purpose of this analysis, the survey categorized farmers' poverty according to ownership of assets (radio, TV, or phone) and acres of agric land cultivated by the household.				

¹ "New" in this case refers to a variety that is new to the farmer's repertoire; it can either be an improved variety or a traditional variety. In the context of this report, the evaluation team is primarily interested in the adoption of SSTP-promoted improved varieties.

Term	Definition		
Quality planting material (QDPM)	A legally recognized class of seed produced by farmers that is not subject to the same stringent controls and certification procedures as certified seed but has met sufficient standards to ensure quality. QDPM is generally applicable only to vegetatively produced crops (e.g., potato, cassava) for which there is less likelihood of loss of genetic quality.		
Seed scaling up program	The strategy used by SSTP to produce and make available quality seed of improved varieties that are already available on the market.		
Socially marginalized farmers	For the purpose of analysis, the survey identified socially marginalized farme according to their marriage status and membership of any local groups (e.g., farme based organization, religious group, credit/microfinance group, mutu help/insurance group, trade and business association, welfare group, social clu etc.). Those who were widowed, separated, divorced, and not members of an group are considered to be the most socially marginalized.		

EXECUTIVE SUMMARY

EVALUATION PURPOSE

This report provides a follow-up to the mid-term performance evaluation of the Scaling Seeds and Technologies Partnership (SSTP). Evaluation methods included a longitudinal panel survey involving two rounds of data collection from the same cohort of sampled direct and indirect farmer beneficiaries. Wave I of the beneficiary² survey was carried out in 2017, and the results were reported in the main evaluation report. Wave II of the survey was carried out in 2018 and forms the focus of the current report. The initial mid-term SSTP evaluation report³ addressed questions about project management/administration, engagement of the private sector, the scaling and adoption of technologies, and the enabling environment.

The purpose of the current report is to present the findings from the Wave II beneficiary farmer survey and generate learning points about scaling seed and technology adoption through the SSTP approach. The report's findings are expected to contribute to the ongoing work of the Alliance for a Green Revolution in Africa (AGRA) in advancing agriculture-led growth in Africa. They will be of particular interest to those involved in the AGRA-led Partnership for Inclusive Agricultural Transformation in Africa (PIATA),⁴ which builds on and expands the earlier work of SSTP.

This report was completed under the United States Agency for International Development's (USAID) Program Evaluation for Effectiveness and Learning (PEEL) mechanism.

PROJECT BACKGROUND

SSTP was a five-year, \$46.8 million program implemented by AGRA in Ethiopia, Ghana, Malawi, Mozambique, Senegal, and Tanzania from July 2013 to July 2018. The SSTP Grants program provided the primary mechanism through which SSTP aimed to achieve the following three objectives:

- 1. Improve capacity of public and private sector groups to deliver quality seed and other technologies to smallholder farmers;
- 2. Increase the use of quality seed and other technologies by smallholder farmers; and
- 3. Improve regional and country-level policy and regulation mechanisms for the production and delivery of quality seed and technologies to smallholder farmers.

The focus of the current report is SSTP-supported activities most relevant to the increased availability and use of improved seed varieties, including seed production by SSTP grantees, increased availability of seed in local markets, seed companies' efforts to create demand for improved varieties, and a range of promotional activities implemented under a small number of communication and outreach grants.

EVALUATION METHODS

The current report draws on the broader findings of the main SSTP evaluation but focuses on the analysis of quantitative data collected by the longitudinal panel survey. Data presented here refer to results from the panel survey and are not linked to specific SSTP interventions. The four selected crops (maize, beans, potato, and cassava) and three pre-selected countries (Ghana, Mozambique, and Tanzania) are not necessarily representative of the 17 crops and associated technologies included under the SSTP project. The panel survey used the same set of randomly sampled direct and indirect beneficiary smallholder farmers that were interviewed for the Wave I survey.⁵ The term "direct beneficiary" is used to refer to

² The term "beneficiary" is used throughout the report as a shorthand to refer to both to direct and indirect beneficiaries.

³ Longley, C., Kamiri, L., and Remington, T., 2017. Mid-Term Performance Evaluation of the Scaling Seeds and Technologies Partnership in Africa: Final Report. Available at: https://pdf.usaid.gov/pdf_docs/PA00N5FH.pdf.

⁴ Further information about PIATA is available at <u>https://agra.org/piata/</u>.

⁵ The sample size for Tanzania was larger because there were three focal crops (beans, Irish potatoes, and maize), whereas there was just one focal crop each in Ghana and Mozambique.

smallholder farmers who received some level of awareness or information about improved varieties through taking part in SSTP-supported activities, and in some cases, this led to application and/or adoption. The term "indirect beneficiary" is used to refer to smallholder farmers who are aware about improved varieties but did not take part in SSTP-supported activities. About 86 percent of the 3,839 selected beneficiaries in Wave I were re-contacted and successfully interviewed in Wave II (3,299).

Key survey limitations included: a) farmers' recall on years, seed quantities, and motivating factors may not always be accurate, especially for those farmers who started using specific varieties more than three years prior; b) the sample frame was not designed to be representative at the level of the different grantees, despite the different approaches used by each grantee; c) low response rates due to loss of panel members from migration, illness, death, or other reasons; and d) the focus on just four crops out of the 17 crops supported across six countries. Findings must be interpreted with caution and cannot be generalized for all SSTP-supported crops, all SSTP grantees, and all regions and countries where SSTP was implemented.

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Findings

Survey findings on the use of quality seed of improved varieties and associated technologies showed that:

- The use of SSTP-promoted improved varieties increased in all three countries within the SSTP project period in terms of the overall number of beneficiaries planting improved varieties.
- For most crops, including maize in Ghana, cassava in Mozambique, and Irish potatoes in Tanzania, the average amount of seed of SSTP-promoted varieties planted by beneficiaries increased over time, from the time that they first planted the variety to the 2017-18 season. The average amount of SSTP-promoted maize seed planted by sampled farmers in Ghana increased from 12.8 to 18.7 kilograms (kg) (roughly equivalent to just under one hectare). In Mozambique, the number of improved cassava cuttings planted by sample farmers increased more than tenfold, from an average of 263.6 to 3,544.2 sticks, representing approximately one-third of a hectare. In Tanzania, the average amount of SSTP-supported Irish potato varieties planted by surveyed beneficiary farmers increased from an average of 119.9 kg in the first season to an average of 796.6 kg by 2018, which equates to almost 0.4 hectare.
- The use of other improved technologies promoted by SSTP (improved farm management practices, fertilizer, other agro-chemicals, and post-harvest processing and storage technologies) increased in Ghana and Mozambique. In Tanzania, only post-harvest processing and storage technologies showed an increase in use.
- Among the three countries, the most common reasons for abandoning or discontinuing SSTPpromoted varieties following application or adoption were broad and relate to the characteristics of the variety itself (e.g., yield, storability); marketability of the output; vulnerability to weather; preferences for other varieties; and the cost and availability of seed.
- The application and adoption of SSTP-promoted improved varieties was greater among direct beneficiaries than indirect beneficiaries, suggesting (as expected) that SSTP grantees were more effective in reaching direct beneficiaries than indirect beneficiaries. In Ghana, the rate of increase in the number of sampled beneficiary farmers who adopted SSTP-promoted varieties during the lifetime of the SSTP project (from 2016-17 to 2017-18) was proportionally greater for indirect beneficiaries, suggesting that there was demand for the SSTP-promoted varieties and that indirect beneficiaries were able to access the seed of these varieties over time. In Mozambique and Tanzania, however, the proportion of sampled indirect beneficiaries using SSTP-promoted varieties appeared to have decreased during the SSTP project.

- In both Ghana and Tanzania, there was very little difference between seed acquisition channels for direct and indirect beneficiaries who applied SSTP-promoted varieties during the SSTP project, suggesting that indirect beneficiaries were able to acquire seed even if they did not benefit directly from SSTP-funded activities.
- In Tanzania, there was an increase in the number of sample beneficiary farmers who purchased seed of SSTP-promoted varieties at full cost and a decrease in those who acquired it for free. This is most likely because there was a decrease in the seed sourced from non-governmental organizations and other projects, as well as a decrease in those sourcing seed from other farmers, combined with a substantial increase in seed purchased from market traders and agro-input dealers. The reverse was true for Ghana where a slight increase in free seed of SSTP-promoted varieties was likely due to seed companies (and possibly also government extension agents) providing free "tester packs" of seed to farmers as a promotional strategy. The relative importance of agro-input dealers as a source of seed acquisition also increased in Ghana.
- In Tanzania, a slightly higher proportion of men purchased seed of SSTP-promoted varieties at full cost, whereas a greater proportion of women acquired seed for free, presumably from other farmers. More men tended to acquire seed from seed companies and agro-input dealers, and the proportion of men and women acquiring seed of SSTP-promoted varieties from market traders was roughly the same.
- In Ghana, other farmers were by far the most important motivating factor in persuading both male and female beneficiaries to first plant SSTP-promoted varieties. Proportionally more women reported to have been influenced by other farmers, whereas proportionally more men said they were influenced by seed companies, agro-dealers, and extension agents in terms of the motivation to apply improved varieties. In terms of seed acquisition, a greater proportion of sampled women purchased seed at full cost, whereas more men acquired seed for free or at reduced cost, most likely from seed companies and extension agents, both of whom were giving free "tester packs" to direct beneficiaries. This is consistent with the finding above that direct beneficiaries in Ghana tended to be more men than women.
- Graphs were used to illustrate the cumulative growth of beneficiary farmers using improved varieties for each crop in each country. All graphs showed increases from year to year during the project period, with variations in the patterns for different crop types: cassava and potato appear to show a much sharper rate of uptake during the project period than maize or beans. This is thought to be due to the presence of strong output markets for the varieties of these two crops that were being promoted by SSTP.

Conclusions

Differences in the levels of adoption between the Wave I and Wave II surveys clearly show that direct beneficiaries adopted the improved varieties before the indirect beneficiaries, and that farmer-to-farmer learning, combined with the availability of seed through farmers, agro-dealers and market traders, allowed for indirect beneficiaries to subsequently adopt the SSTP-promoted improved varieties. Mozambique, however, proved an exception because the way in which planting material was provided did not support farmer-to-farmer acquisition of planting material. Combined with the fact that cassava sticks' perishability means they cannot be provided through agro-dealers, this created a major barrier to acquisition of planting material by indirect beneficiaries.⁶

Regarding the socio-economic characteristics of sampled direct and indirect beneficiaries, the data clearly show that direct beneficiaries of information tended to be male, better-off, and less socially marginalized

⁶ For perishable planting material such as cassava sticks, it is especially important for farmers to be able to access planting material from other farmers.

(measured through marital status and social group membership), and that women, poorer, and more socially marginalized farmers did not benefit as much from free seed provided by extension agents and seed companies. This was most notable in Ghana. However, results should be interpreted with care due to small sample sizes and the use of proxy indicators.

Farmers themselves were found to be the greatest influence in motivating farmers to apply and adopt SSTP-promoted improved varieties, compared to extension agents, agro-dealers, and seed companies.

A comparison of motivation and seed acquisition among pre-SSTP adopters and SSTP adopters reflects the changes in the ways in which improved varieties have been promoted and made available over time, with extension agents becoming more prominent in Ghana and agro-dealers becoming more prominent in recent years in Tanzania. Results for both countries suggest that the improved seed promoted by the project are being made available in local markets, both through agro-input dealers and market traders, and that farmers are willing to purchase them at full cost. Over a longer time period, with the ongoing trend for more sustainable, commercial-based seed systems, one would expect to see an increase in seed purchased in Ghana, as has occurred in Tanzania.

Data on the discontinued use of SSTP-promoted varieties show that farmers will apply but not adopt these varieties for various reasons, including unfavorable varietal characteristics; a decision to switch to an alternative, more preferred variety; a lack of availability of seed of the variety in question; or a lack of opportunities to market the output after harvest. Although cost of seed was cited as a reason for not adopting a variety, the cost issue is not thought (by the Evaluation Team) to be such a constraint if output markets are present and farmers know they can generate income from the sales of the variety's output; in such circumstances, it is thought that farmers would be more willing to invest in the cost of seed.

Differences in the patterns of the cumulative adoption curves, combined with qualitative data about output markets for specific SSTP-promoted varieties, suggest that the process of varietal adoption is faster where farmers are linked to output markets for the specific varieties being promoted.

Recommendations

The report puts forward various approaches and methods that SSTP and other similar programs should incorporate to encourage direct and indirect beneficiaries to both try out and continue to use improved varieties. The recommended approaches are:

- Encourage farmers to learn from each other in various ways and to upscale this to reach more farmers, e.g., through the "small pack/whole village" approach; the use of drama; radio interviews with farmers; and village-based agents who are themselves farmers.
- Promote appropriate varieties, *i.e.*, those that display the characteristics preferred by farmers, are marketable, and are well-adapted to local weather patterns and agro-ecologies.
- Support linkages to output markets, either by selecting varieties for which output markets already exist or by supporting the development of new output markets.
- Ensure seed availability through agro-input dealers who are located within reasonable distance to the target farmers. Seed companies must enhance their marketing and distribution channels to ensure that they work more closely with a sufficient number of agro-input dealers and their subsidiaries.
- Make free varietal "tester packs" available and ensure that these are made available to all farmers, including women and poorer and socially marginalized groups. Both seed companies and donor-funded subsidy programs can support the inclusive, free distribution of "tester packs."
- Support more inclusive outreach and extension. Both government and private extension agents must be trained on the importance of inclusivity. Alternatively, the public and private sectors should promote a population-based or "whole-village" approach to extension.

I.0 INTRODUCTION

The Scaling Seeds and Technologies Partnership (SSTP) was a five-year, \$46.8 million program implemented in Ethiopia, Ghana, Malawi, Mozambique, Senegal, and Tanzania from July 2013 to July 2018 by the Alliance for a Green Revolution in Africa (AGRA). The SSTP mid-term performance evaluation included a longitudinal panel survey with two waves of data collection in 2017 and 2018. The main evaluation report⁷ included findings from the Wave I survey (2017), which addressed all four evaluation questions (EQs) presented in the Expression of Interest (Annex I). This report discusses the findings from the Wave II survey (2018), which focuses on EQ 3. Go here

EQ 3. Scaling and Adoption of Technologies

<u>3.1 Use of quality seed and improved technologies by farmers</u>: To what extent have AGRA and its subgrantees been able to increase the use of quality seed and improved technologies by smallholder beneficiary farmers? By indirect beneficiary farmers?

<u>3.2 Encouraging adoption versus application⁸ by different farmer types</u>: What types of strategies, innovations, or support have been the most effective in encouraging the use of improved seed and technologies for just one season? Over multiple seasons (adoption versus application)? What important barriers remain for the following:

- Direct project beneficiaries?
- Indirect beneficiaries (defined as those in catchment areas of activities who are not directly targeted by the activity)?
- Early adopters? Majority adopters? Late adopters?
- The poor, women, and socially marginalized groups?
- What other types of approaches and methodologies could the Partnership incorporate in its projects to encourage indirect beneficiaries to both try and continue to use new agricultural technologies and practices?

<u>3.3 Take-off points</u>: At what level of market penetration⁹ of potential market demand for targeted technologies is there likely to be spontaneous adoption (two or more growing seasons) by indirect beneficiaries (e.g., What is the take-off point at which technologies could "go viral")?

This report provides robust empirical evidence in response to EQs 3.1 and 3.2 and generates learning points about scaling seed and technology adoption through the SSTP approach. The necessary data on market penetration were not collected, so the report does not address EQ 3.3; instead, it explores the rate of adoption over time for the different crops. The report's findings are expected to contribute to AGRA's ongoing work in advancing agriculture-led growth in Africa and will be of particular interest to those involved in the Partnership for Inclusive Agricultural Transformation in Africa (PIATA),¹⁰ which builds on and expands the earlier work of SSTP.

⁷ Longley, C., Kamiri, L., and Remington, T., 2017. Mid-Term Performance Evaluation of the Scaling Seeds and Technologies Partnership in Africa: Final Report. Available at <u>https://pdf.usaid.gov/pdf_docs/PA00N5FH.pdf</u>.

⁸ Farmers typically test or try out a new variety for two or three seasons before deciding whether to adopt it into their planting repertoire. In the SSTP project, this period of testing is referred to as "application" and will often lead to adoption. In general, there is a blurred line between application and adoption, but farmers that have been growing a variety for more than three years can be considered to have adopted it.

⁹ "Market penetration" is defined as the number of people who buy a specific technology at least once in a given period divided by the size of the relevant market population.

¹⁰ Further information about PIATA is available at <u>https://agra.org/piata/</u>.

2.0 PROJECT BACKGROUND

SSTP was initially designed to contribute to the commitments of the New Alliance for Food Security and Nutrition (New Alliance). The New Alliance, established in 2012, was planned as a 10-year initiative through which the governments of 10 African countries,¹¹ the private sector, and G8 members would focus, accelerate, and coordinate joint efforts to reduce poverty and hunger in Africa.¹² SSTP was designed to support the New Alliance commitment of "*taking innovations to scale*," which involved several enabling actions, including establishing 10-year targets for sustainable yield improvements in national priority value chains, identifying core sets of technologies, and ensuring access to those technologies at sufficient scale. SSTP's objective was to work with six of the 10 New Alliance countries to help meet the 10-year agricultural production targets those countries set for themselves.

2.1 SSTP PROGRAM OBJECTIVES AND RESULTS FRAMEWORK

The SSTP project started in July 2013 and ended in July 2018.¹³ The total budget was \$46,769,842 of which \$22 million was designated grants to partners. SSTP was implemented in six of the 10 New Alliance countries—Ethiopia, Ghana, Malawi, Mozambique, Senegal, and Tanzania—to promote commercialization, distribution, and adoption of seed and related key technologies to increase smallholder yields and resilience to climate change. SSTP's outcomes, shown in Table I, were targeted to increase the supply of improved varieties of quality seed and other technologies so that the following objectives could be achieved:

- Improve the capacity of public and private sector groups to deliver quality seed and other technologies to smallholder farmers;
- Increase the use of quality seed and other technologies by smallholder farmers; and
- Improve regional and country policies and regulation mechanisms for the production and delivery of quality seed and technologies to smallholder farmers.

The development hypothesis behind SSTP was that more purposeful, effective coordination of technologyscaling opportunities for seed and other technologies by a willing private sector within an enabling commercial framework would lead to rapid agricultural productivity increases. For technologies in which commercial potential was untested or weak, more effective coordination and innovative pilots might stimulate new market development or suggest ways to address these scaling challenges. Better monitoring of commercialization and adoption experiences would provide information on which to base subsequent plans and activities, as illustrated through the SSTP Results Framework (Table I, next page).

¹¹ Ethiopia, Ghana, Kenya, Malawi, Mozambique, Mali, Niger, Nigeria, Senegal and Uganda.

¹² The Evaluation Team found that by 2017, the New Alliance itself was no longer on the policy agenda; many of the policy actors interviewed were simply unaware of the New Alliance Cooperation Frameworks, and the Forum for Agricultural Research in Africa (FARA) has taken a backseat in its support to the New Alliance. In some cases, this meant donors lacked the leverage to promote change. In Tanzania, however, the issues that formed part of the New Alliance Cooperation Framework went ahead under the National Agriculture Strategy. Although there may have been some early challenges in starting up SSTP without an effective New Alliance framework, this did not appear to have impeded progress in improving the enabling environment for the seed sector.

¹³ The original end date for SSTP was July 2016, but stakeholders agreed to two extensions that extended the end date to 2018.

Table I. SSTP Results Framework

SSTP Results Framework			
New Alliance for Food Security and Nutrition Goal : To achieve sustained and inclusive agricultural growth and raise 50 million people out of poverty over the next 10 years			
SSTP Goal: To improve food security and reduce poverty among smallholder farmers in targeted areas within			
selected sub-Saharan African coun Objective I: To improve capacity of public and private sector groups to deliver quality seed and other technologies to smallholder farmers	Tries Objective 2: To increase the use of quality seed and other technologies by smallholder farmers	Objective 3 : To improve regional and country-level policy and regulation mechanisms for the production and delivery of quality seed and technologies to smallholder farmers	
 Outcomes: 1.1 Improved access to business development and financial services by agro-enterprises 1.2 Increased sustainable supply of quality seed 1.3 Improved capacity of staff for quality seed production and delivery 1.4 Improved infrastructure to support quality seed production and delivery 1.5 Increased public-private partnerships 	 Outcomes: 2.1 Improved smallholder farmers' access to knowledge and skills 2.2 Increased capacity of farmer organizations to support use of quality seed and technologies 2.3 Increased use of information and communications technology (ICT)-enabled extension services by smallholder farmers (for New Alliance ICT Extension Challenge Fund grantees only) 	 Outcomes: 3.1 Increased consultation by the private and public sector on key seed production and delivery policy and regulatory issues 3.2 Increased coordination and harmonization of country- and regional-level seed production and delivery 3.3 Increased capacity of producer and consumer associations to engage in seed sector policy formulation and implementation 3.4 Increased capacity of public and private sector to monitor and regulate seed production and delivery 3.5 Increased self-monitoring, measurement, documentation, and communication of progress by SSTP focus country governments 	

SSTP aimed to support countries in transition from state-dominated seed systems to systems allowing the private sector to provide key services, like multiplication of foundation seed, and strengthen state capacity to carry out critical regulatory functions such as varietal release and seed certification. SSTP was to support national and regional efforts to revise and implement seed laws by focusing on harmonizing variety release and seed trade at the regional level, establishing foundation seed production in core countries, creating or expanding seed company and seed trade association capacity, and working with agro-dealers and credit providers to ensure farmer awareness of and access to improved seed. As part of their policy commitments under the New Alliance, the target countries pledged to make adoption of the best available technologies a top priority. They also agreed to implement necessary regulatory reforms and to annually assess progress against adoption goals. SSTP built on some of the work AGRA did in the program for African Seed Systems.

2.2 SSTP APPROACHES TO INCREASE THE USE OF IMPROVED SEED AND OTHER TECHNOLOGIES

By the end of the program, SSTP had awarded 67 grants with a combined value of approximately \$25 million (grant plus cost share). There were four main types of grants that corresponded to the three SSTP objectives:¹⁴ I) those supporting seed companies to produce and market improved varieties of seed; 2) those supporting associated technologies such as soil fertility, crop protection, and mechanization; 3) those promoting farmer knowledge about best management practices and awareness of new varieties and technologies promoted by the Partnership; and 4) those supporting policy and regulatory changes. The majority of grants (68 percent) supported seed production and marketing. There were relatively few grants (approximately 10 percent) for complementary technologies (Longley *et al.*, 2017). Complementary technologies played a relatively minor role in the SSTP project. Therefore, this report focuses more on the adoption of improved seed than on adoption of complementary technologies.

Figure I, below, presents grantee organization participation in the SSTP project. Private sector companies included seed companies and consultancy companies, which played a major role in certified seed production, creating demand for seed and strengthening capacity. International organizations and non-governmental organizations (NGOs) tended to be more involved in supporting the private sector to create demand for seed and other technologies and in strengthening capacity. Examples of the types of partnerships funded by SSTP grants are provided in Annex 2.





SSTP supported a range of activities intended to increase the availability of improved seed varieties and promote use of improved seed and other technologies by smallholder farmers. Across the six countries, SSTP worked with a total of 17 crops. The number of improved varieties made available varied by crop— all varieties received the necessary release and registration in the country where they were grown. Activities included:

- Producing foundation seed;
- Producing certified seed;
- Creating demand and marketing improved seed varieties and other technologies;

¹⁴ The first two grant types relate to Objective 1 and the last two grant types relate to Objectives 2 and 3, as shown in the SSTP Results Framework in Table 1.

- Raising farmer awareness of improved varieties, other technologies, and best management practices;
- Strengthening capacity of farmers, seed companies, national seed traders' associations, policymakers, and others; and
- Promoting policy and regulatory implementation and development.

Although it was not explicit in the SSTP Results Framework, seed company marketing efforts and awareness-raising among farmers, which fall under Objective I, were both designed to encourage farmer demand for new varieties. This demand led to an increase in smallholder farmers using new varieties (Objective 2). As such, different grants contributed to different objectives in more complex ways than might be assumed.

SSTP documentation differentiated two strategies for increasing seed availability, including:

- 1. Scaling up production (quantities) of existing seed varieties sold by the grantees and their distribution channel partners (agro-dealers and retailers); and
- 2. Commercializing developed and released varieties not yet on the market or available to farmers by producing quality seed to sell to farmers through grantees and their distribution channel partners (agro-dealers and retailers).

In practice, however, the earlier Evaluation Report states that the Evaluation Team (ET) was unable to identify any differences in the strategies applied; both types of varieties (varieties that already existed on the market and varieties that were not yet on the market or available to farmers) were multiplied, promoted, and made available to farmers in the same ways.

2.3 SUMMARY OF FINDINGS FROM THE 2017 SSTP EVALUATION REPORT

The SSTP-supported activities most relevant to the increased availability and use of improved seed varieties are described in the sections below. These descriptions draw on findings of the broader SSTP evaluation (Longley *et al.*, 2017), which used a mixed-methods approach¹⁵ including field visits by the three members of the ET to Ghana, Mozambique, and Tanzania (January-March 2017).

2.3.1 Seed Production by SSTP Grantees

The majority of SSTP grants supported seed production and marketing, which included production of foundation seed and certified seed. Although the SSTP project was initiated in July 2013, most of the grants did not start until 2014, and the seed produced by the majority of the seed company grantees was not available until 2015 or 2016.

The earlier Evaluation Report found that private sector engagement led to increased production of quality seed for the four focal crops in all six countries—although capacity constraints within both private and public sector organizations remained a major challenge. The evaluation identified a number of barriers to increased seed production by SSTP grantees and made two recommendations for enhancing quality seed production capacity across the focus countries. These were: 1) develop a seed demand forecasting system, and 2) insist that SSTP-supported seed producers document seed quality assurance procedures.

2.3.2 Increased Availability of Seed in Local Markets

Most seed companies lacked field-based marketing agents and relied on agro-dealers, extension agents, and partnerships with NGOs to make their seed available to farmers. SSTP envisaged seed company grantees expanding their retail networks by increasing the number of agro-dealers stocking their seed. As such, one of the project targets was a reduction in distance between farmers and agro-dealers from an

¹⁵ Qualitative and quantitative data collection methods included documentation review, interviews, focus group discussions (FGDs), the compilation of seed production and sales data for focal crops, an online questionnaire completed by all SSTP grantees, and remote interviews.

average of 20 kilometers (km) to six km. Seed companies in both Ghana and Tanzania expressed challenges in getting agro-dealers to pay for seed provided by the seed company on credit, yet a few had developed formal business contracts with agreed-on terms and conditions. Terms of seed supply, sale, and return are critical, especially when agro-dealers have unsold seed and inadequate storage facilities, which could impact the quality of seed sold in subsequent growing seasons.

The evaluation found that the capacity of agro-dealers was a barrier to the availability of improved seed varieties to farmers. Agro-dealers new to the seed business lacked knowledge about farmers' demand for seed and how to stock and sell seed from different suppliers. Some agro-dealers also lacked storage or shelf space in their shops, and many lacked the finances needed to purchase seed up front. Instead, they relied on seed companies to provide seed on credit. These issues made new agro-dealers hesitant to stock enough relevant varieties of seed for farmers. Because the selling season for seed to farmers is only a few weeks long (at the beginning of the planting season), agro-dealers must strike a balance between ordering too much and not enough seed in a very short time frame.

Another barrier is getting agro-dealers to replace old, known varieties with new varieties better adapted to changing environmental pressures like drought, heat stress, disease, or increased pests. This barrier can be overcome if seed companies make efforts to create farmer awareness so farmers will demand the new varieties. Most agro-dealers do not track sales, and the few that do track sales do not convey this information to seed company suppliers. A much closer, formal working relationship between seed companies and agro-dealers can help address some of these capacity issues. The Evaluation Report recommended that SSTP place greater emphasis on assisting grantee seed companies to develop sales and marketing skills.

2.3.3 Seed Companies' Efforts to Create Demand for Improved Varieties

For the most part, grantee seed companies relied on traditional methods to create awareness and promote demand for improved seed varieties. The methods used were very similar across the four crops in the evaluation and included use of demonstration plots, field days, radio programs, printed materials (e.g., leaflets, posters, and stickers), small packets of seed, and advertising in local newspapers. The extent to which these methods were used varied, depending on company resources and the geographic areas of operation. At least one company provided sample seed packs for free.¹⁶ Without field-based marketing agents, most seed companies worked with government extension agents, farmers, agro-dealers, and partnerships with NGOs to promote seed varieties. For demonstration plot management, relationships with extension agents tended to be quite informal.

At least two seed company grantees were very clear that the best way to ensure demand for their seed was through linkages to output markets. In Ghana, for example, one grantee seed company developed linkages with a chicken feed company for purchasing yellow maize from farmers. In Tanzania, a company producing potato plantlets and tubers had a link with a company intending to produce frozen French fries to sell to restaurants and hotels.

2.3.4 Communication and Outreach Grants

In each of the SSTP countries, there was at least one grantee specializing in communication and outreach to promote awareness of improved technologies among smallholder farmers. Overall, however, the number of grants for communication and outreach was relatively small (15 percent of total grants). Several of these grants were implemented as pilot activities to test so-called new approaches when, in fact, several of these approaches had already been tried and tested over many years and reached a large number of farmers. In some cases, the outreach and communication activities were not sufficiently linked to the other

¹⁶ Allowing a farmer to test or try out a variety and learn about it for themselves is considered to be key in promoting adoption (Fisher *et al.*, 2015). As such, affordable or free sample "tester" packs of small quantities of seed (typically 25-100 grams) is effective (ICRISAT, 2014).

grants, which made it difficult to ensure that what was being promoted were SSTP-supported varieties and technologies (Longley, et al., 2017).

The application of ICT extension approaches was supported through SSTP's link with the ICT Challenge Program. In Tanzania, the ICT Extension Challenge Program included a partnership between SSTP seed company grantees and Farm Radio International (FRI). The FRI approach is described in Section 4.3.5 below, which also describes two other particularly innovative outreach approaches implemented by SSTP grantees.

3.0 BENEFICIARY FARMER SURVEY: METHODS AND LIMITATIONS

This section describes the survey and sampling methods, screening questionnaire, and survey questionnaire. The SSTP smallholder beneficiary survey was conducted in two rounds (Wave I and Wave II) with the same pool of beneficiary farmers answering both rounds of the survey. The survey results presented in this report are supplemented by qualitative data collected by the ET through key informant interviews (KIIs) and focus group discussions (FGDs) during field visits to Ghana, Mozambique, and Tanzania, plus a short visit to Nairobi to meet with senior SSTP and AGRA staff, undertaken between January and March 2017. The ET also reviewed literature and project documentation and conducted additional remote interviews. The evaluation report by Longley, Kamiri, and Remington (2017) describes the qualitative methodology in more detail.

3.1 SURVEY METHODOLOGY

The SSTP farmer beneficiary survey was designed as a panel study with two rounds (Wave I and Wave II) of data collected one year apart. The panel study used the same set of randomly sampled direct and indirect beneficiary smallholder farmers to assess and track changes in their application and adoption of improved seed and other technologies over time. Wave I data were collected between March and June 2017, and Wave II data were collected between July and August 2018.

3.1.1 Study Sites and Target Population

The study sites were defined by the locations where SSTP grantees implemented the project activities linked to the focal crops in each country—Ghana (maize), Mozambique (cassava), and Tanzania (beans, maize, and potatoes). In each country, the grantees were given funds to market their products in specific regions, districts, and communities, according to the locations of agro-dealers and other partners in their distribution networks. Table 2 shows the areas where SSTP project activities were implemented for the focal crops in the focus countries.

Country (Crop)	SSTP Grantees Working to Increase Use of Improved Seed and Technologies	SSTP Project Regions by Focal Crops (as Reported by Grantees)	Improved Seed Varieties Promoted by SSTP*
Ghana (Maize)	Bruckner, Innovations Village Seed Company (IVSC), Legacy Crop Improvement Center (LCIC), M&B Seeds and Agricultural Services (M&B), and PEE Farms, Ltd.	Ashanti, Brong Ahafo, Central, Eastern, and Volta	Abontem (Aburo kokoo), Aseda, Mamaba, Obatampa (140 days), Omankwa, Opeaburoo, and Tintim
Mozambique (Cassava)	Institute of Agricultural Research, Mozambique (IIAM), Oruwera Limitada, and the International Fertilizer Development Center (IFDC)	Limpopo and Nacala corridors	Orera, Mokhalana, Eyope, clone 170, Chinhembwe, Colicanana, Liconde, and Varuiya
Tanzania (Beans)	Aminata Seed Company, Agricultural Research Institute (ARI)—Uyole and International Center for Tropical Agriculture (CIAT)	Arusha, Coast, Iringa, Njombe, Manyara, Mbeya, Morogoro, Rukwa, Katavi, Kilimanjaro, Ruvuma, and Tanga	Lyamungo/Rosekoko/Nyayo/ Kitenge (Lyamungo 90), Njano/Njano ndefu/Njano dume (Uyole Njano), Pundamilia, Kombati, Iringa ndefu (Jesca), Kalima (Calima Uyole), and Njano Uyole (Uyole 96)
Tanzania (Irish Potatoes)	Southern Agricultural Growth Corridor of Tanzania (SAGCOT)— Mtanga and Crop Bioscience Solutions	Arusha, Njombe, Manyara, and Kilimanjaro	Asante, Meru, Sherekea, Tengeru, and Obama (Cyangi)
Tanzania (Maize)	Aminata Seed Company, ARI—Uyole, Meru Agro- Tours, and Consultants Co. Ltd.	Arusha, Coast, Iringa, Njombe, Manyara, Mbeya, Morogoro, Rukwa, Katavi, Ruyuma, and Tanga	NATA/Lulu (NATA H104, NATA H105, NATA K6Q), Nyati (Meru HB515), Ngamia (Meru HB513), Boko (Meru HB 623), Uyole 615 (UH615), and Uyole 03 (UH6303)

Table 2. SSTP Project Areas by Focal Crop and Improved Seed Varieties in Ghana,Mozambique, and Tanzania

* Information on the improved varieties promoted through SSTP was provided by SSTP in-country teams and validated with each grantee and sub-grantee and during fieldwork of both survey rounds.

The target population for this survey was smallholder farmers who were direct or indirect SSTP project beneficiaries for each focal crop. *Direct beneficiaries* are smallholder farmers who have come into direct contact with SSTP grantee activities such as demonstration plots, training, or input and service provision promoting either the adoption of improved seed or planting materials or the adoption of other related technologies for beans, cassava, Irish potatoes, and maize. *Indirect beneficiaries* are smallholder farmers who live in the program areas and have not had direct contact with SSTP grantee activities, although they may have seen the variety or technology on a neighbor's farm or obtained it from sources other than the grantee, regardless of whether they applied the technology.

3.1.2 Sample Calculation and Size

The survey sample size calculation was based on the key indicator—percentage of farmers using improved seed of SSTP grantee-supported crops—and was calculated to detect a 10-percentage point difference in farmer adoption of improved seed of each focal crop between the two direct and indirect beneficiaries

with 80 percent power and a confidence interval alpha of 0.05. Sample size calculations accounted for a design effect of about 1.40 based on estimates from other population-based surveys conducted in Ghana. Because this survey was repeated after one year, the sample calculation for respondents considered the non-response rate of 5 percent for the first-round survey and a dropout rate of about 10 percent a year later.

The sample survey helps estimate statistical differences in how groups of beneficiary farmers—categorized by beneficiary status, sex, district, and socioeconomic status—use and adopt improved seed technologies over time. The procedures used in the survey were the same as those applied in other farmer household surveys to calculate and determine the total sample size of farmer beneficiaries (Feed the Future Guide, 2016.¹⁷

In the first survey wave, the sampling methodology was expected to yield the required total sample size of 600 direct beneficiaries and 600 indirect beneficiaries, for a total of 1,200 respondents per country (Ghana, Mozambique, and Tanzania). The sample size estimation for Tanzania was calculated in a slightly different way because there were three focal crops (beans, Irish potatoes, and maize). To avoid double counting farmers growing more than one of the focal crops in the sample, the three crops were each allotted to a different geographical region. For each crop in each region, a minimum of 300 direct and 100 indirect beneficiary farmers were interviewed in Wave I. The same beneficiary farmers were contacted again a year later for Wave II.

3.1.3 Sampling Strategy

The farmer beneficiary sample selection followed a multistage cluster sampling strategy, as described below.

Stage I: Selection of regions or provinces

The regions were selected using a non-probabilistic purposive sampling strategy based on where the project was implemented in the three countries—Ghana, Mozambique, and Tanzania. Initially, the ET worked with SSTP country teams to obtain a complete list of the SSTP grantees and the geographical areas in which they worked for each focal crop in each of the three countries. To increase the likelihood of finding a large enough sample of eligible farmers exposed to project activities, regions with the highest concentration of SSTP activities were selected from the list. Also, to minimize field costs and other logistical challenges, including the possibility of not finding SSTP direct beneficiaries, the ET deliberately selected and focused on two to three regions or provinces per country. In Ghana, the focus areas were the Ashanti, Brong Ahafo, and Central regions. In Mozambique, the focus areas were the Inhambane and Nampula provinces. In Tanzania, the focus regions were Arusha, Manyara, and Njombe.

Stage 2: Selection of communities or villages

The communities or villages selected were within the regions where SSTP grantees had promoted the improved varieties for the focal crops. For each focal crop, the grantees provided lists of all the communities in which they or their partners, including agro-dealers, implemented SSTP-funded promotional or marketing activities. The ET validated and revised the lists with grantees. The lists provided sampling frames for selecting communities for each crop, region, and country. Before the survey, the ET randomly ordered all the communities in the sampling frame by region and then randomly selected 10 or 15 communities per region, for a total of 30 communities per country. The ET selected four or five communities to serve as back-ups or replacements. A few communities were replaced when, on further investigation and consultation with the agro-dealers, they were found ineligible because they were in non-SSTP project areas. Also, some selected communities in Ghana were very small and, as a result,

¹⁷ Available at https://agrilinks.org/sites/default/files/resource/files/Sampling-Guide-Beneficiary-Based-Surveys-Feb122016.pdf).

neighboring communities were annexed because they were assumed to be similar in farmer background characteristics and other contextual factors.

In Ghana, the sampling frame included 199 communities (Ashanti: 55, Brong Ahafo: 70, Central: 74). Ten communities were randomly selected from each region for an initial total of 30. Of these, seven were replaced either because they did not have adequate households cultivating maize or they were not accessible. During data collection, 12 communities were found to have fewer than the required target sample of 35 direct and 35 indirect beneficiaries. As a result, neighboring communities were annexed to meet the quota. Hence, a total of 42 communities were included in the Ghana survey.

In Mozambique, the community sampling frame consisted of 79 communities (Inhambane: 28, Nampula: 51). Using the sub-sampling frames, 15 communities were randomly selected for each province (Inhambane and Nampula) for a total of 30 communities. In Tanzania, the 30 selected communities were evenly distributed across three regions—maize farmers in Arusha, bean farmers in Manyara, and Irish potato farmers in Njombe. Table 3 lists the communities selected in each country.

Country (Crop)	Selected Regions	Selected Communities		
	Ashanti	Hiawoanwu, Frante, Yabraso-Aframso, Ejura Nkwanta, Teacher krom, Kobriti, Mmesuo-Drumakumah, Sekyeredumase, Akomadan (Nkramomu), and Atobiase		
Ghana (Maize)	Brong Ahafo	Swanshi-Jato Zongo, Amantin, Dobidi Nkwanta-Fante Newtown, Asanti boa-Busunya, Bamiri-Oforikrom, Kokroko-Aworowa, Kuntunso-Tanoso, Awisa, Nsoko, and Nkrankrom		
	Central	Dominase-Ojobi, Akwakwaa-Mankrong, Osae Krodua-Krodua, Mfafo-Obrachire, Denkyera Oboasi, Assin Sienchem, Assin Gangan, Assin Bediadua (Bungalo), Assin Nsuta, and Agona Nkum		
Mozambique	Limpopo corridor (Inhambane)	Sizal, Conjo, Benzala, Munguambe, Mwengue, Nharrumbo, Nhambudoz, Cambine, Mindu, Nhambele, Helena, Dongane, Sengane, Inhacoongo, and Bule		
(Cassava)	Nacala corridor (Nampula)	Carrupeia, Namalili, Bueto, Mucuili-unidade Mocambique, Tiponha Nachaca, Nihessiue Muihia, Nacuca, Chilapane, Nathuko, Namatoro, I de Maio, Mariri, Nhamiconha, Caiaia, and Nacuatane		
Tanzania (Maize)	Karatu District Council (DC): Slahamo, Kainam, Rhotia Kati, Arusha K/Tembo, G/Arusha, and Endamarariek Arumeru DC: Lemanyata Imbibia Patandi and Nasholi			
Tanzania	Manyara	Hanang DC: Endasaki and Maeskron Babati DC: Riroda		
(Beans)	Manyara	<i>Mbulu DC</i> : Labay, Dongobeshi, Bashay, Kainamu, Basonyangwe, Harar, and Ngwandaqw		
Tanzania	Niombe	Njombe Town Council: Magoda, Kisilo, Lugenge, and Utengule		
(Irish Potatoes)	, gonibe	Wanging'ombe DC: Ujindile, Utelewe, Usalule, and Igima		

Table 3. Selected Communities for the Beneficiary Farmer Survey by Region and Country

Stage 3: Selection of direct and indirect beneficiary farmers

During fieldwork, a day before the interviews, data collectors conducted a listing exercise for all eligible farmers in each selected community. The listing exercise involved data collectors visiting households and administering a screening questionnaire. The questionnaire consisted of three questions designed to compile a comprehensive inventory of all eligible farmers within the sampled community and distinguish between direct beneficiaries and indirect beneficiaries. Screening questions were directed at a farmer within each household who made decisions related to focal crops.

After obtaining consent, the farmers were asked whether they grew the focal crop (beans, cassava, Irish potatoes, or maize). If their answer was yes, they were asked a second question as to whether they had heard of the improved varieties and other technologies that had been promoted by SSTP. If the answer was yes, they were asked a third question as to whether they had attended or participated in any activities promoting any of the improved crop varieties.¹⁸ If a farmer said yes to all three questions, that farmer was eligible to be included as a "direct beneficiary." If a farmer said yes to the first two questions but no to the last question, that farmer was listed as an "indirect beneficiary."

The ET informed all qualified farmers that they met the criteria for inclusion in the survey. The ET next asked the eligible farmers whether, if selected to represent other farmers in the community, they were available and willing to answer more questions about improved seed. If they agreed, the ET added their names and contact information to a sampling frame list for possible random selection. If the farmer was ultimately selected, the data collector contacted the farmer to schedule an interview. Farmers who did not reply after three contact attempts were dropped from the list and replaced. The ET used tablets to capture Global Positioning System (GPS) coordinates of the selected villages and households with eligible farmers.

The lists of all eligible farmers in each community were submitted electronically to a central server. After the listing data were submitted, the survey manager centrally analyzed and developed two parallel lists based on the farmers' responses to the screening questions. This determined whether the farmer was included as a direct or indirect beneficiary. The two lists served as sampling frames for each community. A total of 1,200 randomly selected beneficiary farmers per country were expected. A total of 40 farmers per community was necessary to achieve the required sample size of 1,200 from the 30 randomly selected communities. Therefore, from each developed sampling frame, 20-22 direct and 20-22 indirect beneficiaries were randomly selected from each corresponding list. This made a total of 40-44 beneficiary farmers for interviews. Up to four extra beneficiary farmers were selected in each community to serve as alternates.

3.1.4 Final Sample Wave

The following paragraphs summarize the sample selection and distribution of beneficiary farmers for each country and crop.

<u>Ghana</u>: In total, 3,201 farmers were listed in the 42 selected communities across the regions of Ashanti (1,046), Brong Ahafo (959), and Central (1,196), which served as sampling frames for each region. The survey sample was equally divided among the three regions (200 direct and 200 indirect), for a total expected sample of 600 direct and 600 indirect beneficiaries. Farmers actually interviewed by region were Ashanti: 400, Central: 401, and Brong Ahafo: 404.

<u>Mozambique</u>: In total, 3,047 farmers were listed in the 30 randomly selected communities. There were 15 communities in Inhambane province and 15 in Nampula province. A total of 600 direct and 600 indirect beneficiaries were expected. A final sample of 1,209 farmer interviews was completed.

<u>Tanzania</u>: In total, 3,600 farmers were listed in the 30 selected SSTP communities and villages. For each community, 44 farmers were randomly sampled for interviews. The distribution of the selected farmers differed from the other two countries because there were three crops. Of the expected 1,200 farmers, 900 were direct beneficiaries (300 for each crop) and 300 were indirect beneficiaries. Therefore, out of the 44 randomly sampled beneficiary farmers, 32 direct SSTP beneficiary farmers and 12 indirect farmer beneficiaries were selected for each community and for each crop. A total of 1,325 interviews were completed in the three Tanzanian regions.

¹⁸ Examples of such activities were given by the interviewer.

Table 4 below presents the overall final sample of smallholder beneficiary farmers across the three countries included in survey Wave I (N=3,839), including 2,172 direct beneficiaries and 1,567 indirect beneficiaries. The survey sample included 2,091 males (54.5 percent) and 1,748 females (45.5 percent).

3.1.5 Final Sample Wave II

The follow-up survey methodology involved tracking the same Wave I respondents using a similar questionnaire. The first step to reaching the farmers was through phone contacts before going to the field. During Wave I, the farmers were asked whether they could be re-contacted a year later for a follow-up interview, and if they gave consent, they were asked to provide their phone number or the phone numbers of close relatives where they could be reached to schedule the interviews. In preparation for Wave II survey fieldwork, all sampled farmers were contacted, informed about the survey, and given estimated dates of when they would be re-interviewed. If a farmer could not be reached by phone after several attempts, the next step was to locate him or her during the first day of visits to the communities.

For farmers who could not be reached by phone, the teams were to identify the farmer's house and physically go to the house and try to find the farmer. If the farmer was not available, neighbors in the community were asked for information on the farmer's whereabouts. If a farmer had relocated, the details were submitted to the supervisor who checked to determine whether the location fell within the sampled communities. If yes, the farmer was tracked to the new residence within the same community. If the farmer had relocated outside the study location, details were submitted to the principal investigator, who made a final decision to drop or replace the farmer.

Table 4 shows the overall final sample of smallholder beneficiary farmers in the Wave II survey. About 86 percent of selected farmers in Wave I were re-contacted and successfully interviewed in Wave II (3,299). Of these, 2,015 (61 percent) were direct beneficiaries and 1,284 (39 percent) were indirect beneficiaries across the three countries. The survey sample included 1,811 males (54.9 percent) and 1,488 females (45.1 percent). The response rates across countries were Ghana (91.0 percent), Mozambique (73.0 percent), and Tanzania (99.7 percent).

Country (Crop/Survey Year)*		Dire	ct Benefici	aries	Indirect Beneficiaries			Total			
		Male	Female	Total	Male	Female	Total	Male	Female	Total	
	Ghana										
Maizo	Wave I	371	233	604	267	334	601	638	567	1,205	
Taize	Wave II	336	218	554	243	300	543	579	518	1,097	
Mozambique											
Cassava	Wave I	279	328	607	213	389	602	492	717	1,209	
Cassava	Wave II	215	250	465	156	260	416	371	510	881	
				Та	anzania*	**					
Maize	Wave I	247	72	319	82	38	120	329	110	439	
Taize	Wave II	262	72	334	72	33	105	334	105	439	
Boons	Wave I	211	110	321	79	40	119	290	150	440	
Dealls	Wave II	214	108	322	76	40	116	290	148	438	
	Wave I	188	133	321	54	71	125	242	204	446	

Table 4. Distribution of Final Sample of Beneficiary Farmers Interviewed by BeneficiaryStatus, Sex, Survey Year, and Country

Country (Crop/Survey		Direct Beneficiaries			Indir	Indirect Beneficiaries			Total		
Yea	r)*	Male	Female	Total	Male	Female	Total	Male	Female	Total	
Irish Potatoes	Wave II	194	146	340	44	60	104	238	206	444	
Total	Wave I	646	315	961	215	149	364	861	464	1,325	
Tanzania	Wave II	670	326	996	192	133	325	861	460	1,321	
Grand	Wave I	1,296	876	2,172	695	872	I,567	1,991	I,748	3,739	
Totals	Wave II	1,221	794	2,015	591	693	1,284	1,811	I,488	3,299	

*Response rates across countries: Ghana - 91 percent, Mozambique - 73 percent, and Tanzania - 99.7 percent **Three crops for Tanzania

3.1.6 Data Collection Procedures

Questionnaire development and translation: The main survey instruments were a beneficiary farmer survey questionnaire (Annex 3) and a pre-screening questionnaire. Questions from existing adoption studies were modified to specifically suit the SSTP project activities, country, and targeted crops. The survey included five subsections: farmer background characteristics; general exposure to improved crop varieties and other improved technologies; application of SSTP-promoted improved varieties of the focal crops; adoption of SSTP-promoted varieties; and discontinuation of tried SSTP-promoted varieties. The questionnaire was developed in English and translated into languages local to the selected survey areas. Respondents took an average of 45-60 minutes to complete the survey. In Ghana, the questionnaire was translated into Twi, in Mozambique into Shangana and Emakwa, and in Tanzania into Kiswahili.

Data entry program design: The survey companies—Economic and Social Research Foundation (ESRF) in Tanzania, and Kantar Public in Ghana and Mozambique—were selected to conduct the survey based on their expertise in using computer-assisted personal interviewing (CAPI) to collect, process, and manage data. The data managers programmed the questionnaire in the Census and Survey Processing System (CSPro) software installed on the handheld digital tablets for CAPI. The program and the questionnaire were adapted for each country and crop, pilot tested, and then loaded onto the tablets. The data entry program had built-in automated checks for quality control.

Data collection team recruitment and training: Data collectors and supervisors with the necessary language skills and, at a minimum, a college degree, were recruited and trained to collect data in each country. Five-day training sessions were implemented both in Wave I and Wave II and provided trainees with comprehensive knowledge about the survey and how it should be implemented in the field. The training included methods to obtain respondents' consent before administering the survey. It also included two days to pilot test and refine the survey tools and familiarize the trainees with the CAPI survey tool. The pilot tests were conducted in local languages and in communities where SSTP grantees and their partners worked, but these communities were not included in the study sample.

Fieldwork: In Tanzania, data collection for the beneficiary farmer survey took place from March 16-April 6, 2017 (Wave I) and July 18-August 2, 2018 (Wave II). In Ghana, data collection occurred between March 31-May 5, 2017 and July 4-August 22, 2018. In Mozambique, data collection was between April 10-May 18, 2017 and July 12-August 22, 2018. In each country, a quality control supervisor was responsible for overseeing the overall data collection process and for communicating weekly with the principal investigator.

Data quality procedures: The field teams implemented and adhered to strict quality control procedures throughout fieldwork preparation and implementation. The field teams used tablets equipped with navigational GPS that captured the coordinates of selected households and communities. CAPI allowed

for built-in quality checks and real-time monitoring of the fieldwork to track data collection progress. Supervisors reviewed the completed questionnaires each day to check for completeness and anomalies in the data and gave the interviewers feedback. The country survey manager produced weekly status reports that documented progress and described any problems that had arisen. These reports were submitted to the principal investigator.

Data processing and cleaning: The field teams entered data for each community and submitted the data, which were automatically uploaded to ICF's password-protected dedicated central office secure servers in accordance with the company's policy on security protocols. Data processors accessed the data each day to ensure all coding and cleaning was done to established data quality standards. Upon fieldwork completion, the responses were translated from the local language into English and checked for logical errors. Crop variety names (both local and official) were validated. Responses from the open-ended questions and answers were coded during Wave I, and the same codes used in the Wave II questionnaire.

3.1.7 Data Analysis Approach

STATA 14 software was used to analyze beneficiary farmer survey data collected from all three countries in 2017 and 2018. Due to attrition, only 3,299 of the original 3,839 cases analyzed in Wave I were included in the Wave II analysis for an overall response rate of 85.9 percent.¹⁹ In addition, because the individual beneficiary farmers in both Waves I and II surveys were matched, no weighting was used. Key indicators were calculated for each of the survey rounds and modules. The survey analysis included descriptive statistics of key variables and standard errors, confidence intervals, and cross-tabulations for key outcome indicators for adoption and application of new seed varieties. Proxy variables were generated for the poverty level index and level of marginalization.²⁰ Multivariate analysis was conducted to determine the key factors and adoption rates of improved varieties. To help explain or interpret the survey findings, the survey data were triangulated with qualitative data the ET collected in 2017.

3.1.8 Ethical Considerations

Before the start of the survey, the ET submitted a comprehensive SSTP Evaluation Protocol package with all survey instruments and interview guides for ethical review and approval by ICF's Institutional Review Board. The full study protocol and instruments were also submitted to local ethics boards in each of the study countries, but the reviews were waived. Permission letters to conduct the survey in each country were obtained from local authorities. All personal identifying information (PII) was removed from the data sets to comply with United States Agency for International Development (USAID) requirements.

3.1.9 Survey Limitations

The survey methodology used in this study had a number of limitations that should be considered when interpreting the data.

- The surveys relied on direct and indirect beneficiary farmers' recall of what they had planted in the preceding main planting season, when (how many years ago) they first started using specific improved varieties, and what had motivated them to do so. Farmers' recall on when they first used specific varieties, the amount of seed first used, and motivating factors may not always be accurate, especially for those farmers who started using them more than three years ago.
- The timing of survey implementation in relation to the planting seasons in each country was late in some cases, especially in Ghana, where there are two planting seasons (major and minor). Thus,

¹⁹ Although data for 306 replacements for drop-outs in Wave II for Ghana and Mozambique were collected, they were excluded from the analysis presented here.

²⁰ Using WAVE II data, frequencies were run of all relevant variables to identify variables that could be used to generate the proxies with some degree of sensitivity in measurement. Variables with many missing responses and mostly uniform responses (e.g., main source of household income from crop sale) were excluded from the proxy variables. However, the majority of sample farmers are married, with marital status remaining as a part of the marginalization proxy.

farmers were asked to recall what they had planted in the major season at a time after they had also completed planting for the minor season. This meant that farmers had to recall what they had planted in the season prior to the most recent planting season. Related to this is the fact that the two surveys were conducted at slightly different times of the year. Wave I was conducted in April-June of 2017, and Wave II conducted in July-August of 2018. The difference in timing may affect the accuracy of recall on events related to focal season for some crops. Different seasons may have been captured, but a lag in recall may distort farmer responses.

- There were no comprehensive lists providing complete sampling frames for selecting beneficiaries during Wave I. Some of the grantees and their partners, notably agro-dealers, did not keep updated lists. To address this limitation, only communities in regions with project activities were included, and the pre-screening questionnaire was used to compile the sampling frame.
- The survey focused on direct and indirect beneficiaries in limited sites in the SSTP project communities, which may be systematically different than farmers in the general population. Thus, the findings from these sites cannot be generalized across the entire population of smallholder farmers in any country.
- During fieldwork, some of the selected project communities were found to be too small in population to yield the required sample size of farmers. This was especially true in Ghana. As a result, neighboring or adjacent communities were annexed, which may have introduced some selection bias, as they may not necessarily have been exposed to promotional or marketing activities implemented as part of the SSTP-supported activities. This being the case, complete capture of project interventions was potentially limited. This bias was mitigated by selecting roughly equal numbers of direct and indirect beneficiaries.
- SSTP supported 17 crops across six countries. The four selected crops and three countries are not necessarily representative of the 17 crops and associated technologies included under SSTP.
- The sample frame was not designed to be representative at the level of the different grantees, despite the different approaches and expected outcomes for each project grantee. Unfortunately, the project areas with the most innovative "communication and outreach" grantees were not included in the sample because the ET did not recognize the innovativeness of these grantees until after the sample frame had been developed. Thus, rather than comparing the approaches of the different grantees, the survey was designed to compare the effectiveness of different motivating factors that prompted beneficiary farmers to use improved varieties.
- Wave II saw low response rates due to the loss of panel members from migration, illness, death, or other reasons. This reduced the sample size and made the sample less representative and the analysis less statistically sound. Therefore, findings are not necessarily applicable to the population of farmers in each country.

4.0 FINDINGS

This section presents the results of the panel survey of beneficiary farmers over the two waves of data collection one year apart in Ghana, Mozambique, and Tanzania. The survey data are supplemented by the qualitative data collected in 2017 by the ET in some of the same locations in the three countries.

4.1 BACKGROUND CHARACTERISTICS OF SURVEY SAMPLE

4.1.1 Socio-Economic Background of Beneficiary Farmers

Table 5 presents background characteristics for beneficiary farmers sampled in survey Wave I (April-June 2017) and Wave II (July-August 2018). Survey results include 3,739 farmers in Wave I and 3,299 farmers

in Wave II across the three countries, with a drop-out rate of 14.1 percent of farmers originally sampled and interviewed in Wave I. Further analysis indicates that the characteristics of farmers interviewed in both survey rounds were similar in terms of their sex, age, and other basic factors, suggesting that there is minimal bias created by those who dropped out of the study.

The overall sample was composed of 53 percent male and 47 percent female smallholder beneficiary farmers. Across the three countries, the majority of respondents were between the ages of 30 and 59, including 53.4 percent in Mozambique, 72.0 percent in Ghana, and 74.0 percent in Tanzania. The percentage of farmers between the ages of 16 and 29 is relatively low in Ghana (12.6 percent) and Tanzania (12.1 percent) but relatively higher in Mozambique at 30.9 percent. The mean household size for sampled farmers was 6.6 persons in Ghana, 5.2 in Mozambique, and 5.7 in Tanzania. Finally, over 80 percent of beneficiary farmers in Tanzania have completed primary or higher levels of education compared to 37.1 percent in Ghana and 23.7 percent in Mozambique.

			Ghan	a	Mozan	nbique	Tanzania		
Cha	aracteristics		Wave I	Wave II	Wave I	Wave II	Wave I	Wave II	
			N=1,205	N=1,097	N=1,209	N=881	N=1,325	N=1,321	
	Male	N	638	579	492	371	861	861	
Sex		%	52.9	52.8	40.7	42.1	65.0	65.2	
	Fomalo	N	567	518	717	510	464	460	
	Female		47.I	47.2	59.3	57.9	35.0	34.8	
	Direct	N	604	554	607	465	961	996	
Beneficiary	Direct	%	50.1	50.5	50.2	52.8	72.5	75.4	
Status	Indiroct	N	601	543	602	416	364	325	
	manecc	%	49.9	49.5	49.8	47.2	27.5	24.6	
	16-29	N	152	129	373	194	160	116	
	Years	%	12.6	11.8	30.9	22.0	12.1	8.8	
Age Group	30-59	N	868	794	646	516	980	999	
(Years)	Years	%	72.0	72.4	53.4	58.6	74.0	75.6	
	60+ Yoars	N	185	174	190	171	185	206	
	our rears	%	15.4	15.9	15.7	19.4	14.0	15.6	
	Completed	N	447	401	286	152	1,144	1,186	
Educational	Primary or Higher	%	37.1	36.6	23.7	17.3	86.3	89.8	
Attained	Incomplete	N	758	696	923	729	181	135	
Attained	Primary and Lower	%	62.9	63.4	76.3	82.7	13.7	10.2	
Read and Un	derstand in	N	490	435	646	451	1,143	1,185	
English or Lo with Ease	cal Language	%	40.7	39.7	53.4	51.2	91.5	95.4	
Mean House	nold Size	Average	6.6	6.6	5.2	5.4	5.7	5.8	
Household La (Hectares)	and Size	Average	2.5	2.7	1.5	0.8	1.3	1.4	
	Dedia	N	911	790	525	353	1,039	1,079	
	Kadio	%	75.6	72.0	43.4	40.1	78.4	81.7	
Media Assets	TV	N	636	613	151	131	307	903	
Ownership	IV	%	52.8	55.9	12.5	14.9	23.2	68.4	
	Mahili	N	1,068	1,022	603	604	1,283	1,305	
	Modile	%	88.6	93.2	49.9	68.6	96.8	98.8	

Table 5. Beneficiary Status and Country

			Ghar	na	Mozan	nbique	Tan	Tanzania	
Char	acteristics		Wave I	Wave II	Wave I	Wave II	Wave I	Wave II	
			N=1,205	N=1,097	N=1,209	N=881	N=1,325	N=1,321	
Main Source	Sale of	N	I,090	1,001	805	571	1,107	1,125	
of	Crops	%	90.5	91.2	66.6	64.8	83.5	85.2	
Household	Other	N	115	96	404	310	218	196	
Income	Sources	%	9.5	8.8	33.4	35.2	16.5	14.8	
Crows Mambarahis N		N	1,058	1,051	897	731	770	634	
Group Men	inci suih	%	87.8	95.8	74.2	83.0	58. I	48.0	

Group membership was based on a response of "yes" to the group membership question.²¹ Reported group membership by respondent or family member in household was relatively high in Ghana (87.8 percent) and Mozambique (74.2 percent), but lower in Tanzania (58.1 percent). Commonly reported assets owned by respondents were a mobile phone (53.0 percent) and a radio (51.0 percent). Fewer beneficiary farmers owned a TV (21.0 percent).

4.1.2 Socio-Economic Characteristics of Direct and Indirect Beneficiaries

Tables 6-8 compare the socio-economic characteristics of direct and indirect beneficiaries in each country. As seen in Table 6, survey results show that female beneficiary farmers in all countries are less likely to be direct beneficiaries, and the findings are statistically significant.

Ghana Farmer Statı	IS	Male	Female	Total
	N	336	218	554
Direct Beneficiary	%	60.6	39.4	50.5
Indianat Danafisians	N	243	300	543
Indirect Beneficiary	%	44.8	55.2	49.5
Total	N	579	518	1,097
Total	%	52.8	47.2	100.0
Pearson Chi-Square 0.000***			····	
* p<0.05; ** p<0.01; *** p<0.001				
Mozambique Farmer St	tatus	Male	Female	Total
Direct Bonoficiery	N	215	250	465
Direct Beneficiary	%	58.0	49.0	52.8
Indiract Panaficiany	N	156	260	416
Indirect Beneficiary	%	42.0	51.0	47.2
Total	N	371	510	881
				100.0
lotai	%	42.1	57.9	100.0
Pearson Chi-Squared 0.009**	%	42.1	57.9	100.0

Table 6. Farmer Beneficiary Status by Sex (Wave II)

²¹ This question asked specifically about membership for a range of different group types, including farmer-based organizations, religious groups, credit/microfinance groups, mutual help/insurance groups, trade and business associations, welfare groups, social clubs, *etc.*

Tanzania Farmer Status		Male	Female	Total
Direct Peneficiany	Ν	670	326	996
Direct Beneficial y	%	78.0	70.6%	75.4
	Ν	189	136	325
Indirect Beneficiary	%	22.0	29.4	24.6
Total	Ν	859	462	1,321
Total	%	65.0	35.0	100.0
Pearson Chi-Square 0.003**		•		
* p<0.05; ** p<0.01; *** p<0.001				

Table 7 shows results for a proxy variable representing levels of social marginalization among beneficiary farmers. The marginalization variable is calculated based on marital status and group membership²² (e.g., farmer group, social group, savings group, religious group, welfare group, etc.).

Ghana Farmer Status Less Not Total Very Marginalized Marginalized Marginalized Marginalized 83 554 Direct Ν 460 3 8 **Beneficiary** % 0.5 15.0 1.4 83.0 100.0 Indirect Ν 7 94 28 414 543 **Beneficiary** % 1.3 17.3 5.2 76.2 100.0 Ν 10 177 36 874 1.097 Total % 0.9 3.3 79.7 100.0 16.1 Mozambique Farmer Status Very Not Total Less Marginalized Marginalized Marginalized Marginalized 72 Ν 13 43 337 465 Direct 15.5 9.2 100.0 **Beneficiary** % 2.8 72.5 Ν 30 64 254 416 Indirect 68 Beneficiary % 7.2 16.3 15.4 61.1 100.0 Ν 43 140 107 591 881 Total % 4.9 15.9 100.0 12.1 67.I Tanzania Less **Farmer Status** Very Not Total Marginalized Marginalized Marginalized Marginalized Ν 37 44 444 471 996 Direct Beneficiary 4.4 100.0 % 3.7 44.6 47.3 9 110 325 Indirect Ν 23 183 Beneficiary % 7.1 2.8 56.3 33.8 100.0 Ν 60 53 627 581 1,321 Total % 4.5 4.0 47.5 44.0 100.0

 Table 7. Farmer Beneficiary Status by Social Marginalization (Wave II)

Finally, Table 8 shows there is a statistically significant difference between beneficiary type and poverty status, but a larger sample size is needed to tease out differences across the categories.

²² Measuring social marginalization depends on how it is defined. In our understanding, those who are socially marginalized includes those who lack representation and are thus excluded to some extent from community activities, decision-making processes, networks and/or groups. It is relatively easy to ask an individual about their group membership, so this was used as an indicator.

			Ghana F	Poverty Le	vel 2018*		
Farmer Sta	atus	Deer	Less	Middle	Better	Highest	Total
		Foor	Poor	Level	Off	Income	
Direct	N		75	67	102	199	554
Beneficiary	%	20.0	13.5	12.1	18.4	35.9	100.0
Indirect	N	83	115	63	109	173	543
Beneficiary	%	15.3	21.2	11.6	20.1	31.9	100.0
Total	N	194	190	130	211	372	1,097
TOLAI	%	17.7	17.3	11.9	19.2	33.9	100.0
Pearson Chi-Squared	1 .006**				•	•	
* p<0.05; ** p<0.01;	*** p<0.001						
		M	lozambiqu	e Poverty	Level 2018	**	
Farmer Sta	atus	Poor	Less	Middle	Better	Highest	Total
	1		Poor	Level	Off	Income	
Direct	N	214	74	97	67	13	465
Beneficiary	%	46.0	15.9	20.9	14.4	2.8	100.0
Indirect	N	227	49	100	36	4	416
Beneficiary	%	54.6	11.8	24.0	8.7	1.0	100.0
Total	N	441	123	197	103	17	881
Total	%	50.I	14.0	22.4	11.7	1.9	100.0
Pearson Chi-Squared	1 .002**						
* p<0.05; ** p<0.01;	*** p<0.001					_	
			Tanzania I	Poverty Le	vel 2018**	*	
Farmer Sta	atus	Poor	Less	Middle	Better	Highest	Total
			Poor	Level	Off	Income	
Direct	N	148	4	255	342	110	996
Beneficiary	%	14.9	14.2	25.6	34.3	11.0	100.0
Indirect	N	73	46	108	78	20	325
Beneficiary	%	22.5	14.2	33.2	24.0	6.2	100.0
Total	N	221	187	363	420	130	1,321
	%	16.7	14.2	27.5	31.8	9.8	100.0
Pearson Chi-Squared	1.000***						
* p<0.05; ** p<0.01;	*** p<0.001						

Table 8. Farmer Beneficiary Status by Poverty Level

4.2 USE OF QUALITY SEED AND IMPROVED TECHNOLOGIES BY BENEFICIARY FARMERS

4.2.1 Use of Any Improved Technologies by Direct and Indirect Beneficiary Farmers

Table 9 shows changes in the types of improved agricultural technologies applied by sampled smallholder beneficiary farmers for all three countries in the 2016-17 and 2017-18 planting seasons, including improved seed and improved farm management practices, fertilizer, other agro-chemicals, and post-harvest processing and storage technologies.

Table 9. Percentage of Beneficiary Farmers Who Have Tried Any Improved Technologiesby Survey Wave and Country*

		Ghana		Mozambique		Tanzania		All Countries	
ltem		Wave I	Wave II	Wave I	Wave II	Wave I	Wave II	Wave I	Wave II
		N=1,205	N=1,097	N=1,209	N=881	N=1,325	N=1,321	N=3,739	N=3,299
Improved Seed	Ν	583	740	291	319	1,195	1,225	2,069	2,284
Varieties	%	48.4	67.5	24.1	36.2	90.2	92.7	55.3	69.2
Farm Management	Ν	805	917	175	495	503	457	I,483	1,869
Practices	%	66.8	83.6	14.5	56.2	38	34.6	39.7	56.7

ltem		Ghana		Mozar	Mozambique		Tanzania		All Countries	
		Wave I	Wave II	Wave I	Wave II	Wave I	Wave II	Wave I	Wave II	
		N=1,205	N=1,097	N=1,209	N=881	N=1,325	N=1,321	N=3,739	N=3,299	
Fertilizer	Ν	667	769	168	176	818	615	1,653	1,560	
Applications	%	55.4	70.1	13.9	20	61.7	46.6	44.2	47.3	
Other Agro-	Ν	752	923	93	173	656	572	1,501	1,668	
Chemical use	%	62.4	84.I	7.7	19.6	49.5	43.3	40.1	50.6	
Processing/Storage	Ν	166	675	60	134	200	283	426	1,092	
1 1 OCESSING/Storage	%	13.8	61.5	5	15.2	15.1	21.4	11.4	33.1	

*Multi-response question

Table 10 presents differences in the use of any improved technologies (whether promoted by SSTP) and beneficiary type for Ghana and Mozambique. Responses are multi-response for each option and column percentages are shown separately for each wave. Focusing on the use of improved seed varieties, the overall usage rate increased by 14.6 percentage points in Ghana (53.7 percent to 68.3 percent) compared to a 3.9 percentage point decrease (57.2 percent to 53.3 percent) in Mozambique. In Ghana, both direct and indirect beneficiaries increased their use of improved seed varieties from Wave 1 to Wave 2. In Mozambique, direct beneficiaries increased their use of improved seed varieties from Wave 1 to Wave 2; however, indirect beneficiaries significantly decreased their use of improved seed varieties over the same period by 16.1 percentage points (55.6 percent to 39.5 percent) contributing to an overall reduction in usage from Wave 1 to Wave 2.

				Ghana		Mozambique			
Techno	logy		Direct Beneficiaries	Indirect Beneficiaries	Total	Direct Beneficiaries	Indirect Beneficiaries	Total	
Improved	Wave	Ν	365	218	583	216	75	291	
Sood	Ι	%	62.9	43.2	53.7	57.8	55.6	57.2	
Variation	Wave	Ν	423	317	740	225	94	319	
varieties	II	%	76.9	59.5	68.3	62.5	39.5	53.3	
Form	Wave	Ν	442	363	805	149	26	175	
Managament	Ι	%	76.2	71.9	74.2	39.8	19.3	34.4	
Practicos	Wave	Ν	490	427	917	307	188	495	
rractices	11	%	89.1	80.1	84.7	85.3	79.0	82.8	
	Wave	Ν	387	280	667	37	31	168	
Fertilizer	1	%	66.7	55.4	61.5	36.6	23.0	33.0	
Applications	Wave	Ν	410	359	769	110	66	176	
	11	%	74.5	67.4	71.0	30.6	27.7	29.4	
	Wave	Ν	414	338	752	67	26	93	
Other Agro-	Ι	%	71.4	66.9	69.3	17.9	19.3	18.3	
Chemical Use	Wave	Ν	479	444	923	114	59	173	
	II	%	87.I	83.3	85.2	31.7	24.8	28.9	
Deet Llemment	Wave	Ν	94	40	134	47	13	60	
Post-Harvest	Ι	%	16.2	7.9	12.4	12.6	9.6	11.8	
Storago	Wave	Ν	290	205	495	75	29	104	
Storage	II	%	52.7	38.5	45.7	20.8	12.2	17.4	
Total	Wave	Ν	580	505	1,085	374	135	509	
Respondents	Ι	%	100.0	100.0	100.0	100.0	100.0	100.0	
Who Applied ANY Technology	Wave II	N	550	533	1,083	360	238	598	

Table 10. Beneficiary Farmers Using Improved Technologies in the Past Season by Beneficiary Status and Country*

*Multi-response question

Table 11, below, shows that the difference in the application of improved technologies by direct and indirect beneficiaries is statistically significant for Mozambique (p-value .000); note that this difference is due to an apparent decrease in the use of improved seed varieties by indirect beneficiaries (Table 10).

Table 11. Results for Chi-Square Wave II, Between Direct and Indirect Beneficiaries (Tried Any Improved Seed Technology)

Wave II		Ghana	Mozambique
Ever Tried Any Improved	Chi-square	2.730	41.120
Seed Technology	p-value	0.090	0.000****

Table 12. Results for Chi-Square Wave II, Between Direct and Indirect Beneficiaries (Use of Improved Agriculture Technology)

Valuo		
value	38.020	30.465
p-value	0.000***	0.000***
Value	16.813	3.971
p-value	0.000***	0.046*
Value	6.799	0.550
p-value	0.009**	0.458
Value	3.086	3.295
p-value	0.078	0.069
Value	22.190	7.459
	0.000***	0 006**
p-value	0.000	0.008
	p-value Value p-value Value p-value Value p-value Value p-value	p-value 0.000*** Value 16.813 p-value 0.000*** Value 6.799 p-value 0.009** Value 3.086 p-value 0.078 Value 22.190 p-value 0.000***

* p<0.05; ** p<0.01; *** p<0.001

Tanzania's results in Table 13 show that survey respondents classified as indirect beneficiaries are much less likely to use improved seed and technology when looking at trends. Fertilizer application declined substantially for indirect beneficiaries from Wave I to Wave II.

Tanzania			Direct Beneficiaries				Indirect Beneficiaries				All Beneficiaries
			Maize	Beans	Irish Potatoes	Total	Maize	Beans	Irish Potatoes	Total	Total
Improved Seed Varieties	Wave I	N	317	319	273	909	106	102	78	286	1,195
		%	99.4	99.4	85.0	94.6	88.3	85.7	62.4	78.6	90.2
	Wave II	N	334	322	339	995	81	90	59	230	1,225
		%	100.0	100.0	99.7	99.9	77.1	77.6	56.7	70.8	92.7
Farm Management Practices	Wave I	N	161	134	154	449	19	26	9	54	503
		%	50.5	41.7	48.0	46.7	15.8	21.8	7.2	14.8	38.0
	Wave II	N	139	138	153	430	7	10	10	27	457
		%	41.6	42.9	45.0	43.2	6.7	8.6	9.6	8.3	34.6
Fertilizer Applications	Wave I	N	180	162	286	628	58	41	91	190	818
		%	56.4	50.5	89.1	65.3	48.3	34.5	72.8	52.2	61.7
	Wave II	N	96	152	277	525	17	29	44	90	615
		%	28.7	47.2	81.5	52.7	16.2	25.0	42.3	27.7	46.6
Other Agro- Chemical Use	Wave I	N	98	186	203	487	44	51	74	169	656
		%	30.7	57.9	63.2	50.7	36.7	42.9	59.2	46.4	49.5
	Wave II	N	114	117	261	492	18	24	38	80	572
		%	34.1	36.3	76.8	49.4	17.1	20.7	36.5	24.6	43.3
Post-Harvest Processing/Storage	Wave I	N	71	67	33	171	5	13	8	26	197
		%	22.3	20.9	10.3	17.8	4.2	10.9	6.4	7.1	14.9
	Wave II	N	101	76	44	221	9	7	7	23	244
		%	30.2	23.6	12.9	22.2	8.6	6.0	6.7	7.1	18.5
Total Respondents Who Applied ANY Technology	Wave I	N	319	321	321	961	120	119	125	364	١,325
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Wave II	N	334	322	340	996	105	116	104	325	1321

Table 13. Tanzania: Beneficiary Farmers Who Tried Any Improved Seed and Technology by Beneficiary Type*

*Multi-response question
4.2.2 Use of Improved Seed Varieties by Direct and Indirect Beneficiary Farmers

As described in the evaluation report (Longley et al., 2017), a relatively high proportion of sampled beneficiary farmers were using improved technologies—including some of the SSTP-supported improved varieties—before the start of the SSTP project, particularly in Ghana and Tanzania. To focus better on the use of improved varieties during the SSTP project, the evaluation report categorized both direct and indirect beneficiary farmers into three adopter groups:

- 1. Pre-SSTP adopters—those beneficiary farmers who adopted SSTP-supported seed varieties before they were made available through the SSTP project, *i.e.*, before 2014;
- 2. SSTP adopters—those beneficiary farmers who adopted or applied SSTP-supported varieties during the time when the SSTP project supported the increased availability, *i.e.*, 2014/15-2017/18; and
- 3. Non-adopters—those beneficiary farmers who did not apply or adopt SSTP-supported varieties.

Table 14 shows the number of beneficiary farmers in each country who fell into the above three categories for each survey wave. In Ghana, the proportion of pre-SSTP adopters remained approximately the same. The proportion of SSTP adopters increased by approximately 10 percentage points (from 15.9 percent to 26.1 percent), and the proportion of non-adopters decreased by the same amount. These numbers are expected given the increased uptake of improved varieties described in the previous section.

In Mozambique, the changes were relatively small, which might be explained by the attrition within the sampled farmers plus the fact that the seed distribution modality itself was not sustainable and most of the SSTP grants had come to an end in 2017 and were not renewed.

In Tanzania, the proportion of SSTP adopters increased by just over 10 percentage points (from 30.4 percent to 42.9 percent), yet—and surprisingly—the proportion of pre-SSTP adopters decreased, and the proportion of non-adopters increased, possibly explained by differences in farmer recall and/or the different names that are given to particular varieties and whether these were classified as "improved" or not.

Adoption		Ghana		Mozambique		Tanzania		All Countries	
lypes		Wave I	Wave II	Wave I	Wave II	Wave I	Wave II	Wave I	Wave II
Pre-SSTP	N	520	481	83	36	861	654	1,464	1,171
Adopters	%	43.2	43.8	6.9	4.1	65.0	49.5	39.2	35.5
SSTP	N	192	286	219	149	403	567	814	1,002
Adopters	%	15.9	26.1	18.1	16.9	30.4	42.9	21.8	30.4
Non-	N	493	330	907	696	61	100	1,461	1,126
Adopters	%	40.9	30.1	75.0	79.0	4.6	7.6	39.1	34.1
Total	Ν	1,205	1,097	1,209	881	1,325	1,321	3,739	3,299

Table 14. Overall Percentage of Beneficiary Farmers Who Have Adopted or Applied SSTP-Promoted Varieties

Findings show that the proportion of SSTP adopters among the direct beneficiaries (36.8 percent by Wave II) was greater than that for indirect beneficiaries (20.3 percent) (Table A. I, Annex 4), suggesting that, as expected, the SSTP grantees were more effective in reaching the direct beneficiaries than the indirect beneficiaries. As Section 4.3.3 will show, this can be explained by the important role played by farmers themselves in promoting the application and adoption of improved varieties.

Table 15 shows the average amount of SSTP variety seed beneficiary farmers planted across countries in the first season they planted the particular variety (*i.e.*, the 2016-17 season or 2017-18 season) with the

assumption that changes after 2013 were due in some measure to SSTP. With the exception of maize and beans in Tanzania, beneficiary farmers planted larger average amounts of SSTP-supported improved seed over time after the first time planting them. Specifically, the average amount increased in Ghana from 12.8 to 18.7 kilograms (kg), with a greater increase among direct beneficiaries (13.2 to 21.6 kg) than indirect beneficiaries (12.2 to 18.3 kg). Given that the recommended seeding rate for maize is 22-25 kg per hectare, this means that direct beneficiaries were planting an average of just under one hectare of SSTP-promoted maize varieties by 2018.

In Mozambique, the number of improved cassava cuttings planted increased more than tenfold, from an average of 263.6 to 3,544.2 sticks. The recommended planting rate for cassava is approximately 10,000 sticks per hectare, so beneficiary farmers in Mozambique were planting an average of approximately one-third of a hectare by 2018—slightly more for direct beneficiaries and slightly less for indirect beneficiaries.

In Tanzania, the average quantities of maize and beans showed an increase between the first year planted and the 2016-17 season, but then dropped slightly in the 2017-18 season. Indirect beneficiaries planted more seed of improved bean varieties than direct beneficiaries in the 2017-18 season. With a recommended sowing rate for beans at 80 kg per hectare, direct beneficiaries planted an average of 0.29 hectare (23.4 kg), whereas indirect beneficiaries planted an average of 0.36 hectare (29.1 kg) in 2017/18. The average amount of SSTP-supported Irish potato varieties increased among both direct and indirect beneficiaries, from an average of 119.9 kg in the first season planted to an average of 796.6 kg by 2018. The recommended seeding rate for potato is 2,000 kg per hectare, so this equates to almost 0.4 hectares planted.

		Direct Beneficiaries			Indirect Beneficiaries			All Beneficiaries		
		Wave I		Wave II	Wa	Wave I		Wa	ve l	Wave II
Country	Сгор	Season First Planted	Last Season Planted (2016)	Last Season Planted (2017)	Season First Planted	Last Season Planted (2016)	Last Season Planted (2017)	Season First Planted	Last Season Planted (2016)	Last Season Planted (2017)
Ghana	Maize	13.2	19.4	21.6	12.2	17.6	18.3	12.8	18.7	20.2
Mozambique	Cassava	300.9	487.3	3,650.4	55.8	975.3	3,016.8	263.6	561.7	3,544.2
	Maize	18.1	21.9	16.7	15.9	18.9	14.7	17.5	21.1	16.1
Tanzania	Beans	33.3	35.7	23.4	28.2	27.9	29.1	32	33.8	24.7
	Irish Potatoes	125.2	183.5	837.9	103.1	164.8	631.3	119.9	179	796.6

Table 15. Seed of SSTP Varieties Planted (Kilograms) by Country, Crop, and Farmer Beneficiary Status*

*Note: Cassava planting material is measured by the number of planting sticks, not by weight.

To summarize the key findings presented above:

- The use of any improved varieties increased in Ghana and Tanzania between 2016-17 and 2017-18 within the SSTP project period.
- The use of other improved technologies (improved farm management practices, fertilizer, other agro-chemicals, and post-harvest processing and storage technologies) also increased during this period in Ghana and Mozambique. However, only post-harvest processing and storage technologies showed an increase in use in Tanzania.
- The use of SSTP-promoted improved varieties increased in terms of the overall number of beneficiary farmers planting these varieties during the SSTP project period.
- As expected, the application and adoption of improved varieties was greater among direct beneficiaries than indirect beneficiaries. However, for Ghana, the increase in the use of SSTP-promoted varieties from 2016-17 to 2017-18 was proportionally greater for indirect beneficiaries.

• For most crops—including maize in Ghana, cassava in Mozambique, and Irish potatoes in Tanzania—the average amount of seed of SSTP-promoted varieties planted by farmers over time increased from the time that they first planted the variety in question up to the 2017-18 season.

4.3 ENCOURAGING ADOPTION VERSUS APPLICATION BY DIFFERENT FARMER TYPES

4.3.1 Application, Adoption, and Abandonment

Farmers will test or try out a new variety over several seasons before deciding to adopt it into their planting repertoire (Okali *et al.*, 1994). It is normal for farmers to test a small quantity of a new seed variety and perhaps even increase the quantity of seed sown each season while it is being tested. Within the SSTP project, this period of testing by farmers is referred to as "application" and will often, although not always, lead to adoption. In general, there is a blurred line between application and adoption, but when a farmer has grown a variety for more than three years, they can generally be considered to have adopted the variety.

A farmer will adopt a variety after they have learned about and tested or "applied" it on their farm if it is appropriate to the agro-ecology of the farm and if a range of other conditions are met. Such conditions vary for different crops, agro-ecologies, and farmers and depend on the comparative qualities of specific varieties in relation to other crops or varieties that form part of an individual farmer's planting repertoire. Existing literature suggests that some of these conditions include the household members' preferred characteristics—taste, texture, and cooking qualities; whether seed is available and accessible; and whether there is a known market for the output (Morris, *et al.*, 1999; Doss, 2006; Fisher, *et al.*, 2015). The literature further suggests that more educated and (usually) better-off farmers are also more likely to adopt improved varieties than their less-educated peers (Bruce, *et al.*, 2014; Morris, *et al.*, 1999). Farmers' learning processes are also important in new technology adoption; learning from their own experiences and from those in their social networks is a proven means to affect farmers' adoption decisions (Foster and Rosenzweig, 1995; Conley and Udry, 2000; Bandiera and Rasul, 2002, cited by Doss, 2006).

To see where farmers were on this continuum, the survey asked beneficiary farmers who cultivated an SSTP-promoted variety whether the farmer intended to plant the same variety again the following year. Where farmers answered "yes," they either meant they were continuing a period of testing and application or that they made a decision to adopt the variety. Farmers who answered "no" clearly decided not to adopt the variety.

A decision not to plant a variety again the following year is generally referred to as abandonment or discontinuation. There are two types of cases when a farmer stops growing a particular variety: 1) a farmer decides not to adopt a variety after having tested or applied it for approximately one to three years; or 2) an adopted variety that has been cultivated over several years is replaced by another variety. In analyzing the survey data, the ET assumed that a variety that was grown for three years or less and then abandoned fell into the first case; it is these cases of application and then abandonment that are the focus of the following discussion.

Table 16 presents data for all cases of abandonment. The most common reasons for abandoning varieties related to the characteristics of the variety itself (e.g., yield, storability); marketability of the output; vulnerability to weather; preferences for other varieties; and the cost and availability of seed. Clearly, for farmers to continue to grow varieties, it is important that:

- The characteristics of the varieties meet the preferences of farmers;
- There is a market for the output;
- The varieties are appropriate to changing weather patterns; and
- The seed is both available and affordable.

Dessen for Abordonnont	Country, Wave II			
Reason for Abandonment		Ghana	Mozambique	Tanzania
Low Yield	N	59	5	101
Low Held	%	23.9	10.6	38.3
Net Marketable	N	42	9	82
Not Marketable	%	17.0	19.1	31.1
Switched to Other Veriety	N	31	NA	71
Switched to Other Variety	%	12.6	NA	26.9
Maathan Mula ang hilitu	N	14	3	80
vveather vulnerability	%	5.7	6.4	30.3
	N	68	6	12
Storage issues	%	27.5	12.8	4.5
Variaty Saad Nat Available	N	26	16	34
variety seed not Available	%	10.5	34	12.9
	N	19	4	43
Expensive to Furchase the inputs	%	7.7	8.5	16.3
Don't Like Tests	N	12	13	23
Don't Like Taste	%	4.9	27.7	8.7
Pequines a lot of lobor	N	9	I	9
Requires a Lot of Labor	%	3.6	2.1	3.4
Total Respondents	N	247	47	276

Table 16. Wave II - Reasons Beneficiary Farmers Did Not Continue with Seed Variety (For All Cases of Abandonment)*

*Multi-response question

Table 17 presents only the data for the Ghana cases where the variety had been grown for three years or less, because there were not enough cases of abandonment within the three-year time frame in either Mozambique or Tanzania. The limited number of cases of abandonment in these two countries suggests that the varieties promoted were more appropriate to beneficiary farmers' preferences and local agroecologies, that seed was available, and the output produced was marketable.

As shown by Table 17, the top five reasons given by Ghanaian beneficiary farmers for discontinuing SSTPpromoted varieties after testing them for between one and three years included:

- Factors relating to the varieties themselves, *i.e.*, poor grain storability, (mentioned by 29.2 percent • of beneficiary farmers);
- Low yield (23.4 percent);
- Preference given to alternative varieties (11.7 percent);
- Availability of seed (11.1 percent); and
- Lack of output markets (9.9 percent).

Category		Values
Poor Grain Storability	N	50
FOOT Grain Storability	%	29.2
Low Vield	N	40
LOW Held	%	23.4
Other	N	27
Other	%	15.9
Availability of Alternatives/Switched to	N	20
Another Variety	%	11.7
Variaty of Sand Nat Available	N	19
variety of Seed Not Available	%	11.1
Not Marketable	N	17
NOL Marketable	%	9.9
Exponsive to Purchase	N	15
Expensive to Fulchase	%	8.8
No Bassons/None	N	13
NO Reasons/None	%	7.6
Weather Vulgorability	N	9
	%	5.3
Requires a Lot of Labor	N	8
Requires a Lot of Labor	%	4.7
Don't Liko Tasto	N	7
Don't Like Taste	%	4.1
Not Enough Land	N	5
	%	2.9
Total	N	171

Table 17. Wave II – Reasons Beneficiary Farmers Did Not Continue with Seed Variety (For Cases in Which Variety Grown for Less Than Three Years)*

*Multi-response question

A comparison of Tables 16 and 17 suggests that the reasons for abandonment did not differ much according to the number of years for which a variety was cultivated.

The above analysis demonstrates that, to encourage the continuation of improved varieties beyond farmers' "testing" stage (adoption as opposed to application), it is important to ensure that:

- Varieties being promoted are appropriate in relation to farmer preferences (including yield) and changing weather patterns;
- Farmers have access to markets through which they can sell the output produced by the varieties; and
- Seed is available.

Although the price of seed was also reported as among the main reasons for abandoning improved varieties, it seems likely that if there is a ready market through which to sell the output, then farmers could earn an income from the variety and would be more willing to pay for the required inputs.

4.3.2 Barriers to Adoption by Direct and Indirect Beneficiaries

The Wave II survey data show that 21.6 percent of direct beneficiaries and 53.9 percent of indirect beneficiaries did not apply or adopt SSTP-promoted varieties (Table A.1, Annex 4). This section discusses barriers to adoption by exploring the factors that motivated beneficiary farmers to try out new varieties, how they acquired the seed, and the extent to which different types of farmers may or may not have access to these motivating factors and channels of seed acquisition.

Farmers' learning processes are important in the adoption of new technologies. The survey results showed that the means through which beneficiary farmers learned about varieties tended to be very similar to the factors that motivated them to try out new varieties, so the ET has presented only the results for the latter.

Referring to Table 18 (Tanzania) and Table 19 (Ghana) for Wave II, motivation provided by other farmers (friends, family, and neighbors) was most important to indirect beneficiaries in both countries, and especially in Tanzania, as reported by 83.8 percent of indirect beneficiaries.

In Tanzania, farmer-managed demonstrations influenced direct beneficiaries (21.1 percent) considerably more than indirect beneficiaries (0.4 percent). The third most important motivating factor in Tanzania reported by 11.4 percent of all beneficiary farmers was agro-dealers.

In Ghana, extension agents were the second most important motivating factor as reported by 28.7 percent of direct beneficiaries and 19 percent of indirect beneficiaries. In Ghana, radio programs came third, as reported by 5.3 percent of sampled beneficiary farmers.

Results shown for motivation sources for direct and indirect beneficiaries are statistically significant for both countries, using the Pearson Chi-Square test (not shown).

		Farme	r Status	
Motivating Factor		Direct	Indirect	Total
		Beneficiary	Beneficiary	
Former Managed Demonstration	N	209	I	210
Farmer-managed Demonstration	%	21.1	0.4	17.2
		26	0	26
Seed Company/Froject-managed Demo	%	2.6	0.0	1.9
Agra Dealar	N	115	24	139
Agro-Dealer		11.6	10.5	11.4
Neighbor/Relative		451	192	643
		45.5	83.8	52.7
Field Days		23	0	23
		2.3	0.0	1.9
Community Events to Promote Agricultural	N	53	6	59
Technologies	%	5.3	2.6	4.8
Agricultural Show	N	6	I	7
Agricultural show	%	0.6	0.4	0.6
Covernment Extension Agent	N	69	5	74
Government Extension Agent	%	7.0	2.2	6.1
Village Based Agent (V/BA)	N	13	0	13
Village-based Agent (VBA)	%	1.3	0.0	1.1
Former Training Course	N	11	0	11
Farmer Training Course	%	1.1	0.0	0.9
Padia Program	N	12	0	12
	%	1.2	0.0	1.0
Other	N	4	0	4
	%	0.4	0.0	0.3
Total	N	992	229	1,221
Total		100.0	100.0	100.0

Table 18. Tanzania Wave II – Main Motivating Factors That Persuaded BeneficiaryFarmers to First Plant the SSTP-Promoted Improved Variety

		Farm		
Motivating Factor		Direct	Indirect	Total
		Beneficiary	Beneficiary	
Farmer-Manager	N	9	I	10
Demonstration	%	2.1	0.3	1.3
Seed Company/Project	N	12	5	17
Managed	%	2.8	1.5	2.2
Arna Daslar	N	10	9	19
Agro-Dealer	%	2.3	2.7	2.5
Naighbor/Palative	N	238	209	447
Neighbor/Relative	%	54.7	63.0	58.3
Field Dave	N	I	3	4
Field Days	%	0.2	0.9	0.5
Community Events to	N	I	4	5
Promote Agriculture	%	0.2	1.2	0.7
Agricultural Show	N	3	0	3
Agricultural show	%	0.7	0.0	0.4
Government Extension	N	125	63	188
Agent	%	28.7	19.0	24.5
	N	3	7	10
V BA	%	0.7	2.1	1.3
Padia Program	N	19	22	41
	%	4.4	6.6	5.3
TV Program	N	4	5	9
I v Frogram	%	0.9	1.5	1.2
No Particular Mativation	N	7	2	9
NO Particular Protivation	%	1.6	0.6	1.2
Other	N	3	2	5
Other	%	0.7	0.6	0.7
Total	N	435	332	767
i Utai	%	100.0	100.0	100.0

Table 19. Ghana Wave II, Main Motivating Factors That Persuaded Beneficiary Farmers toFirst Plant the SSTP-Promoted Improved Variety

Data on the acquisition of improved seed varieties applied or adopted within the time frame of the SSTP project (*i.e.*, by SSTP adopters) are presented in Table 20 and Table 21. No data are presented for Mozambique because the disaggregated numbers were too small to be significant.

In Tanzania (Table 20), the vast majority of SSTP adopters—both direct beneficiaries (95.2 percent) and indirect beneficiaries (94.8 percent)—purchased the seed at full cost the first time they applied it.

Table 20. Tanzania Wave II – I	Means of Seed Ac	cquisition by S	STP Adopter
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Means of Acquisition		Direct Beneficiary	Indirect Beneficiary	Total
Purchasod at Full Cost	N	944	217	1,161
Furchased at Fun Cost	%	95.2	94.8	95.I
Purchased at Reduced Cost	N	9	3	12
rurchased at Reduced Cost	%	0.9	1.3	1.0
Cot It for Free	N	36	8	44
Got it for thee	%	3.6	3.5	3.6
In Kind or Any Exchange	N	3	I	4
III-KIIId OF Ally Exchange	%	0.3	0.4	0.3
Total	N	992	229	1,221
lotal	%	100.0	100.0	100.0

In Ghana, as in Tanzania, there is very little difference between seed acquisition channels for direct and indirect beneficiaries who applied improved varieties during the SSTP project (Table 21). This suggests that indirect beneficiaries are not disadvantaged in terms of acquiring seed by the fact that they did not benefit directly from SSTP-funded activities.

Like Tanzania, the majority of sampled SSTP adopters purchased seed at full cost (57.7 percent of direct beneficiaries; 58.4 percent of indirect beneficiaries), but a substantial proportion of beneficiary farmers also accessed the improved seed for free (34.3 percent of direct beneficiaries; 33.4 percent of indirect beneficiaries).

Means of Acquisition		Direct Beneficiary	Indirect Beneficiary	Total
Runchasad at Full Cost	N	251	194	445
Furchased at Full Cost	%	57.7	58.4	58
Purchased at Peduced Cost	N	21	13	34
ruichased at Reduced Cost	%	4.8	3.9	4.4
Cot It for Free	N	149		260
Got it for thee	%	34.3	33.4	33.9
In Kind or Any Exchange	N	14	14	28
	%	3.2	4.2	3.7
Total	N	435	332	767
i Otai	%	100.0	100.0	100.0

Table 21. Ghana Wave II – Means of Seed Acquisition by SSTP Adopter

The top three sources of improved Irish potato, maize, and beans seed in Tanzania among SSTP adopters were seed companies and agro-input dealers (54 percent of direct beneficiaries; 58 percent of indirect beneficiaries); relatives and other farmers (30 percent of direct beneficiaries; 30.1 percent of indirect beneficiaries); and market traders (27.2 percent of direct beneficiaries; 27.9 percent of indirect beneficiaries) (Table 22).

Table 22. Tanzania Wave II – Source of Irish Potato, Maize, and Bean Seeds by SSTPAdopter*

Source of Seed		Direct Beneficiary	Indirect Beneficiary	Total
Former Posed Organization	Ν	6	I	7
Farmer-Based Organization	%	0.6	0.4	0.6
	Ν	8	0	8
	%	0.8	0.0	0.7
Seed Company and Agro-Input	Ν	532	133	665
Dealer	%	54.0	58.0	54.7
	Ν	3	I	4
Government Extension Agent	%	0.3	0.4	0.3
	Ν	16	2	18
V DA	%	1.6	0.9	1.5
Other Farmer or Relative	Ν	296	69	365
	%	30.0	30.1	30.0
Market Trader	Ν	268	64	332
	%	27.2	27.9	27.3
Total	Ν	986	229	1,215

*Multi-response question

As seen in Table 23, the top three sources of improved seed in Ghana were other farmers (37.7 percent of direct beneficiaries; 41.6 percent of indirect beneficiaries); seed companies and agro-input dealers (35.6 percent of direct beneficiaries; 35.3 percent of indirect beneficiaries) and relatives and government extension agents (used by 23.8 percent of direct beneficiaries; 16.4 percent of indirect beneficiaries). In Ghana, some of the maize seed company grantees worked through government extension agents to sell their seed direct to farmers. Since the extension agents travel to the farmers' villages, this allowed farmers to purchase seed within the village. Indirect beneficiaries relied more on agro-input dealers and, where there was none in the village, they had to travel outside the village to purchase seed.

Source of Seed		Direct Beneficiary	Indirect Beneficiary	Total
Earmor Based Organization	N	4	2	6
Tarmer-Based Organization	%	0.9	0.6	0.8
NCO/Aid Distribution	N	3	2	5
NGO/Ald Distribution	%	0.7	0.6	0.7
Seed Company and Agro-	N	154	116	270
Input	%	35.6	35.3	35.5
Covernment Extension Agent	N	103	54	157
Government Extension Agent	%	23.8	16.4	20.6
VBA	N	7		18
VВА	%	1.6	3.3	2.4
Other Former or Belative	N	163	137	300
Other Farmer of Relative	%	37.7	41.6	39.4
Markat Tradar	N	30	26	56
	%	6.9	7.9	7.4
Total	Ν	432	329	761

Table 23. Ghana Wave II – Source of Maize Seed by SSTP Adopter*

*Multi-response question

The lack of significant differences between beneficiary types in the ways in which beneficiary farmers are motivated to try out improved seed varieties, together with the findings presented above regarding adoption and application by indirect farmers in Wave II, suggest that, over time, indirect beneficiaries do not face additional barriers to adoption, as compared to direct beneficiaries. This conclusion is less to do with the SSTP project itself and mostly due to the role of farmers themselves in motivating others to try out new varieties. Differences in seed acquisition between Wave I and Wave II SSTP adopters are presented in Section 4.3.4.

In Tanzania there were no significant differences among beneficiary types in terms of seed acquisition; however, in Ghana indirect beneficiaries were not able to purchase seed from government extension agents to the same degree that direct beneficiaries could because they were not members of the groups supported by extension agents. Indirect beneficiaries had to purchase seed from agro-inputs dealers instead. The finding that higher proportions of women, poorer, and socially marginalized farmers tend to fall into the group of indirect beneficiaries may create additional barriers for some. This is further explored in Section 4.3.5.

4.3.3 Barriers to Adoption by Early Adopters, Majority Adopters, and Late Adopters

As shown above (Table 14, Section 4.2.2), between 35 and 40 percent of sampled beneficiary farmers (from all countries) had adopted SSTP-promoted varieties prior to the start of the SSTP project; approximately 30 percent adopted or applied SSTP-promoted varieties during the SSTP project; and approximately 34 percent had not adopted or applied the varieties at all. As expected, the proportions of SSTP adopters and non-adopters changed during the course of the project, with an increase in the proportion of SSTP adopters in Ghana and Tanzania, and a decrease in the non-adopters in Ghana. Surprisingly, changes in the proportions of pre-SSTP adopters were also noted for Tanzania, although this

would have been expected to remain the same; farmers' ability to recall exactly when they started growing a particular improved variety might be the reason for this change.

Survey results reveal significant socio-economic differences among these various adoption groups, particularly for Ghana and Tanzania. In Tanzania, pre-SSTP adopters tended to be older in age, and SSTP adopters tend to be younger (sig 0.003). No significant differences were observed by level of education. Pre-SSTP adopters tended to be less socially marginalized (sig. 0.000). For Mozambique, no significant differences were observed among the adoption groups. In Ghana, there were no significant differences in age among the adoption groups. SSTP adopters tended to have more education, whereas the non-adopters tended to have lower or no education (sig. 0.000). Finally, pre-SSTP adopters tend to be less socially marginalized (sig. 0.02).

Key findings for Ghana and Tanzania are that pre-SSTP adopters tended to be less socially marginalized, suggesting that a farmer's social networks are important in allowing them to hear about new varieties and to access the seed. In Ghana, SSTP adopters tended to be more educated, whereas non-adopters were less educated, a finding that is also supported by the broader literature (Bruce, *et al.*, 2014; Morris, *et al.*, 1999).

The analysis below (drawing on data presented in Annex 4) explores whether there are any significant differences among pre-SSTP adopters and SSTP adopters in relation to how beneficiary farmers learned about the varieties, their main motivation for trying them out (applying or testing the varieties), and how and from whom they acquired the seed.

Tables A.2 and A.5 (Annex 4) show the motivating factors that persuaded pre-SSTP adopters and SSTP adopters to try out a new variety for the first time. The most important factors were farmer-managed demonstration plots and agro-dealers for Tanzania (Table A.2) and other farmers (neighbors and relatives) and extension agents for Ghana (Table A.5). The differences between the two countries appear to reflect the different promotional strategies that have been used over time, with agro-dealers becoming more prominent in recent years in Tanzania and extension agents and, to a lesser extent, radio programs becoming more prominent in Ghana.

As described above, the comparison of the means through which seed was acquired during the SSTP project (*i.e.*, for SSTP adopters in Wave I and Wave II) shows that for Tanzania, there was an increase in the number of beneficiary farmers who purchased the seed at full cost and a decrease in those who acquired it for free. The reverse was true for Ghana, although the percentage changes are quite small. For Tanzania, data on the source of seed reveal that the decrease in those who acquired it for free is most likely because there was a decrease in the seed sourced from NGOs and other projects as well as a decrease in those sourcing seed from other farmers, combined with a substantial increase in seed purchased from market traders and agro-input dealers. In Ghana, the relative importance of other farmers as a source of seed decreased from Wave I to Wave II; the increase in free seed is likely due to seed companies and possibly also to government extension agents who provided free "test packs" of seed to farmers as a promotional strategy. The relative importance of agro-input dealers also increased in Ghana.

Results for both countries suggest that the improved seed promoted by the project are being made available in local markets, both through agro-input dealers and market traders, and that farmers are willing to purchase them at full cost. Over a longer time period, one would expect to see an increase in seed purchased in Ghana, as has occurred in Tanzania.

4.3.4 Barriers to Adoption by the Poor, Women, and Socially Marginalized Beneficiary Farmers

In Tanzania, there were slightly significant differences (p<0.05) in the motivating factors reported by men and women (Table A.2), among those from different wealth classes (Table A.3), and by different levels of social marginalization (Table A.4). Poorer beneficiary farmers appeared to be more influenced by other farmers and by agro-dealers, but less influenced by demonstration plots, community events, and extension workers. More socially marginalized beneficiary farmers were more influenced by other farmers and less influenced by agro-dealers and extension agents. Results for the influence of farmer-managed demonstration plots were mixed in relation to social marginalization. In sum, the poor and the socially marginalized appear to be excluded by extension workers.

In Ghana, the differences between men and women appeared to be more marked in terms of the factors that motivated them to try a new variety, with women reporting to have been more influenced by other farmers and less influenced by seed companies, agro-dealers, and extension agents (Table A.5). No clear differences emerged for wealth classes or levels of marginalization (Tables A.6 and A.7).

With the exception of Ghana, there were no significant differences in the ways that beneficiary farmers from different poverty groups acquired seed (Annex 4, Tables A.8 and A.9). In Ghana, beneficiary farmers from the two poorest poverty groups were disproportionally more likely to purchase seed at full cost, whereas farmers from the two better-off poverty groups were more likely to get seed for free (Table A.8). This might be because poorer farmers may have been excluded from accessing free seed through the project.

In Tanzania, the opposite was observed, although it was not significant, because almost all seed (95 percent) of SSTP-promoted improved varieties was purchased at full cost (Table A.9). In Mozambique there was no clear pattern; both poorer, more socially marginalized beneficiary farmers, and better-off, less socially marginalized beneficiary farmers were able to acquire seed for free (data not presented).²³

In Ghana, there were sex differences in terms of seed acquisition. A greater proportion of men acquired seed for free or at reduced cost (Annex 4, Table A.10), and a higher proportion of women acquired seed from other farmers, which may account for some free seed acquisitions. Women tended to acquire more from agro-input dealers (Table A.11), while men tended to acquire more from seed companies and extension agents, both of whom were giving free "tester packs" to direct beneficiaries (Table A.11). This is consistent with the finding above that direct beneficiaries in Ghana included more men than women.

In Tanzania, there were also significant sex differences (Tables A.10 and A.11). A slightly higher proportion of men purchased seed at full cost, whereas a greater proportion of women acquired seed for free, presumably from other farmers (Table A.10). More men tended to acquire seed from seed companies and agro-input dealers, and the proportion of men and women acquiring seed from market traders was roughly the same (Table A.11).

4.3.5 Approaches to Encourage Indirect Beneficiaries to Adopt Improved Varieties

Encouraging farmers to learn from each other: The finding that emerged most clearly regarding how farmers learn and what motivates them to try new varieties was the key influential role played by other farmers in this process. It is therefore important that efforts to promote improved varieties and technologies actively involve other farmers to promote learning and adoption. Among the communication and outreach grants reviewed by the ET, three approaches were found to be particularly innovative, as described in Annex 5. The communication and outreach grantees were encouraging farmers to interact and learn from each other in at least four different ways:

- 1. Farm Input Promotions Africa Ltd. (FIPS) uses a "small pack/whole village" approach, as opposed to a group-based approach, to reach as many farmers as possible and provide small quantities of seed for farmers to test new varieties for themselves. By allowing more farmers to test the varieties, more neighbors will also potentially see and learn about the varieties as well.
- 2. The Story Workshop Educational Trust (SWET) uses drama to encourage farmers to interact and learn from each other.

²³ The SSTP grantee distributed cassava planting sticks for free to members of the farmer groups established by the project, so there was very little variation in the means of seed acquisition among the sampled direct beneficiaries in Mozambique.

- 3. FRI, SWET, and Modern African Productions (MAP) interview farmers on their farms, allowing them to explain in their own words the advantages of the improved varieties and other technologies so that other farmers can learn directly from them.
- 4. FIPS uses VBAs, who are themselves farmers, to influence other farmers. It is important to note that an FGD with VBAs revealed that it took time for them to gain the trust of the farmers in order to influence them.

Appropriate varieties: The main reason that farmers gave for not adopting a variety after testing it on their farms was that they did not like certain characteristics of the variety itself (e.g., yield, storability). Although some characteristics, such as taste, are quite personal, there are other characteristics, such as storability, that are more general. The selection criteria of crops and improved varieties to be promoted should not only consider the appropriateness in relation to local preferences and local agro-ecological conditions, including weather variability, but should also consider the market potential of the end products.

Presence of output markets: Another key reason given by farmers for not adopting a variety after testing it was the lack of output markets; if farmers are unable to sell the output grown from an improved variety, then they are likely to abandon it. This is illustrated by the case of a female farmer in Amfoe village (Adako District, Volta Region) in Ghana, as reported by the ET. The farmer was keen to try out *abontem* maize variety (also known as "yellow corn") when she saw it on an SSTP-supported demonstration plot. She had eaten yellow maize when she was a schoolgirl and liked it. After growing it for a season, she saw that it was high yielding, but discovered there were no markets for her surplus production, and she decided not to grow it again the following season. In this case, there was, in fact, a market for *abontem* (for chicken feed), but the farmer was not aware of this. If the farmer had been linked to the output market, she probably would have adopted the variety and continued to cultivate it. This illustrates the need for specific efforts to link farmers to output markets; it cannot be assumed that farmers will find them on their own.

Functional agricultural output markets stimulate demand for improved varieties, as illustrated within the SSTP project by the recent expansion in the cultivation of potatoes in Tanzania and cassava in Mozambique. In Mozambique, the cassava varieties promoted had been specifically selected for beer brewing, and one of the partners involved in promoting the variety was purchasing cassava to make cassava cakes for the beer company. This created a very high level of demand for the SSTP-promoted varieties (which unfortunately could not be satisfied through the grantee's particular dissemination method for the planting material).

The cost of seed can be indirectly addressed by the presence of output markets; if farmers are able to sell the output, then they would be more willing to invest in the cost of the seed.

Seed availability: Availability at scale can be addressed through the market system by ensuring that good quality seed of improved varieties is available through agro-input dealers. Farmers are more likely to be able to purchase seed of improved varieties if the source is within a reasonable distance. Reducing the distance between farmers and agro-dealer shops is a major strategy used by the SSTP project, and it was among its key outcome indicators.

For all cases in which farmers acquired SSTP-promoted seed from an agro-dealer, Table 24 presents the average distance farmers reported from their homes to the agro-dealer where they purchased maize and bean seed of the SSTP-promoted varieties.²⁴ The average distance traveled when they first used the seed, which may have been prior to or during the SSTP project, was compared to the average distance for the season immediately prior to the survey. On average, the distances have reduced from 11.4 km to 7.8 km in Ghana, and from 3.0 km to 2.7 km in Tanzania. The program target was a reduction in distance from an average of 20 km to 6 km. Mozambique is not included because the grantee used farmer associations

²⁴ Cassava and potato have been excluded from the table because their planting material is bulky and tends not to be supplied by agro-dealers.

to distribute or sell cassava cuttings for planting to other farmers and not agro-dealers. The same case applies to Irish potato seed in Tanzania.

Country	Сгор		Distance (km) Between Home and Agro-Dealer to Get Seed When First Planted	Distance (km) Between Home and Agro- Dealer to Get Seed for Last Season	Distance (km) Between Home and Agro-Dealer to Get Seed for Last Season
			2017	2017	2018
Chana	Maize	N	198	198	154
Gilalla		Mean	11.4	4.6	7.8
	Maizo	N	369	369	374
	Taize	Mean	3.2	2.7	4.0
Tanzania	Boons	N	154	154	81
ranzania	Dealis	Mean	2.6	2.7	1.4
	Total	N	523	523	23
	i Otal	Mean	3.0	2.7	2.7

Table 24. Average Distance to Agro-Dealer (km)

Free varietal "tester" packs: Allowing a farmer to test or try out a variety and learn about it for themselves is considered to be key in promoting adoption (Fisher, et al., 2015). Affordable or free sample "tester" packs of small quantities of seed (typically 25-100 grams [g]) are effective (ICRISAT, 2014). Within the SSTP project, sample packs were provided for free by FIPS in Tanzania and by M&B in Ghana. The data for Ghana clearly show that women and more socially marginalized farmers did not benefit from these free seed packs because women, poorer, and more socially marginalized farmers tended not to be direct beneficiaries. If free seed packs are provided, it is important that the distribution be done in an inclusive manner so that women and more socially marginalized farmers are not excluded.

Inclusive outreach and extension: Survey findings show that women, poorer, and more socially marginalized farmers do not benefit as much from extension agents as do male, better-off, and less socially marginalized farmers. Similarly, the socio-economic characteristics of direct and indirect beneficiaries suggest that women, poorer, and more socially marginalized farmers are proportionally fewer among direct beneficiaries than indirect beneficiaries.

There are at least two possible solutions to this problem: 1) either greater efforts or different approaches are needed to include women, poorer, and more socially marginalized farmers in the groups benefitting directly from targeted outreach and extension approaches, or 2) a population-based approach (or "whole-village" approach) is required. The FIPS approach described in Annex 5 provides an example of a whole-village approach. With relatively high levels of radio and mobile phone ownership, ICT-based extension approaches using radio or mobile phones have the potential to reach a broad audience.

4.4 RATES OF ADOPTION OVER TIME

It is important to highlight that different crops will have different rates at which adoption takes place over time. There are at least three factors that help to explain the different rates of adoption for different crops and crop varieties: 1) the presence or absence of output markets; 2) the history of a crop in a country or region; and 3) the potential for farmer-to-farmer adoption. So-called "push" and "pull" factors must also be considered. It is most likely that widespread adoption happens via demand-pull, but if there are no output markets, or if there is no profitability, then the other options are supply-push (which is more challenging) or public-private institutional arrangements. If output markets are present for particular crops and varieties, it is logical to assume that farmers will be more willing to adopt those crops and varieties. Because they can earn income by selling outputs, they will be more likely to invest in the regular purchase of inputs, particularly if there are product quality standards that must be maintained. As such, crop varieties that have ready output markets are likely to be adopted more quickly than crop varieties that are mainly grown for subsistence purposes.

The history of a crop in a country or region determines the range of varieties available. If a crop is relatively new and there are no local varieties, farmers must depend on the improved varieties. In such cases, the rate of adoption is likely to be faster.

Self-pollinating crop varieties such as beans and rice, for which quality seed can be effectively maintained by farmers, have the potential to be disseminated through informal markets and farmer-to-farmer adoption, rather than by solely relying on agro-dealers and other distribution channels of the formal seed sector. Whether this has occurred in practice is debatable; no cases were documented by the seed study conducted by Lion, *et al.* (2015). However, DNA analysis of rice varieties grown by sampled farmers in Tanzania show that 100 percent of varieties analyzed were improved—yet only 6 percent of farmers reported growing improved rice varieties (Oruko, *et al.*, 2015). It seems likely that these improved varieties have been widely adopted because historically a wide range of local varieties was not available, and improved varieties have spread through farmer-to-farmer diffusion.

In the case of beans, farmers regularly purchase bean seed from the informal market (market traders and other farmers), and there is a well-developed regional bean market in Tanzania. For these reasons, the ET expected improved bean varieties to be widely adopted relatively quickly, although perhaps not as quickly as rice, because beans have a longer history than rice in Tanzania and there is more choice in the range of varieties available.

4.4.1 Adoption Rates of SSTP-Promoted Varieties for the Focal Crops Over Time

Figure 2, below, shows the percentage of beneficiary farmers in all countries combined using improved seed varieties by season (year) when first planted for the four focal crops.

Figure 2. Percentage of Beneficiary Farmers Using Improved Seed by Beneficiary Status by First Season Used in All Three Countries



The highest proportion of beneficiary farmers reported starting to use SSTP-promoted improved seed more than three years ago (pre-SSTP period). Then, the proportion decreased before it started increasing again within the last season (SSTP implementation period). A higher proportion of SSTP direct beneficiaries than indirect beneficiaries tried improved seed varieties in the past two seasons.

The graphs presented in Annex 6 illustrate the cumulative increase in the numbers of beneficiary farmers using SSTP-promoted improved varieties of each crop in each country for the period 2013-2017. In Ghana,

the graph shows that the number of beneficiary farmers using SSTP-promoted maize varieties increased from year to year during the program period. The trend suggests that more farmers will adopt these improved maize varieties in the future. For Tanzania, the rates of adoption of SSTP-promoted maize, bean, and potato varieties can be seen to be leveling off towards the end of project.

Across all crops and countries, the cumulative adoption rate for SSTP-promoted improved varieties was greatest for cassava in Mozambique. Qualitative data collected by the ET suggest that this was mainly because the varieties promoted were selected as being the most appropriate for use by the beer industry; farmers were linked to a company that purchased the cassava tubers to make cassava cakes which were then sold to a brewery. Farmers were able to earn an income from the sale of the cassava tubers and there was, consequently, a high demand for the planting material. The cassava planting material was provided to farmers for free (which may have also influenced the initial rate of adoption), although this proved to be unsustainable, and there was a large unmet demand for the planting material, especially among indirect beneficiaries.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This report shows that just over one-third of sampled beneficiary farmers had already adopted some of the SSTP-promoted varieties before the SSTP project started, and that the SSTP project itself contributed towards the adoption of SSTP-promoted varieties by almost another one-third of beneficiary farmers. Differences in the rates of adoption between the Wave I and Wave II surveys clearly show that direct beneficiaries adopted the improved varieties before the indirect beneficiaries and that farmer-to-farmer learning, combined with the availability of seed through farmers, agro-dealers and market traders (with the exception of cassava in Mozambique), allowed for indirect beneficiaries to subsequently adopt the improved varieties.

In Mozambique, however, levels of adoption/application remained relatively low among sampled indirect beneficiaries (39.5 per cent; Table 10). Qualitative data collected by the evaluation team suggested that the way in which planting material was provided did not support farmer-to-farmer acquisition of planting material (Longley, *et al.*, 2017). Combined with the fact that cassava sticks' perishability means they cannot be provided through agro-dealers, this created a major barrier to planting material acquisition by indirect beneficiaries (*ibid.*).

Regarding the socio-economic characteristics of direct and indirect beneficiaries, the data clearly show that direct beneficiaries tended to be male, better-off, and less socially marginalized, and that women, poorer, and more socially marginalized farmers did not benefit as much from free seed provided by extension agents and seed companies. This was most notable in Ghana.

Farmers themselves were found to be the greatest influence in motivating farmers to apply and adopt improved varieties.

A comparison of motivation and seed acquisition among pre-SSTP adopters and SSTP adopters reflects the changes in how improved varieties have been promoted and made available over time, with extension agents becoming more prominent in Ghana and agro-dealers becoming more prominent in recent years in Tanzania. Results for both countries suggest that the improved seed promoted by the project are being made available in local markets, both through agro-input dealers and market traders, and that beneficiary farmers are willing to purchase them at full cost. Over a longer time period, one would expect to see an increased seed purchases in Ghana, as has occurred in Tanzania.

Data on the discontinuation of improved varieties show that beneficiary farmers will apply but not adopt a variety for reasons relating to:

- The varietal characteristics;
- If alternative, more preferred varieties become available;
- If seed of the variety in question is not available; or
- If they cannot sell the output after harvest.

Although cost of seed was cited as a reason for not adopting a variety, the cost issue is not considered to be a large constraint if output markets are present, because farmers can use the proceeds from the sales of the variety's output to purchase seed.

Differences in the rates of adoption of SSTP-promoted improved varieties suggest that the highest adoption rates are most likely to take place via the demand-pull created by the presence of output markets through which farmers can sell their produce.

5.2 **RECOMMENDATIONS**

Based on the above findings, the report recommends various approaches and methods that SSTP might incorporate into projects to encourage direct and indirect beneficiaries both to try out and continue to use improved varieties. The recommended approaches are described below.

- Encourage farmers to learn from each other in various ways, including through the "small pack/whole village" approach; the use of drama; radio interviews with farmers; and village-based agents who are themselves farmers. Each of these methods were described in Section 4.3.5 and are further elaborated in Annex 5.
- Promote appropriate varieties, including those that display the characteristics preferred by farmers, are marketable, and are well-adapted to local weather patterns and agro-ecologies.
- Support linkages to output markets, either by selecting varieties for which output markets already exist or by supporting the development of new output markets.
- Ensure seed availability through agro-input dealers who are located within reasonable distance to the target farmers. Seed companies must enhance their marketing and distribution channels to ensure that they work more closely with a sufficient number of agro-input dealers and their subsidiaries.
- Make free varietal "tester packs" available and ensure that these are made available to all farmers, including women and poorer and socially marginalized groups. Both seed companies and donor-funded subsidy programs can support the inclusive, free distribution of "tester packs."
- Support more inclusive outreach and extension. Both government and private extension agents must be trained on the importance of inclusivity. Alternatively, the public and private sectors should promote a population-based or "whole-village" approach to extension.

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ANNEX I: OVERALL EVALUATION EXPRESSION OF INTEREST



PEEL TASK ORDER EXPRESSION OF INTEREST

I. BACKGROUND INFORMATION

A) Identifying Information

I. Project/Activity Title:	Scaling Seeds & Technologies Partnership
2. Award Number:	AID-OAA-A-13-00040
3. Award Dates:	July 2, 2013 – July 1, 2016
•	No-Cost Extension Modification to July 1, 2017
•	Planned No-Cost Extension Modification to July 1, 2018
4. Project/Activity Funding:	\$46,769,499.00
5. Implementing Organization:	Alliance for a Green Revolution in Africa (AGRA)
6. Project/Activity COR/AOR:	Mark Huisenga

B) Development Context

I. Problem or Opportunity Addressed by the Project/Activity Being Evaluated

The G8 Fact Sheet on Food Security and Nutrition, issued by the White House on May 18, 2012, outlined the commitments made at Camp David to launch the New Alliance for Food Security and Nutrition (New Alliance) an initiative by African governments, the private sector, and G8 members to focus, accelerate, and coordinate their joint efforts aimed at reducing poverty and hunger in Africa over the next 10 years.²⁵ The New Alliance builds on the Comprehensive African Agricultural Development Program (CAADP) Country Investment Plans (CIP) and will help accelerate the implementation of key CIP priorities.

One of the New Alliance commitments is "Taking innovations to scale" and involves several enabling actions including establishing 10-year targets for sustainable yield improvements in national priority value chains, identifying core sets of technologies that would contribute to achieving those targets, and ensuring access to those technologies at sufficient scale.

To meet the commitment to significantly scale access to new technologies, the G8 has called on the Alliance for a Green Revolution in Africa (AGRA) to create a Scaling Seeds and Technologies Partnership (the Partnership). The Partnership will help New Alliance countries coordinate related but separate country, donor-financed and private sector programs to strengthen the inputs sector and to promote the commercialization, availability and adoption of technologies at scale. In particular, the Partnership will help countries transition from state-dominated seed systems to systems that allow the private sector, including local businesses and non-profit organizations to provide key services, but also strengthen the capacity of the state to carry out critical regulatory functions.

USAID/Washington has, on behalf of the G8, signed a Cooperative Agreement with the Partnership team to implement the Partnership in Ghana, Ethiopia, Senegal, Malawi, Mozambique, and Tanzania. The

²⁵ See <u>http://www.whitehouse.gov/the-press-office/2012/05/18/fact-sheet-g-8-action-food-security-and-nutrition</u>

Partnership activities are targeted at scaling up the supply of improved seed and other technologies to achieve the following objectives:

- To improve capacity of public and private sector groups to deliver quality seeds and other technologies to smallholder farmers;
- To increase the use of quality seeds and other technologies by smallholder farmers; and
- To improve regional and country level policy and regulation mechanisms for the production and delivery of quality seeds and technologies to smallholder farmers.

C) Intended Results of the Project/Activity Being Evaluated

The objective of the Scaling Seeds and Technologies Partnership activity is to work with New Alliance countries to meet 10-year agricultural production targets set by countries themselves. To meet these targets, AGRA will assist countries to coordinate sector strategies and programs to strengthen the seed sector and promote the commercialization, distribution and adoption of seeds and related key technologies to increase smallholder yields and resilience to climate change.

While agricultural productivity has increased in much of the developing world, average grain yields in Sub-Saharan Africa are about one-third of the average yield in developing countries, and one-fifth of the yield of the developed countries. Since 1970, per capita food production in Africa has declined more than 10 percent, while productivity elsewhere in the world has risen significantly.

In particular, poor access to and adoption of improved seed varieties and complementary technologies are significant contributors to the region's relatively lower agricultural yields.

Successful adoption at scale in SSA requires addressing regulatory and market barriers and constraints, increasing incentive mechanisms, and strengthening local capacity, with a particular focus on inclusive participation of women and smallholders. Many important seed and other complementary technologies, which are critical to improving agricultural productivity, increasing climate resilience, and enhancing nutrition, already exist in international and national public research institutions and the private sector. Seed companies and farmers are often unaware of, or lack access to, improved seed varieties and other promising technologies. Mechanisms to facilitate the rapid dissemination and commercialization of seeds and other locally tested technologies, focusing on strengthening the capacity of local public and private actors, are needed to improve adoption rates.

In countries that are reforming their national seed systems, policies and regulations need to be improved and implemented to respond to local and regional demand, and in a way that allows the private sector to take on increasing functions, while strengthening state agencies so they can provide effective oversight and support. Male and female smallholder farmers, producer organizations, small entrepreneurs and agribusinesses often lack the information, advisory and extension services necessary to guide innovation with improvement in management, marketing production, and adoption of new technologies (management practices, seed varieties, equipment, infrastructure, inputs).

<u>Development Hypothesis</u>: The development hypothesis behind this Partnership is that more purposeful, effective coordination of technology-scaling opportunities for seeds and other technologies by a willing private sector within an enabling commercial framework will lead to rapid agricultural productivity increases. For important technologies where commercial potential is currently untested or weak, more effective coordination and innovative pilots may stimulate the development of new markets or suggest new ways to address these scaling challenges. Better monitoring of commercialization and adoption experiences will provide information on which to base future plans and activities.

The Partnership also intends to support countries to transition from state-dominated seed systems to systems that allow private sector provision of key services (e.g., multiplication of foundation seeds), and strengthen the capacity of the state to carry out critical regulatory functions (e.g., varietal release and seed certification). The Partnership aims to support national and regional efforts to revise and implement seed

laws, focusing especially on regional harmonization of variety release and seed trade, the establishment of foundation seed production in core countries, creating or expanding seed company capacities and seed trade associations, and work with agro-dealers and providers of credit to ensure farmers have awareness of and access to improved seeds. As part of their policy commitments under the New Alliance, the target countries committed to making adoption of the best available technologies a top priority, implementing the necessary regulatory reforms and assessing progress against adoption goals on an annual basis.

<u>Key Assumptions</u>: Through their agreement on the New Alliance, the focus countries and G8 donors implicitly recognized that the "old" approach to agricultural development was not fully achieving intended results. Key assumptions of this new approach to bringing seeds and other technologies to scale are:

- 1. There are technologies (seeds, fertilizer, agricultural chemicals, *etc.*) that are ready to be taken to scale through commercialization or other means to increase their availability that will lead to sustained increases in productivity, income and food security for smallholders.
- 2. More effective coordination among focus country governments, G8 donors and the private sector, particularly related to scaling access to agricultural inputs, will lead to more positive outcomes for smallholder farmers. Better coordination will facilitate follow-through on implementation of key pieces of the reform agenda related to technology scaling and thus to improving the enabling environment for sustained private sector investment, growth of local companies and/or facilitating access by nonprofit organizations.
- 3. Focus country governments and the private sector will need support to meet market technical requirements (certification, registration, *etc.*) and adhere to international agreements to which governments have acceded but are not yet in compliance.
- 4. Efficiency of local and regional markets—particularly trade in agricultural inputs—can be substantially improved through technical support to governments and regional bodies, rationalization and harmonization of trade policies, and private industry monitoring and benchmarking of performance.

D) Approach and Implementation

The Partnership has three objectives:

- 1. Improving the capacity of public and private sector groups to produce and deliver quality seeds and other technologies to smallholder farmers;
- 2. Improving the capacity of smallholder farmers to adopt quality seeds and technologies; and
- 3. Improving the policy and regulatory mechanisms for the delivery of quality seeds and technologies to smallholder farmers.

These objectives will be met by carrying out the following seven activities:

- I. Develop "Road Maps" of specific public and private sector actions needed;
- 2. Coordinate and align efforts among public and private sector actors and donors;
- 3. Provide technical support locally for building capacity of public and private actors;
- 4. Model and pilot priority activities through grant-making;
- 5. Provide regional technical support for finding solutions to cross-cutting issues;
- 6. Monitor and benchmark progress toward goals; and
- 7. Address constraints to regional harmonization.

The overall benefit from the Partnership will be a better-aligned and coordinated set of donor and government actions, which leverage greater private sector investment for the sustainable supply of seed, fertilizer, and other technologies at farmer level. AGRA will also convene international and regional groups active in the development of seed systems to discuss specific challenges and solutions and gather momentum at a regional level. Together with direct investments made by the initiative to alleviate specific bottlenecks in seed and other input supply chains, the Partnership is envisaged as a definitive intervention

in the resolution of barriers to food security which have caused human suffering and limited Africa's chances for economic development for decades.

AGRA estimates that these interventions will ultimately contribute to at least an additional \$40 million in investment in private sector seed supply in the target countries, including the establishment of 12 seedor-other technology supply enterprises led by women. At least 50 improved production technologies will be commercialized, and investment in local supply chains will reduce the average distance that farmers need to travel to access agricultural inputs from 20 to six kilometers. These changes in seed and technology markets will contribute to a 45 percent increase in the adoption of improved seed, fertilizers and other production technologies, resulting in an additional 4.5 million metric tons of grain production and improved food security for 7.6 million individuals in four years.

Country	Target Ecological Areas	Target Crops	Related Target Technologies/Interventions			
Ethiopia	North Region, South West region, Southern region, Middle rift valley areas, Central highlands, East Central highlands, North West area, Central west area, North East area	Maize, Wheat, Barley, Teff, Sesame, Chickpeas	 Rhizobium inoculants Fertilizer blends and associated technologies Quality seed, including vegetative planting materials, of superior varieties of identified target crops Post-harvest storage Seed processing and testing facilities Vertisol drainage solutions Seed business incubation Capacity building/training 			
Ghana	Brong Ahafo, Ashanti, Eastern, Volta, Central	Maize, Rice, Cassava, Soybeans, Yam, Cowpeas	 Fertilizer deep placement Rhizobium inoculants Appropriate mechanization for planting, harvesting, and processing etc. Quality seed, including vegetative planting materials, of superior varieties of identified target crops Post-harvest storage 			
Malawi Mozambique	Machinga, Mzuzu, Karonga, Kasungu, Lilongwe, Blantyre, Shire Valley and Salima Agricultural Development Divisions Beira, Nacala, Zambezi, Limpopo	Cassava, Orange- fleshed Sweet Potato, Rice, Maize, Pigeonpeas, Beans, and Cowpeas Maize, Cassava, Soybean	 Fertilizer blends SRI technology, quality seed, including vegetative planting materials, of superior varieties of identified target crops Fertilizer blends Rhizobium inoculants Quality seed, including vegetative planting materials, of superior varieties of identified target crops 			
Senegal	Groundnut Basin, Casamance, Senegal River Valley, Southern Groundnut Basin, Eastern	Groundnuts, Rice, Pearl Millet, Maize, and Cowpeas	 Appropriate mechanization—rice planters/direct paddy seeder and weeder, fertilizer deep placement applicator, and conservation agriculture (ripper) 			

Target Areas, Target Crops and Related Technologies Prioritized for Scaling by Country

Country	Target Ecological Areas	Target Crops	Related Target Technologies/Interventions			
	Senegal Groundnut Basin, Sylvo pastoral zone, Eastern Senegal, Northern Groundnut Basin, Pastoral zone		 Two-wheel tractors Rice harvesting and threshing machines Hand operated millet threshing machine Fertilizer deep placement Fertilizer blends Quality seed, including vegetative planting materials, of superior varieties of identified target crops Post-harvest storage 			
Tanzania	Southern Highlands, Eastern Zone, Northern Zone	Maize, Sorghum, Cassava, Round Potatoes, Beans, Soybeans and Pigeonpeas	 Fertilizer blends Rhizobium inoculants Quality seed, including vegetative planting materials, of superior varieties of identified target crops 			

Modifications since inception:

Mod 1) Increase incremental funding from \$1.0 million to \$17.0 million

- Mod 2) Change DUNS number, update standard provisions, change Agreement Officer, revise Program Description, update Key Personnel, revise "substantial involvement," revise budget, insert geographic code, insert capital equipment summary
- Mod 3) Extend award date by one year to July 1, 2017
- Mod 4) Change payment method, amend limitation on light construction activities
- Mod 5) Provide incremental funding of \$8.0 million to \$25.0 million, revise budget, update standard provisions
- Mod 6) Planned: to extend Cooperative Agreement at no cost by one year to July 1, 2018

E) Documents

Key documents will be provided by BFS including: Cooperative Agreement, project work plan, PMP, M&E plan including baseline data, quarterly and annual reports, annual implementation plans, and other important documents.

II. EVALUATION RATIONALE

A) Evaluation Purpose

This Mid-Term Performance Evaluation is intended to provide robust empirical evidence responding to evaluation questions designed to support learning and continuous improvement for the Activity and BFS. The evaluation will assess what is working well and what is not working well in implementation, assess progress toward activities objectives and outcomes, as well as unintended outcomes, and provide evidence-based findings and recommendations that AGRA and BFS can use to improve activity effectiveness and better achieve objectives.

B) Audience and Intended Uses

The results of this evaluation will be used by the Agreement Officer, the Agreement Officer's Representative, and AGRA to provide guidance on any mid-course corrections and direction during the final years of implementation. Results will be shared with USAID, both in the Bureau for Food Security to inform other scaling activities and Mission Activity Coordinators which are expected to help them coordinate in-country activities more effectively with the Partnership. Evaluation findings will support AGRA's decision making with regards to its final funding years and may be shared with other G7 donors and the Bill & Melinda Gates Foundation.

C) Evaluation Questions

Evaluation questions are grouped according to the specific interests of this Evaluation.

Management/Administration

- 1. What are the strengths and weaknesses of AGRA's grants selection process as a way to select the sub-grantees with the highest potential? In what ways could it be improved? How effective has the Partnership been in supporting the role of the private sector and other key stakeholders as a way of meeting the objectives of USAID's FORWARD strategy—notably as the engines for sustainable development in their countries?
- 2. How effectively has the project management facilitated communication and coordination amongst the different stakeholders involved in the partnership, including AGRA and its country offices, USAID, grantees, and beneficiaries? Are information transfers amongst sub-grantees, sharing of lessons learned and collaborations evident? In what ways could communications and coordination be improved as a way to advance project goals and objectives, meet reporting requirements and encourage additional relevant partners?
- 3. Are data management systems in place to collect, track and report on AGRA and FTF indicators, outputs, outcomes, and impacts from the beneficiary level and are they comparable across grantees? Does the collection and reporting conform to USAID requirements?

Engagement of the Private Sector

- I. In what ways has the Partnership increased the capacity of public and private sector groups to produce and make quality seeds of improved varieties and other technologies available to small holder farmers? To what extent has the Partnership increased the availability of promoted technologies in markets in target areas? What are the most important barriers that AGRA and the sub-grantees must yet address while trying to increase availability of improved seeds and technologies in local markets?
- 2. What technologies/crops are more likely to be produced and made available on a wide scale by the private sector and why? Which segments of the seed or technology value chain is the private sector likely to take on? Which segments are likely to be more difficult for the private sector and why? How can the Partnership improve its approach to scaling through the private sector in light of these differences?
- 3. What has been the private sector's experience creating demand under the Partnership? How could the private sector's effectiveness at creating demand be improved through the Partnership?

Scaling and Adoption of Technologies

- 1. To what extent have AGRA and its sub-grantees been able to increase the use of quality seeds and improved technologies by small holder beneficiary farmers?²⁶ By indirect beneficiary farmers?²⁷
- 2. What types of strategies, innovations or support have been the most effective in encouraging use of improved seeds and technologies for just one season? Over multiple seasons (adoption vs. application)? What important barriers remain? by:
 - a. Direct project beneficiaries?
 - b. Indirect beneficiaries? (those in "catchment areas" of activities but aren't directly targeted by the activity)
 - c. Early adopters? Majority adopters? Late adopters?
 - d. The poor, women, and socially marginalized groups?
- 3. What are other types of approaches and methodologies that USAID could incorporate in its projects to encourage indirect beneficiaries to both try out and continue to use new agricultural technologies and practices? At what level of market penetration²⁸ of potential market demand²⁹ for targeted technologies is there likely to be spontaneous adoption (over 2+ growing seasons) by indirect beneficiaries? (e.g., what is the take-off point at which technologies could "go viral"?)

Enabling Environment

- 1. What progress has the Partnership made in supporting country-level and regional policy and regulatory mechanisms with the aim of increasing the production and delivery of improved seeds and technologies? What progress has there been in contributing to New Alliance objectives of improving the enabling environment within countries and across countries? What other opportunities are there for the Partnership to support attainment of New Alliance objectives of enabling environment improvement?
- 2. What additional policy reforms, in order of priority, should the Partnership support (including AGRA, the Steering committee, sub-grantees, donors, other stakeholders, *etc.*) to:
 - a. Raise the supply of improved seeds and technologies in markets in target areas?
 - b. Increase the production and delivery of improved seeds and technologies on a national and regional level?

III. EVALUATION DESIGN AND METHODOLOGY

A) Evaluation Design

Scale and sustainability means achieving a critical mass of adopters of new technologies. Once this critical mass of adopters is reached, further adoption will continue to grow organically ("go viral"). The

²⁶ An individual is a direct beneficiary if s/he comes into direct contact with the set of interventions (goods or services) provided by the activity. Individuals who receive training or benefit from activity-supported technical assistance or service provision are considered direct beneficiaries, as are those who receive a ration or another type of good. The intervention needs to be significant, meaning that if the individual is merely contacted or touched by an activity through brief attendance at a meeting or gathering, s/he should not be counted as beneficiary.

²⁷ An indirect beneficiary does not necessarily have direct contact with the activity but still benefits, such as the population that uses a new road constructed by the activity, neighbors who see the results of the improved technologies applied by direct beneficiaries and decide to apply the technology themselves (spill-over), or the individuals who hear a radio message but do not receive any other training or counseling from the activity.

²⁸ Market Penetration is defined as the number of people who buy a specific technology at least once in a given period, divided by the size of the relevant market population.

²⁹ Market potential is the entire size of the market for a technology at a specific time and represents the upper limits of the market, measured by either the value or volume of sales.

Partnership emphasizes the role of the private sector for achieving its goals; and the private sector is the preferred pathway for scaling as well. At the same time, the Partnership recognizes that partnerships with the public sector or civil society (e.g., NGOs, universities) may play an important role.

This performance evaluation should use a mixed-methods approach employing a time series data collection design to allow for robust quantitative and qualitative data collection to assess performance of the Partnership intended to provide insight into what the "take-off point" is for achieving scale of selected technologies and may shed light on innovative growth models for bringing new technologies to scale. Optimally, through this methodology we might better understand what it take to achieve this take-off point for USAID's planning, budgeting, cost/benefit analysis, and future monitoring and evaluation of FTF programs.

The challenge for this Evaluation is to estimate the potential market demand of an innovation and determine the number in a population that represents the early and majority adopters who are and aren't the direct beneficiaries of the activity.

<u>Sampling Parameters</u>: The performance evaluation will cover the entire activity, however, due to budget constraints and the geographic spread of the Partnership, **site visits will be carried out in three (3)** countries: Ghana, Mozambique, and Tanzania.

<u>Countries</u>: The evaluation team is expected to conduct site visits with between a quarter and a third of sub-grants in Ghana, Mozambique and Tanzania. Specific commodities that should be examined include maize in Tanzania and Ghana; cassava in Mozambique; Irish potato and beans in Tanzania. The selection criteria will be included as part of the evaluation design. Key informant interviews and/or surveys will be carried out with a majority of grantees (via phone, Skype, Internet, *etc.*).

<u>Contracts</u>: The Partnership has made some additional sub-contracts, and these should be examined for their contribution to the evaluation questions, such as the COMESA Seed Catalog and upcoming PERUSAP training (in 2017).

<u>Timing</u>: The first data collection phase should occur in the Summer of 2016 and the second data collection phase in Summer of 2017.

B) Data Collection Methods

This evaluation is expected to collect data through both qualitative and quantitative methods from a variety of stakeholders.

The evaluation should assess impacts on four levels:

Enabling Environment: The evaluation is expected to look at the Partnership's support to policies and regulations in the seed sector at the national and regional level, on the way to fulfilling the commitment to the New Alliance

Primary direct beneficiaries: Enterprise-level data will focus on the seed companies with which the Partnership works directly. Data on the numbers of employees (or members), the gender of the employees and leadership/management, and information on the type of organization are being collected by the Partnership for each performance indicator, including the production of seeds, and the value/volume of seeds sold.

Secondary direct beneficiaries: Smallholder farmer data are being collected by the sub-grantees, in order to assess impact on applying new technologies and varieties. These farmers are expected to participate in grantee activities such as extension services (e.g., demonstration plots), capacity training (e.g., short-term trainings), and other services and facilitation activities. The assumption is that these farmers would have adopted the improved seeds and technologies and demonstrated impact.

Indirect beneficiaries: Effects on smallholder farmers who have bought the Partnership's supported, improved seed varieties and/or associated technologies by non-grantee agro input dealers (where AGRA has pre-existing relationships built through other programs or who purchase/receive Partnership-supported improved seed varieties and/or improved technologies and/or improved management practices) will also be examined to look at what elements affect farmer demand, bring about uptake, and have an impact on productivity and income.

A selection of potential data collection methods are provided for consideration below. The Concept Note, and subsequent Performance Evaluation Protocol (which will include a data collection plan) will be finalized by the evaluation team, with approval from the BFS AM and COR, in the Evaluation Plan at the beginning of the assignment.

The evaluation team should collect data disaggregated by gender and will ensure that women are included and able to actively voice their perspectives throughout data collection. Additionally, for all data collection methods the team will aim to include farmers from different socio-economic backgrounds as determined by proxies such as land size and income. Together this will make sure the evaluation accounts for potential disparate effects related to these respondents' different characteristics.

Sample-based farmer survey. A multi-stage sampling design could be used to determine impact on direct and indirect beneficiaries, perhaps utilizing adaptive sampling (a technique used to amplify responses from difficult to find groups while retaining the ability to generalize). A large initial random sample conducted in target areas, intended to cover both direct and indirect farmer beneficiaries, will generate information on proportions of direct versus indirect beneficiaries, critical demographic information and farmer behavior and use of technologies. The second data collection phase would focus the sampling more on direct beneficiaries with a smaller proportion of indirect beneficiaries interviewed.

<u>Key informant interviews</u>: Key informant interviews (KIIs) could be used to collect information from stakeholders. KIIs will be employed in answering all evaluation questions. The evaluation teams will use structured or semi-structured interview guides for KIIs to ensure key questions are systematically answered. These guides will also allow interviewers the freedom to ask spontaneous questions to uncover important and unanticipated information. The evaluation team will design a separate key informant interview guide for each stakeholder group.

<u>Focus group discussions</u>: FGDs could be carried out with key stakeholders, and direct and indirect beneficiaries. FGDs should allow researchers to collect information about more people in a shorter amount of time and provide valid ways of identifying trends or conclusions with respect to counterfactuals or external factors.

<u>Focus group discussion sampling plan</u>: Stakeholders should be identified in consultation with the Partnership's COP and staff, taking into consideration the limitations on LOE and travel. As mentioned above, the sampling plan for selection of focus group participants will be included in the evaluation plan and in consultation with USAID/AGRA to minimize potential bias.

<u>Secondary data collection</u>: Secondary data collection could be from three sources: project performance reporting and data, other project related research including baseline studies, and a literature review of approaches to measuring technology scaling (some provided by USAID).

C) Data Analysis Methods

Analysis of data on adoption/scaling and data on other dimensions of the Partnership's performance will require different methodologies. Analysis will entail triangulating data from different sources to reduce bias and provide robust results. The methods for analyzing both quantitative and qualitative data will be elaborated more fully in the Evaluation Plan.

IV. EVALUATION PRODUCTS

A) Deliverables

- I. Evaluation Plan (at least 2 revisions, pending USAID approval)
- 2. Mission Outbriefs: Short presentation of country-wide findings for USAID mission for each country where site visits were conducted following both phases of data collection
- 3. Presentation of findings (2): following each data collection phase, short presentation of initial findings/results for USAID and AGRA (utilizing web based interface)
- 4. Interim evaluation report (2 revisions, pending USAID approval) following initial data collection phase, including evidence-based findings and short-term actionable recommendations, relating to the evaluation questions and activity implementation, with the intention of information AGRA's work plan.
- 5. Evaluation report (at least 2 revisions, pending USAID approval) following second data collection phase, including evidence-based findings and short-term and longer-term actionable recommendations, relating to the evaluation questions and activity implementation, on the Partnership's management and administration, private sector engagement, technology scaling and adoption progress, and enabling environment influence.
- 6. Data sets: cleaned and uploaded according to USAID's open data policy.
- 7. S-curve models, plotting the Partnership's progress on beneficiaries' adoption of selected technologies.
- 8. All deliverables as specified in the PEEL-TO contract

V. TEAM COMPOSITION

Describe the intended size of the evaluation team, the roles and responsibilities of team members, specific qualifications that team members are expected to possess, and the manner that their qualifications will contribute towards the evaluation effort.

The Evaluation envisions a team of **three Key Persons**—an Evaluation Specialist, an Agriculture Economist, and an Agronomist—but will need to be supplemented by additional specialists possibly including a statistician, a geographer/GIS expert, and a marketing/communications expert.

Evaluation Team Lead: A senior-level evaluator with a minimum of 10 years of experience managing and/or evaluating multifaceted international development teams, involving farmers, private sector, and public sector involvement. The candidate will also have: a) a demonstrated capacity to conduct independent program evaluation; b) an understanding of USAID's foreign assistance goals, and its particular objectives related to agricultural development and food security; and c) the ability to analyze issues and formulate concrete recommendations orally and in writing. Experience in Sub-Saharan Africa is necessary.

Technical team members (2): Must be experienced experts (5-10 years or more) in international development related to agriculture adoption and scaling of agricultural technologies; in particular, team members must have experience working with African seed systems. Technical team members will also have demonstrated the following: a) the capacity to conduct independent program evaluation; b) a thorough understanding of research methodology; c) experience in effectively conducting outreach and dissemination to policy makers, development practitioners and/or the private sector; and d) the ability to analyze issues and formulate concrete recommendations orally and in writing.

Disciplines of all members (4): The team members need familiarity with Sub-Saharan Africa's agricultural systems with the following required composition of skill sets among them: quantitative and qualitative evaluation, organizational and capacity development, gender analysis, demand and supply economics, agronomist/agricultural systems background of staple crops (*i.e.*, maize, rice, tubers, grain legumes), agriculture economics background, private sector/seed distribution and marketing systems, value-chain orientation, seed regulatory systems.

VI. TIMELINE

- Timeframe for Evaluation: Approx. July 2016-July 2017
- Final draft: July 2017

ANNEX 2: EXAMPLES OF SSTP PARTNERSHIPS

I. Linking input and output value chains: Cassava in Mozambique

An example of a partnership promoting value chain linkages is the International Fertilizer Development Center (IFDC) grant for the promotion of quality planting material of higher yielding, disease resistant cassava in Mozambique. With support from Mozambique's Institute of Agricultural Research, IIAM, (supported previously by AGRA PASS and currently by SSTP in a separate grant) and the International Institute of Tropical Agriculture (IITA), farmers are able to plant and harvest the improved varieties to sell to a Dutch-supported cassava processing company, DADTCO, for processing into cake for sale to Cervejas de Moçambique (CDM) for the brewing of Impala beer. IFDC and DADTCO were previously working together, and SSTP facilitated the partnership with IIAM to allow for the introduction of improved cassava varieties into the value chain. On the policy side, CDM has received a significant reduction in the excise tax for its cassava beer.

2. Supporting seed and other technologies in a pluralistic partnership: Beans in Tanzania

Another example is the International Center for Tropical Agriculture (CIAT) grant in Tanzania. In this example, the findings of CIAT's socio-economic research on bean markets and farmer preferences have been shared with agronomists from the national ARI who have screened and identified appropriate improved bean varieties for commercialization (with support from CIAT PABRA). Breeder seed from ARI is sent to and multiplied by the Agricultural Seed Agency (ASA). ASA and Meru Agro Tours then produce certified seed, which is promoted by CIAT through mother-baby demonstrations (which also involve the use of diammonium phosphate [DAP] fertilizer and Apron Star seed treatment). CIAT also supports the sale of ASA and Meru Agro Tours certified seed through participating agro-dealers. And lastly, CIAT is partnering with FIPS in the Southern Highlands under their separate SSTP grant to extend mother-baby trials, support quality declared seed (QDS) production, and promote improved bean varieties. In this example, SSTP facilitated the links between CIAT and Syngenta (who produce Apron Star) and also FIPS.

3. Supporting SSTP grantees to promote certified seed through information technology: Partnering with the ICT Challenge Program in Tanzania

A third example of support to varietal promotion is provided through SSTP's linkage with the ICT Challenge Program in Tanzania, where FRI is working closely with SSTP grantees, Aminata Seed Company, and Kibaha Sugarcane Research Institute (SRI).

4. Supporting a pluralistic public-private sector partnership: ECoSIB in Ghana and FIPS in Tanzania

- a. Entrepreneurship for Commercial Seed Incubation Business (ECoSIB) brings together a seed sector service team to support nascent commercial seed companies in Ghana. The ECoSIB grant is managed by Forum for Agricultural Research in Africa (FARA) and implemented by Agri-Impact Consult. Key partners include Kwame Nkrumah University of Science and Technology (KNUST), Crop Research Institute (CRI), and Ghana GLDB (Grain Legume Development Board). Organizational and staff changes within FARA meant that SSTP had to play a key role in ensuring the effective management of this grant, and Agri-Impact has successfully managed the relationships among the various public and private sector partners.
- b. The goal of the FIPS grant is to scale up a private, farmer-led, extension approach across three districts in Tanzania's Southern Highlands. SSTP facilitated a partnership between FIPS and Centum Learning, a private company specializing in skills development and vocational training, in developing guidance and training material. FIPS collaborates with and supports the private sector technology companies (seed, fertilizer, crop protection products) and the Ministry of Agriculture (MOA) Extension Service. As elaborated in Section VII, the approach includes VBAs linked to and supported by MOA extension, high ratio mother-baby demonstrations (1:100) and QDS bean and cowpea.

ANNEX 3: SURVEY QUESTIONNAIRE

GHANA

Verbal Consent

INTRODUCTION

Hello. My name is _____I work for **Kantar Public** a research company based here in Ghana. You were asked by [-----INSERT PERSON'S NAME WHO CALLED] from [**Kantar Public or NAME**] if it was okay for someone to come and interview you again this year about the study on improved agricultural technologies involving farmers like you who grow maize and were interviewed last year. Thank you for agreeing to talk to me today. Is this a good time to talk?

Purpose of the study

I'm going to share more details about the purpose of the study. You can interrupt me with questions at any time. USAID supported partners to produce improved agricultural technologies to increase crop production in Ghana. Kantar Public has been funded by Mendez England and Associates (ME&A) to conduct an assessment of these efforts. We are interviewing farmers who were identified and interviewed last year as MAIZE farmers. We would like to know more about improved agricultural technologies in your community.

I am contacting you now to conduct an interview. The purpose of this interview will be to ask about your knowledge, experiences, perspectives, and use of improved agricultural technologies. The interview will take approximately 30-40 minutes to complete.

Before I ask you whether you agree to be interviewed, there are a few more things that you should know:

Participation in this study is voluntary. You may also choose not to answer a question for any reason but I hope that you can provide information that we will add to what you gave us last year to help develop better ways of developing and disseminating improved seeds and other agricultural technologies to more farmers. We are interested in knowing if you have used the any improved seed varieties, participated in any of the related activities, and hear your thoughts and opinions about them. Again, we are not promising you any immediate benefit but your responses in this survey will go a long way to help improve work around seed production and dissemination by various partners in Ghana. There are no right or wrong responses to the interview questions, and the answers you provide will be kept confidential. Honest answers to the questions will help us better understand what is happening and what people think, say, and do.

Do you have any questions for me? (If a question is asked, please answer before continuing).

Do you agree to participate in this interview?

Yes – continue

No - do not interview but provide survey manager contact information below

QUESTIONNAIRE (CROP) TYPE: Ghana – MAIZE CODE

SECTION 0: FARMER IDENT	FICATION						
FARMER NAME:			_				
Phone Number:	· · · · · · · · · · · · · · · · · · ·	_					
House Number/Address:							
FARMER ID (Unique Study ID):		<u> </u>					
Farmer Status:							
I. Direct Beneficiary							
2. Indirect Beneficiary							
I. In the past year, have you pa	rticipated in any activities ab	out imp	proved				
(Maize) varieties such as demon	stration plots, field-day, atten	ded a tr	raining,				
or listened to radio or 1 V prog	ram and then made inquiries t	o learn	more?				
INTERVIEW INFORMATION							
		11	NTERVI				
DATE:							
INTERVIEWER NAME:							
INITERVIEW START TIME:							
		L	ANGUA				
LANGUAGE OF QUESTIONNAIR	.E:						
DATA QUALITY CHECK (If A	Applicable)						
SUPERVISOR	Accompanied by Supervi	isor		QC present			
				_			
NAME:	NAME:		NAM	E:			
			_				
			DATE	Ë			
DATE:	DATE:						

	Section I	: Farmer's Background	Chara	acteristics				
No.	Questions	and Filters Coding Categories Sk						
101.	Sex of farme	er	Male				I	
	(Mark one wi	ithout asking)	Female				2	
102.	How old are	e you?	Age ii	n completed years				
103.	What is the	highest level of formal	None					
	education yo	ou have completed? (List	Prima	iry Incomplete		I		
	Country Specific Educational Levels,			iry Complete		2		
			Secondary Complete					
				er		4		
104.	Can you rea	d and understand a letter	a letter In English					
	or newspape	er with ease in English or	In loc	al language ()		2		
			Both	English and local ()		3		
			Not a	at all		4		
105.	What is you	r marital status?	Neve	r married		Ι		
			Inform	nal/Living together		2		
			Marri	ed		3		
			Wido	owed		4		
			Separated					
			Divor	rced	6			
106.	How many p	people live in your househo	old (incl	uding you and children)?				
	Total numbe	er of people						
107.	107. How many males and females live in your household?			Number of males				
				Number of females				
				-				
108.	In total, how did vour hou	/ many acres of agricultural usehold cultivate last seasor	land n?	Farm size in acres				
109		r household own the follow	ving? [it	ems which have been funct	ioning	within	the	
	last 6 month	is]						
	a.	Radio?			Y		Ν	
	b.	Television?			Y		Ν	
	с.	Mobile phone? Y					Ν	
110.	What was th	he main source of your household income last year?						
	a.	Salaried employment/Job						
	b.	Sale of crops 2						
	с.	Sale of livestock	3					
	d.	Petty trade	4					
	e.	Sale of labor			5			
	f.	Remittances			6			
	g.	Pension fund/Pension pay			7			
	h.	Sale of trees			8			

	Section	: Farmer's Background Characteristics							
	i.	Other: Specify	9						
111.	11. Which crops were the main sources of your household income last year? (Mark all that								
	apply)								
	a.	None	[]				
	b.	Maize	[]				
	с.	Beans]]				
	d.	Irish potatoes]]				
	e.	Cassava]]				
	f.	Fruits	[]				
	g.	Nuts]]				
	h.	Yams]]				
	i.	Vegetables] []				
	j.	Other:Specify]]				
112.	Do you or a	ny member of your household belong to any type of	Yes	I		lf 2 skip ->			
	groups or co	ommittees?	No	2		sec. 2			
113.	What types (Mark all the	of groups/committees do you or any member of your house t apply) [Probe for Religious Groups—when it is NOT mentioned]	hold be	elong t	0?				
	a.	Farmer-based organization] []				
	b.	Religious group] []				
	с.	Credit/Microfinance group (i.e., savings/merry-go-round)]]				
	d.	Mutual help/Insurance group (i.e., burial societies)]]				
	e.	Trade and business association]]				
	f.	Livestock keeping groups	[]				
	g.	Welfare group	[]				
	h.	Social club] []				
	i.	Other: (Specify)] []				
	j.	None] []				

Section 2: General Exposure to <u>ANY</u> Improved Seeds & Other Technologies											
Interviewer Notes: Now, I'd like to ask you about improved seeds and agricultural											
techno	ologies you are aware about in your area.										
No.	Questic	ons and Filters				Codir Cater	lg Ioric	NC .	Skip		
201.	What crops did you plant on your farm in last long rainy season? (Mark all that										
	apply)										
	a.	Maize					Ι				
	b.	Beans					2				
	С.	Irish potatoes					3				
	d.	Cassava					4				
	e.	Fruits					5				
	f.	Nuts					6				
	g.	Yams					7				
	h.	Vegetables					8				
	i.	Other:Spe	cify				9				
202.	Have you	u ever heard of any improved agricu	ltural	echnique	c)	Yes	I				
	used for crop production that are recommended for your No 2										
	area?			•							
203.	What are fertilizer, all that a	e the different improved agricultural or farming techniques) used for crop pply) [Probe by prompting: Have you he	techno product eard abo	logies (i tion hav out?]	.e., im _i e you	proved heard	seec abo	ls, ut? (Mar	k		
	a.	Improved seed varieties				[]				
	b.	Farm management practice					[]			
	с.	Fertilizer applications					[]			
	d.	Other agro-chemical use					[]			
	e.	Improved post-harvest processing					[]			
	f.	Improved post-harvest storage					[]			
	g.	Otner: (Specify)		-			L]			
204.	For each heard ab	of the improved agricultural techno out (crosscheck with 203), when did y	ologies c you first	or farmir : hear at	ng pra Dout i	ctices t?	you	have			
	Agricul	tural Technologies	This s	season	•••••		•••••				
	Last season2						2				
	Three years ago More than 3 years					•••••	•••••	4			
						ago		5			
					-			-			
	a. Improved seed varieties				3 2	4 ⊿		5			
	c. Fertilizer applications I 2				3	4		5			
	d. C	Other agro-chemical use	I		2	3	4		5		
------	--	---	-------------------	-------------	--------------------	--------------	------------------	----------------	--------------	---------	---------
	e. In	nproved post-harvest processing	I		2	3	4		5		
	f. In	nproved post-harvest storage			2	3	4		5		
	g. C	other: Specify	I		2	3	4		5		
205.	Within	the past three years, how have you hear	rd a	ıbo	ut these	impro	ved ag	gricu	Iltural		
	technologies or farming techniques? (This list must include the specific radio or TV show								/ shows		
	orICI	channels that SSTP is supporting, e.g., KUAP	AI	VS	eries in G	hana.)		_			
	a.	Demonstration						L]		
	b.	Farmer-managed demonstration						[]		
	c.	Agro-dealer						[]		
	d.	Neighbor/relative						[]		
	e.	Field days						[]		
	f.	Community events to promote agricul	tura	al te	echnolog	gies		[]		
	g.	Agricultural show						[]		
	h.	Government extension agent						[]		
	i.	i. Village-based agent (VBA)]		
	j.	j. TV show]		
	k.	k. Radio program]		
	I.	I. ICT (SMS) Services						[]		
	m.	NGOs						[]		
	n.	Other: Spec	cify					[]		
206.	Have y techno	ou ever tried any of the improved agricu logies or farming techniques you have he	iltur eard	°al I ab	out for	Ye	s			lf No -	> Q.211
	yourse	If on your farm?				N	5 2	2			
207.	Which season	improved agricultural technologies or fa ? (Mark all that apply) [Probe by prompting	rmi : Die	ng d ya	techniqu ou use	ies did /	you u ast yea	se la ir/se	ast ason?		
	a.	Improved seed varieties						[]		
	b.	Farm management practice						[]		
	с.	Fertilizer applications						[]		
	d.	Other agro-chemical use						[]		
	e.	Improved post-harvest processing						[]		
	f.	Improved post-harvest storage						[]		
	g.	Other: Specify						[]		
208	On how	w many acres of land did you grow (CR ? (Crosscheck with target crop in question 2	DP 01).	XX	X) durin;	g last					
209	Season: (crosscreeck with target crop in question 201). What was the reason for growing (CROP XX) last season?										

	a.	Food			
	b.	Sale		2	
	с.	Both food and sale		3	
	d.	Other (Specify)		4	
210.	Which apply)	of the following agro-chemicals did you use in the last season? (<i>i</i>	Mark a	ll that	Skip>Sect. 3
	a.	Herbicide	[]	
	b.	Insecticide	[]	•
	с.	Fungicide	[]	•
	d.	Fertilizer	[]	•
	e.	None	[]	
	f.	Other (Specify)	[]	
211.	What a techno	pply.]			
	a.	No interest in trying something	[]	
	b.	Unable to afford the technology	[]	
	с.	Don't know where to get the technology	[]	
	d.	Don't have enough/type of land	[]	
	e.	Don't have enough labor	[]	
	f.	Uncertain about market for outputs]]	END
	g.	Don't know how (no knowledge)	[]	
	h.	Technology is time-consuming	[]	
	i.	Not farming (farmer not well)	[]	
	j.	No difference in yield	[]	
	k.	Unavailability of seed/agro-chemical	[]	
	I.	Others (Specify)	[]	

	Section 3: Certified Seed of Improved Varieties Tried or Tested								
Interviewer	Notes:	Now, I'd like to	ask you a	about the Ce	rtified Seeds c	of improved (CROP X) varieties the	hat you		
have ever use	d or tried	l in your farm.					•		
No.		Ques	tions an	d Filters		Coding Categories		Skip	
301.	Have yo varietie potatoe (Some f group/co	bu ever tried and s of (CROP X es) on your farr armers may be g ommunal farm, o	nd used ar () (maize, n? growing im e.g., in Tar	ny improved cassava, bear proved seeds izania)	seed ns, or Irish in a	Yes1 No2		lf, Yes skip to -> 303	
302.	Do you varietie	intend to use s on your farm	improved in future	seed of (CR	OP X)	Yes1 No2		END	
Interviewer Notes: Now, I am going to ask y ever tried or used in your farm. I will ask you t season and this season, and which of these wer variety the farmer mentions spontaneously, probe of 303305.303305.303: Could you please name all the improved seed varieties of (CROP X) that you have ever used or tried?				ou about eac o indicate wh e tried but la and mark all th 304 : Was (Variety) plar season; (b). season/year	th of the impro- nich of these va ater abandoned hat apply). Name nted (a). Last This -? (Yes=1/	 avieties of (CROP X) you arieties of CROP X were planted la d (i.e., not planted last season). (Select 305: Why have you not planted th variety last season and this season/ (Abandoned) 	bu have st ct each is /year?		
				No =2)	-				
		Variety 303				Reasons			
		Name	Code	304a	304b	305	Code		
١.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
Variety	Code	Variety	Code		30	05 Reasons	Code		
Abeleehi	I	Opeaburoo	16	No interest	t in trying		1		
Abontem	2	Yellow corn/ Golden Jubilee	17	Unable to a	Unable to afford the seed variety 2				
Aburo Denkye	3	Pannar	18	Don't knov	v where to get	the improved seed	3		
Aspino	4	Pannar 52	19	Don't have	enough/type o	of land	4		
Aburotia	5	Pannar 53	20	Don't have	enough labor		5		
Aseda	6	Pannar 54	21	Uncertain a	ıbout market f	or outputs	6		
Dobidi	7	Suhundoo	22	Unavailabili	ty of variety/Se	eeds are not readily available	7		

	Sectio	n 3: Certified	Seed of	Improved Varieties Tr	ied or Tested		
Kohyekole	8	Timtim	23	It doesn't last long (shoi	rt storage time)	8	
Kparifako	9	Tospino	24	Low yield/Less harvest		9	
Kwappia	10	Other I	25	Other:		10	
Laposta		Other 2	26				
Mamaba	12						
Obatampa	13						
Okomasa	14						
Omankwa	15						
306.	Of all the improved seed varieties for (CROP X) you have ever used, which variety do you like the most (prefer) to grow in your farm? (Name ONLY ONE)			(Crosscheck with target variety in question 303)			
307.	Do you intend to use your preferred variety (<i>Name of Variety</i>) next season?			Yes1 No2		lf, NO skip to -> Sect. 4	
308.	ls your	preferred VA	RIETY X	X easily accessible?	YesI No2		

Section 4: Technology Adoption – Use of Improved CROP X Varieties in Last Season							
Inter menti	viewer Not oned and is	:es : Now, I am going to ask you about (VARIETY YY – choose name of the an SSTP Variety) that you have said you planted in last season in your	ne first farm.	Skip			
401.	When did	you first use or try out (VARIETY YY)?					
		Last season	I				
		Two years ago	2				
		Three years ago	3				
		More than 3 years ago	4				
402.	When you first used the (VARIETY YY) (N years ago), how did you acquire it?						
		Purchased at full cost	I				
		Purchased at reduced cost	2				
		Got it for free	3				
		In-kind or any exchange	4				
403.	When you first used (VARIETY YY) (N years ago), from whom did you acquire it? (<i>Mark all that apply</i>)						
	a.	Farmer-based organization	[]				
	b.	NGOs/AID distribution	[]				
	с.	Seed company	[]				
	d.	Agro-input dealer	[]				

Section 4: Technology Adoption – Use of Improved CROP X Varieties in Last Season							
	e.	Government extension agent]			
	f.	Village-based agent (VBA)]			
	g.	Other farmers or relative]			
	h	Market trader]			
	i.	Other: (Specify)]			
404.	When you	first used (VARIETY YY) (N years ago), what was the	Quantity in				
	quantity of	seed did you use?	(kilograms)				
	(Note : In n Check seed kilograms).	nost cases, the seed is supplied in packets of a known weight. packet sizes that are sold locally and convert their weight to					
405.	When you	first used (VARIETY YY) (N years ago), what was the distance you acquired it? (Indicate in zero kilometers (00 km) if the	nce (km) between seed was acquired/re	your ceived			
	within the h	ome village/town)	seed was acquired it				
	Distance from home in (km)						
406.	How did yo	ou first learn about (VARIETY YY)? (Mark all that apply)					
	a.	Farmer-managed demonstration					
	b	Seed company/project-managed demo		- 1			
	с.	Agro-dealer		- 1			
	d.	Neighbor/relative		- 1			
	с. е	Field days		- 1			
	f.	Community events to promote agricultural technologies		- 1			
	σ						
	ة، h	Government extension agent		- 1			
	i	Village-based agent		- 1			
	i. i	Farmer training course		- 1			
	j. k	Radio program		- 1			
	к. I			- 1			
	1. m						
	n.	Market trader					
	11.						
	0.	Other: Specify					
407	p.	Cuter Specify					
ч 0 7.	YY for the	e first time ? [Spontaneous response, indicate one answer only—t	hat which was most	∟ ∎∎ important			
	in persuadir	ng farmer to plant this variety]		•			
	a.	Farmer-managed demonstration		I			
	b.	Seed company/project-managed demo		2			
	с.	Agro-dealer		3			
	d.	Neighbor/relative		4			
	e.	Field days		5			
	f.	Community events to promote agricultural technologies		6			
	g.	g. Agricultural show 7					

Secti	on 4: Techr	nology Adoption – Use of Improved CROP X Varietie	s in Last Sea	son			
	h.	Government extension agent		8			
	i.	Village-based agent (VBA)		9			
	j.	ICT (SMS) message		10			
	k.	Radio program		11			
	I.	TV program		12			
	m.	Market trader		13			
	n.	No particular motivation		14			
	0.	Other: Specify		15			
Inter seaso	viewer Not n in your far	es: Now, I am going to ask you about (VARIETY YY), whe m.	n you planted	it in last			
408.	What is the	e size of the farm plot (in acres) where (VARIETY YY)	Plot size in				
	was planted	last season?	acres				
409.	What quar	auantity of seeds of (VARIETY YY) did you plant last season? Quantity in (kilograms)					
410.	What was the source of the seed of (VARIETY YY) that you planted last season? (<i>Probe: Mark all that apply</i>)						
	a.	Self-saved seed		[]			
	b.	Farmer-based organization [
	c.	NGOs/AID distribution []					
	d.	Agro-input dealer	[]				
	e.	Government extension officer	[]				
	f.	Village-based agent (VBA)		[]			
	g.	Other farmers or relative		[]			
	h.	Purchased in market		[]			
	i.	Seed company		[]			
	j.	Can't remember		[]			
	k.	Other:Specify		[]			
411.	When you distance (kr if the seed	acquired the seed of (VARIETY YY) last season, what was m) between your home to where you acquired it? (Indicate 0) was acquired/received within the home village/town)	the) km				
412	Distance fro	om home in (km) fits have you experienced in your household from using this (Variety VV)	[Shontaneous			
TI2.	response on	ly. Do not read. Mark all that apply.]	variety i i j:	Labourgueous			
	a.	Increased yield with this variety		[]			
	b.	More income from crop sales of this variety		[]			
	С.	Reduced labor demands from this variety		[]			
	d.	Better tasting food products from this variety		[]			
	e.	Reduced fuel used in cooking this variety		[]			
	f.	f. Lasts longer in storage []					

Section 4: Technology Adoption – Use of Improved CROP X Varieties in Last Season								
	g.	High market demand	High market demand []					
	h.	Quick harvesting time			Ī]		
	i.	No benefit]]		
	j.	Other:	(Specify)]]		
413.	Do you inte	end to use this (VARIE	TY YY) again next season?	Yes	I			
			+1 <i>5)</i>	No	2			
414.	Since you s	tarted using (VARIET	Y YY), have you changed any of the	Yes	I			
	farm manag	gement practices becaus	se of the technology's characteristics	No	2			
415								
415.	VVhy have y	you decided not to con	tinue using (VARIEI Y YY) next seas	son? (Mark all t	hat apply	<i>')</i>		
	a.	Expensive to purchase the inputs]		
	b.	Requires a lot of labo	Requires a lot of labor					
	с.	Don't like taste]]		
	d.	Not marketable]]		
	e.	Inadequate storage fa	cility		[]		
	t.	Poor crop yields			l	1		
	g.	Short storage duratio	Short storage duration					
	h.	Switched to another variety]		
	I.	Switched to other crops]		
	j.	No reason/None]		
	k.	Other:	(Specity)		l	J		
416	Interview (VARIET) After I have you disagre or you stro	er text: I am now goin Y YY). I am interested e read each statement, be with the statement, y ongly agree with the state	g to read a few statements about your in the extent to which you agree or di please indicate whether you strongly d ou are neutral about the statement, yo tement.	sagree with eau sagree with eau isagree with th ou agree with t	f the ch statei e staten he state	ment. nent, ment		
	I like using	(VARIETY YY) in	Strongly disagree					
	my farm.		Disagree		2			
			Neutral		3			
			Agree		4			
			Strongly agree		5			
417	I would rec	commend (VARIETY	Strongly disagree		I			
	relatives.		Disagree		2			
			Neutral		3			
			Agree		4	•		
			Strongly agree		5)		
418	I intend to again in futu	use (VARIETY YY) ure.	Strongly disagree					
			Disagree		2			
			Neutral					
			Agree		4	•		

Section 4: Technology Adoption – Use of Improved CROP X Varieties in Last Season				
		Strongly agree	5	

Secti	on 5: Tried and	Discontinued Seed Variety					
Inter discor	viewer Notes : N ntinued.	low, I'd like to ask you about (VARIE T	FY ZZ) that you have tried	but then	abando	ned or	Skip
501.	When did you f	first use or try out (VARIETY ZZ) ?					
		Last season				I	
		Two years ago				2	
		Three years ago	Three years ago				
		More than 3 years ago				4	
502.	What was the r time? [Spontane variety]	nain motivation (source of information) ous response, Indicate one answer only—t	that persuaded you to plar hat which was most importan	nt this var t in persu	riety for ading far	the first mer to pla	int
		Farmer-managed demonstration	Farmer-managed demonstration Seed company/project-managed demo Agro-dealer				
		Seed company/project-managed					
		Agro-dealer					
		Neighbor/relative			4		
		Field days			5		
		Community events to promote	e agricultural technologies		6		
		Agricultural show			7		
		Government extension agent			8		
		Village-based agent			9		
		Farmer training course			10		
		Radio program			11		
		TV program			12		
		ICT			13		
		Other:			14		
503.	For how many s	seasons or years did you use (VARIET	Y ZZ) ?	Numbe	er of		
				seasons	5		
504.	When you first	used (VARIETY ZZ) (N years ago),	Purchased at full cost	•		I	
	now did you ac	quire it?	Purchased at reduced cos	st/subsidy	/	2	
			Got it for free			3	
			In-kind or exchange			4	

Sectio	Section 5: Tried and Discontinued Seed Variety							
505.	When yo what was	u first used (VARIETY ZZ) (N years the quantity of seed that you acquired	s ago), d?	Quantity in (kilograms)				
506.	When yo	u first used (VARIETY ZZ) (N	Farmer-t	based organization	Ι			
	years ago), from whom did you acquire it?	NGOs/A	ID distribution	2			
			Seed cor	npany	3			
		· · · · · · · · · · · · · · · · · · ·	Agro-inp	ut dealer	4			
			Governn	nent extension officer	5			
			Village-b	ased agent	6			
			Other farmers or relative.					
			Market t	rader	8			
			Other: _	(Specify)	9			
507.	7. When you first used (VARIETY ZZ) (N years ago), Distance from home in (km) what was the distance (km) between your home to where you acquired it?							
508.	. Why did you decide not to continue using (VARIETY ZZ) ? (Mark all that apply)							
	a.	Expensive to purchase the inputs]]		
	b.	Requires a lot of labor]]		
	c.	Don't like taste]]		
	d.	Not marketable]]		
	e.	Low yield]]		
	f.	Weather vulnerability]]		
	g.	Availability of alternative variety/Sw	ritched to	o another variety]]		
	h.	Problem of storage/Short storage d	uration]]		
	i.	Variety seeds not available			[]		
	j.	No reason/None]]		
	k.	Other]]		
509.	Do you p	lan to use (VARIETY ZZ) again in fu	uture?	Yes	I			
				No	2			

MOZAMBIQUE

Verbal Consent

INTRODUCTION

Hello. My name is ______ I work for **Kantar Public** a research company based here in Mozambique. You were asked by [------INSERT PERSON'S NAME WHO CALLED] from [**Kantar Public or NAME**] if it was okay for someone to come and interview you again this year about the study on improved agricultural technologies involving farmers like you who grow cassava and were interviewed last year. Thank you for agreeing to talk to me today. Is this a good time to talk?

Purpose of the study

I'm going to share more details about the purpose of the study. You can interrupt me with questions at any time. USAID supported partners to produce improved agricultural technologies to increase crop production in Mozambique. Kantar Public has been funded by Mendez England and Associates (ME&A) to conduct an assessment of these efforts. We are interviewing farmers who were identified and interviewed last year as CASSAVA farmers. We would like to know more about improved agricultural technologies in your community.

I am contacting you now to conduct an interview. The purpose of this interview will be to ask about your knowledge, experiences, perspectives, and use of improved agricultural technologies. The interview will take approximately 30-40 minutes to complete.

Before I ask you whether you agree to be interviewed, there are a few more things that you should know.

Participation in this study is voluntary. You may also choose not to answer a question for any reason but I hope that you can provide information that we will add to what you gave us last year to help develop better ways of developing and disseminating improved seeds and other agricultural technologies to more farmers. We are interested in knowing if you have used any improved seed varieties, participated in any of the related activities, and hear your thoughts and opinions about them. Again, we are not promising you any immediate benefit but your responses in this survey will go a long way to help improve work around seed production and dissemination by various partners in Mozambique. There are no right or wrong responses to the interview questions, and the answers you provide will be kept confidential. Honest answers to the questions will help us better understand what is happening and what people think, say, and do.

Do you have any questions for me? (If a question is asked, please answer before continuing).

Do you agree to participate in this interview?

Yes – continue

No - do not interview but provide survey manager contact information below

PHONE #:

QUESTIONNAIRE (CROP) TYPE: CASSAVA CODE

SECTION 0: FARMER IDENTI	FICATION						
FARMER NAME:							
In the past year, have you partici plots, field-day, attended a trainin	pated in any activities about impro g, or listened to radio or TV prog	oved (Cassava) varieties such as demonstration ram and then made inquiries to learn more?					
INTERVIEW INFORMATION							
DATE://		INTERVIEWER CODE:					
INTERVIEW START TIME:							
LANGUAGE OF QUESTIONNAIR	E:						
DATA QUALITY CHECK (If A	Applicable)						
SUPERVISOR	Accompanied by Supervisor	QC present					
NAME:	NAME:	NAME:					
DATE:	DATE:	DATE:					

	Section I: Farmer's Background Characteristics								
No.	Questions	and Filters	Coding Categories				Skip		
101.	Sex of farme	er	Male			I			
	(Mark one w	ithout asking)	Female			2			
102.	How old are	e you?	Age in completed years						
103.	What is the	highest level of formal	None		0				
	Country Spe	ecific Educational Levels.	Primary Incomplete		Ι				
	e.g., grade)		Primary Complete		2				
			Secondary Complete		3				
			Higher		4				
104.	Can you rea	d and understand a letter	In English/Portuguese		Ι				
	local languag	ge?	In local language ()		2				
			Both English/Portuguese and local (.)	3				
			Not at all		4				
105.	What is you	r marital status?	Never married		Ι				
			Informal/Living together		2				
			Married		3				
			Widowed		4				
			Separated		5				
			Divorced		6				
106.	How many p	people live in your househo	ld (including you and children)?						
	Total numbe	ar of people							
107.	How many r	males and females live in	Number of males						
	your househ	nold?							
			Number of females						
108.	In total, how	v many acres of	Farm size in acres						
	agricultural	and did your household							
	cultivate last	season?							
109.	Do you/you 6 months]	r household own the follow	ring? [items which have been functioning	g withi	n th	e last			
	a.	Radio?		Y		Ν			
	b.	Television?		Y		N			
	с.	Mobile phone?		Y		N			
110.	What was th	ne main source of your hou	sehold income last year?						
	a.	Salaried employment/Job		Ι					
	b.	Sale of crops		2					
	с.	Sale of livestock		3					
	d.	Petty trade		4					
	e.	Sale of labor		5					

	Section I:	Farmer's Background Characteristics				
	f.	Remittances	6			
	g.	Pension fund/Pension pay	7			
	h.	Other: Specify	8			
111.	Which crop	s were the main sources of your household income last year? (Ma	rk all th	at af	oply)	
	a.	None]]	
	b.	Maize]]	
	с.	Beans]]	
	d.	Irish potatoes]]	
	e.	Cassava]]	
	f.	Fruits]]	
	g.	Nuts]]	
	h.	Yams]]	
	i.	Vegetables]]	
	j.	Sorghum]]	
	k.	Other: Specify]]	
112.	Do you or any member of your household belong			Ι		lf 2 skip ->
	to any type	of groups or committees?	No	2		sec. 2
113.	What types (Mark all tha	of groups/committees do you or any member of your household l t apply) Probe for religious group when not mentioned	belong	to?		
	a.	Farmer-based organization]]	
	b.	Religious group]]	
	с.	Credit/Microfinance group (i.e., savings/merry-go-round)]]	
	d.	Mutual help/Insurance group (i.e., burial societies) group]]	
	e.	Trade and business association]]	
	f.	Livestock keeping groups]]	
	g.	Welfare group]]	
	h.	Social club]]	
	i.	Other: (Specify)]]	
	j.	None]]	

	Section 2: General Exposure to <u>ANY</u> Improved Seeds & Other Technologies									
Intervie	ewer No	otes: Now, I'd like to ask you about improved seeds and agricultural technolog	gies you are av	vare						
No.		Questions and Filters	Coding Ca	tegories	Skip					
201.	What	crops did you plant on your farm in last year-long rainy season? (Mark all that a	pply)	-						
	a.	Maize								
			I							
	D.	Beans	2							
	c.	Irish potatoes	3							
	d.	Cassava	4							
	e.	Fruits								
	f.	Nuts	5							
		Vana	6							
	g.	rams	7							
	h.	Vegetables	8							
	i.	Sorghum	9							
	j.	Other: Specify	10							
202.	Have y	ou ever heard of any improved agricultural technologies (i.e., improved seeds,	Yes	1						
	your a	r or farming techniques) used for crop production that are recommended for rea?	103	•						
	/		No	2						
203.	VVhat a used fo about -	are the different improved agricultural technologies (i.e., improved seeds, fertilize or crop production have you heard about? (Mark all that apply) [Probe by prompt ?].	r, or farming te ing: Have you l	chniques) heard						
	a.	Improved seed varieties]]						
	b.	Farm management practice]]						
	c.	Fertilizer applications]]						
	d.	Other agro-chemical use]]						
	e.	Improved post-harvest processing]]						
	f.	Improved post-harvest storage]]						
	g.	Other: Specify]]						
20.4				ala di Sil						
204.	For ea 203), v	cn of the improved agricultural technologies or farming practices you have heal vhen did you first heard about it?	ra about (cross	scheck with						

	Agri h. li i. F j. F	This Last Two Thre More	Inis season I Last season 2 Two years ago 3 Three years ago 4 More than 3 years ago 5 I 2 3 4 5 I 2 3 4 5 I 2 3 4 5 I 2 3 4 5 I 2 3 4 5 I 2 3 4 5								
	m. li	mproved post-harvest processing		2	3	4	5				
	n. C	Dther: Specify	1	2	3	4	5				
										<u> </u>	-
205.	technic <i>KUAPA</i>	the past three years, how have you h ques? (This list must include the specific r TV series in Mozambique.)	eard at adio or	OUT the TV show	ese imp /s or IC	roved T chani	agricultural nels that SST	technologies P is supporting	or farm g, e.g.,	ling	
	a. Demonstration]]	
	b. Agro-dealer								[]	
	c. Neighbor/relative							Ι]		
	d. Field days								[]	
	e. Community events to promote agricultural technologies]]	<u> </u>
	f.	Agricultural show							[]	
	g.	Government extension agent]]	
	h.	Village-based agent (VBA)							Ι]	1
	i.	TV show							Ι]	<u> </u>
	j.	Radio program]]	<u> </u>
	k.	ICT (SMS-based) services]]	
	I.	NGOs							I]	
	m.	Other: Specify							Ι]	
206.	Have y about	ou ever tried any of the improved agr for yourself on your farm?	icultura	al techno	ologies	you h	ave heard	Yes		I	
								No		2	
207.	Which apply)	improved agricultural technologies or [Probe by prompting: Did you use	r farmin —last ye	ig practi ar/seaso	ices dic n?]	l you u	se last year/	/season? (Mar	k all the	ıt	
	a.	Improved seed varieties							Ι]	
	b. Farm management practice []							<u> </u>			

с.		[]							
d.	Other agro-chemical use]]					
e.	Improved post-harvest processing]]					
f.	Improved post-harvest storage]]					
g.	Other:]]					
On last	now many acres of land did you grow (CROP XX) during year season? (Crosscheck with target crop in question 201).	any acres of land did you grow (CROP XX) during ason? (Crosscheck with target crop in question 201).								
Wha with	t was the reason for growing (CROP XX) last season? (Crosscheck target crop in question 111).									
a.	Food	I								
b.	Sale	2								
c.	Both food and sale	3								
d.	Other (Specify)	4								
Which	of the following agro-chemicals did you use in the last season? (Mark all that	apply)				Skip -				
a.	Herbicide			[]	-Sect.				
b.	Insecticide	[]	3						
c.	Fungicide	[]	-						
d.	Fertilizer			[]					
e.	None			[]	-				
f.	Other: (Specify)	[]	-						
What a technic	at are the main reasons for not having tried any improved agricultural technologies or farming niques? [Spontaneous response only. Mark all that apply]									
a.	No interest in trying something			[]					
b.	Unable to afford the technology	[]							
c.	Don't know where to get the technology	[]							
d.	Don't have enough/type of land			[]					
e.	Don't have enough labor			[]					
f.	Uncertain about market for outputs			[]	END				
g.	Don't know how (no knowledge)			[]					
h.	Technology is time-consuming			[]					
i.	Not farming (farmer not well)			[]					
j.	No difference in yield			[]					
	c. d. e. f. g. On f last y with a. b. c. d. e. f. Which a. b. c. d. e. f. What a techniq a. b. c. d. e. f. g. h. j.	c. Fertilizer applications d. Other agro-chemical use e. Improved post-harvest processing f. Improved post-harvest storage g. Other:	c. Fertilizer applications d. Other agro-chemical use e. Improved post-harvest processing f. Improved post-harvest storage g. Other:	c. Fertilizer applications d. Other agro-chemical use e. Improved post-harvest processing f. Improved post-harvest storage g. Other:	c. Fertilizer applications [d. Other agro-chemical use [e. Improved post-harvest processing [f. Improved post-harvest storage [g. Other:	c. Fertilizer applications [] d. Other agro-chemical use [] e. Improved post-harvest processing [] f. Improved post-harvest storage [] g. Other: [] On how many acres of land did you grow (CROP XX) during last year season? (Crosscheck with target crop in question 201). [] What was the reason for growing (CROP XX) last season? (Crosscheck with target crop in question 111). a. Food 1 a. Food 1				

k.	Unavailability of seed/agro-chemical	[]	
I.	Others Specify	[]	

Section 3: Certified Seed of Improved Varieties tried or tested										
Interv X) va	viewer Notes : Now, rieties that you have	I'd like to used or t	o ask you abo ried in your f	ut the Certif arm.	ied Seeds of	impr	oved (CROP			
No.	Questions and Filters		Coding Ca	ategories				Skip		
301.	 301. Have you ever tried and used any improved seed of (CROP X) (maize, cassava, beans, or Irish potatoes) varieties on your farm? (Some farmers may be growing improved seeds in a group/communal farm, e.g., in Tanzania) 302 Do you intend to use improved seed of (CROP X) 				Yes No	No2				
302.	Do you intend to use improved seed of (CROP X) Yes varieties on your farm in future? No						I 	END		
Interviewer Notes: Now, I am going to ask you about each of the improved (CROP X) varieties you have tried or used in your farm. I will ask you to indicate which of these varieties of (CROP X) were planted last season and this season, and which of these were tried but later abandoned (i.e., not planted last season). (Select each variety the farmer mentions spontaneously, probe and mark all that apply).303 303 305.303: Could you please name all the improved seed varieties of (CROP X) that you have ever used or tried?304: Was (Name Variety) planted (a) last year / (Yes=I/ No =2), (b). This year / season?305: Why have you not planted this variety la season and this season/year? (Abandoned)Variety 303PlantedPlanted					es you have ever blanted last ason). (<i>Select</i> this variety last andoned)					
	Name	Code	304a	304b	305			Code		
a.										
b.										
C.										
a.										
e.										
Т.										
g.										
h.										
i.										
i. j.										

Codes for 303 and 305

303 – Variety Name	Code	305 Reasons	Code
Chinhembwe	I	No interest in trying	I
Clone 170 (Galinha)	2	Unable to afford the seed variety	2
Clone 3	3	Don't know where to get the improved seed	3
Clone 4	4	Don't have enough/type of land	4
Colicanana	5	Don't have enough labor	5
Еуоре	6	Uncertain about market for outputs	6
Mokhalana	7	Unavailability of variety/Seeds are not readily available	7
Amarelinha	8	It doesn't last long (short storage time)	8
Orera	9	Low yield/Less harvest	9
Nzaiva	10	Other:	10
Liconde	11		
Natulo	12		
Nziva	13		
Okhumelela		-	
Varuiaya	1		

306.	Of all the improved seed varieties for (CROP X) you have ever used, which variety do you like the most (prefer) to grow in your farm? (Name ONLY ONE)	(Crosscheck with target variety in question 303)	
307.	Do you intend to use your preferred variety (<i>Name</i> of <i>Variety</i>) this season or next season?	Yes1 No2	lf, NO skip to - > Sect. 4
308.	Is your preferred variety XX easily accessible?	YesI No2	

Section 4: Technology Adoption – Use of Improved CROP X Varieties in Last Season								
Interv and an	view SST	er Notes: Now, I am going to ask you about (VARIETY YY – choose name of the Variety) that you have said you planted in last year season in your farm.	I st mentioned	Skip				
401.	Wh	en did you first use or try out (VARIETY YY)?						
			2					
		Three years ago	3					
		More than 3 years ago	4					
402.	Wh	en you first used the (VARIETY YY) (N years ago), how did you acquire it?						
		Purchased at full cost	1 1					
			1					
		Purchased at reduced cost	2					
		Got it for free	3					
		In-kind or any exchange	4					
403.	Wh	en you first used (VARIETY YY) (N years ago), from whom did you acquire it? (<i>M</i>	ark all that apply)					
	a.	Farmer-based organization	[]					
	b.	NGOs/AID distribution	[]					
	c.	Seed company	[]					
	d.	Agro-input dealer	[]					
	e.	Government extension agent	[]					
	f.	Village-based agent (VBA)	[]					
	g.	Other farmers or relative.	[]					
	h	Market trader	[]					
	i	Other: (Specify)	[]					
404.	Wh qua pack conv	en you first used (VARIETY YY) (N years ago), what was the ntity of seed did you use? (Note : In most cases, the seed is supplied in kets of a known weight. Check seed packet sizes that are sold locally and tert their weight to kilograms).						
405.	Wh	en you first used (VARIETY YY) (N years ago), what was the distance (km) betwee	en your home to wi	here				
	you		ine nome villagertowi	"				
	Dist	ance from home in (km)						
406.	Ηον	v did you first learn about (VARIETY YY)? (Mark all that apply)						
	a.	Farmer-managed demonstration.	[]					
	b.	Seed company/project-managed demo	[]					
	c.	Agro-dealer	[]					
	d.	Neighbor/relative	[]					
	e.	Field days	[]					
	f.	Community events to promote agricultural technologies	[]					
	g.	Agricultural show	[]					
	h.	Government extension agent	[]					

Secti	on 4:	Technology Adoption – Use of Improved CROP X Varieties in	n Last Seaso	on					
	i.	Village-based agent]]				
	j.	Farmer training course		[]				
	k.	Radio program	[]					
	I.	TV program]						
	m.	ICT (SMS)]]				
	n.	Market trader [
	0.	o. NGOs [
	р.	Other: Specify		[]				
407.	Wh the farn	at was the main motivation (source of information) that persuaded you first time? [Spontaneous response, indicate one answer only—that which was her to plant this variety]	u to plant VAI s most importai	RIETY Y nt in persu	Y for ading				
	Farmer-managed demonstration								
		Seed company/project-managed demo				2			
		Agro-dealer				3			
		Neighbor/relative				4			
	Field days								
	Community events to promote agricultural technologies								
	Agricultural show								
	Government extension agent								
	Village-based agent (VBA)								
		ICT (SMS) messages				10			
		Radio program				11			
		TV program				12			
		Market trader				13			
		No particular motivation				14			
		Other: Specify				15			
408.	Wh plar	at is the size of the farm plot (in acres) where (VARIETY YY) was ited last season?	Plot size in acres						
409.	Wh seas	at quantity of seeds of (VARIETY YY) did you plant last year son?	Quantity in (kilograms)						
410.	Wh that	at was the source of the seed of (VARIETY YY) that you planted last <i>apply)</i>	year season? (Probe: Ma	ırk all				
	a.	Self-saved seed]]				
	b.	Farmer-based organization]]				
	с.	. NGOs/AID distribution []							
	d.	Agro-input dealer]]				
	e.	Government extension officer		[]				
	f.	Village-based agent (VBA)		[]				
	g.	Other farmers or relative]]				

Secti	on 4	: Technology Adoption – Use of Improved CROP X Varieties ir	n Last Seaso	n					
	h.	Purchased in market		[]				
	i.	Seed company]]				
	j.	Can't remember]]				
	k.	Other: Specify]]				
411.	Wł	nen you acquired the seed of (VARIETY YY) last season, what was the	distance						
	(kn	eed was							
	acq	un eu/received within the nome vinage/towny							
412	Distance from home in (km)								
412.	response only. Do not read. Mark all that apply.]								
	a.	Increased yield with this variety		[]				
	b.	More income from crop sales of this variety		[]				
	с.	[]						
	d.		[]					
	e.	Reduced fuel used in cooking this variety]]					
	f.	Last longer storage	[]					
	g. High market demand								
	h. Quick harvesting time]				
	i. :	No benefit		<u>[</u>	<u>]</u>				
	J	Other: (specify)		L	J				
413.	Do	you intend to use this (VARIETY YY) again next season? (If No,	Yes						
	ma		No	2	-				
414.	Sin	ce you started using (VARIETY YY). have you changed any of the	Yes	-					
	farr	n management practices because of the technology's characteristics or							
	req	uirements?	No	2					
415.	Wł	ny have you decided not to continue using (VARIETY YY) next season	? (Mark all that	: apply)					
	a.	Expensive to purchase the inputs		[]				
	b.	Requires a lot of labor]]				
	c.	Don't like taste		[]				
	d.	Not marketable]]				
	e.	Inadequate storage facility		[]				
	f.	Poor crop yields		[]				
	g.	Short storage duration		[]				
	h.	Switched to another variety		[]				
	i.	Switched to other crop]]				
	j.	None		[]				
k. Other: (Specify)									

Secti	on 4: Technology Adoption – Use of Improved CROP X Varieties in Last Seaso	n	
	Interviewer text : I am now going to read a few statements about your perceptions of th YY). I am interested in the extent to which you agree or disagree with each statement. A each statement, please indicate whether you strongly disagree with the statement, you dis statement, you are neutral about the statement, you agree with the statement or you strong the statement.	he (VARIETY fter I have read agree with the ongly agree with	
416.	I like using (VARIETY YY) in my farm.		
	Strongly disagree	I	
	Disagree	2	
	Neutral	3	
	Agree	4	
	Strongly agree	5	
417	I would recommend (VARIETY YY) to other farmers or relatives.		
	Strongly disagree	I	
	Disagree	2	
	Neutral	3	
	Agree	4	
	Strongly agree	5	
418	I intend to use (VARIETY YY) again in future.		
	Strongly disagree	I	
	Disagree	2	
	Neutral	3	
	Agree	4	
	Strongly agree	5	

Section 5: Tried and Discontinued Seed Variety Interviewer Notes: Now, I'd like to ask you about (VARIETY ZZ) that you have tried but then Skip abandoned or discontinued. When did you first use or try out (VARIETY ZZ)? 501. If 304a is No and 304b is No, then return variety as abandoned to 501 Last season Т Two years ago 2 3 Three years ago More than 3 years ago 4

502.	. What was the main motivation (source of information) that persuaded you to plant this variety for									
	the first time? [Spontaneous resp	onse, Indi	cate one answer only—that which	was most ir	nportant	in				
	persuading farmer to plant variety	/]								
	Farmer-managed demo	onstration		I						
	Seed company/project	2								
	Agro-dealer	3								
	Neighbor/relative	4								
	Field days									
	Community events to	promote	agricultural technologies	6						
	Agricultural show			7						
	Government extensio	n agent		8						
	Village-based agent	Village-based agent								
	Farmer training course	Farmer training course								
	Radio program	Radio program								
	TV program			12						
	ICT (SMS)			13						
	Other:			14						
503.	For how many seasons or years o	Number of seasons								
504.	When you first used (VARIETY	ZZ) (N	ZZ) (N Purchased at full cost Purchased at reduced cost/subsidy		I					
	years ago), now did you acquire i				2					
		Got it for free			3					
			In-kind or exchange		4					
505.	When you first used (VARIETY years ago), what was the quantity that you acquired?	ZZ) (N of seed	Quantity in (kilograms)							
506.	When you first used	Farmer-	based organization		1					
	(VARIETY ZZ) (N years ago),	NGOs/A	AID distribution		2					
	nom whom did you acquire it:	Seed cor	mpany		3					
		Agro-ing	out dealer		4					
		Government extension officer			5					
		Village-based agent			6					
		Other fa	rmers or relative		7					
		Market t	rader		8					
		Other:	(Specify	y)	9					

507.	When years a betwe acquire	you first used (VARIETY ZZ) (N ago), what was the distance (km) en your home to where you ed it?			
508.	Why c	did you decide not to continue using (VARIETY ZZ) ? (Mark all that apply)			
	a.	Expensive to purchase the inputs	[]	
	b.	Requires a lot of labor	[]	
	c.	Don't like taste	[]	
	d.	Not marketable	[]	
	e.	Low yield	[]	
	f.	Weather vulnerability	[]	
	g.	Availability of alternative variety	[]	
	h.	Problem of storage/Short storage duration	[]	
	i.	Switched to another variety	[]	
	j.	Variety not available	[]	
	k.	None	[]	
	I.	Other	[]	
509.	Do yo again i	u plan to use (VARIETY ZZ) Yes n future?	I		
		No	2		

TANZANIA

Verbal Consent

INTRODUCTION

Hello. My name is _____I work for **Kantar Public** a research company based here in Tanzania. You were asked by [-----INSERT PERSON'S NAME WHO CALLED] from [**Kantar Public or NAME**] if it was okay for someone to come and interview you again this year about the study on improved agricultural technologies involving farmers like you who grow maize and were interviewed last year. Thank you for agreeing to talk to me today. Is this a good time to talk?

Purpose of the study

I'm going to share more details about the purpose of the study. You can interrupt me with questions at any time. USAID supported partners to produce improved agricultural technologies to increase crop production in Ghana. Kantar Public has been funded by Mendez England and Associates (ME&A) to conduct an assessment of these efforts. We are interviewing farmers who were identified and interviewed last year as MAIZE farmers. We would like to know more about improved agricultural technologies in your community.

I am contacting you now to conduct an interview. The purpose of this interview will be to ask about your knowledge, experiences, perspectives, and use of improved agricultural technologies. The interview will take approximately 30-40 minutes to complete.

Before I ask you whether you agree to be interviewed, there are a few more things that you should know:

Participation in this study is voluntary. You may also choose not to answer a question for any reason but I hope that you can provide information that we will add to what you gave us last year to help develop better ways of developing and disseminating improved seeds and other agricultural technologies to more farmers. We are interested in knowing if you have used the any improved seed varieties, participated in any of the related activities, and hear your thoughts and opinions about them. Again, we are not promising you any immediate benefit but your responses in this survey will go a long way to help improve work around seed production and dissemination by various partners in Ghana. There are no right or wrong responses to the interview questions, and the answers you provide will be kept confidential. Honest answers to the questions will help us better understand what is happening and what people think, say, and do.

Do you have any questions for me? (If a question is asked, please answer before continuing).

Do you agree to participate in this interview?

Yes – continue

No - do not interview but provide survey manager contact information below

QUESTIONNAIRE (CROP) TYPE: Tanzania CODE

SECTION 0: FARMER IDENTI	FICATION							
FARMER NAME: Phone Number: House Number/Address: FARMER ID (Unique Study ID): Farmer Status: I. Direct Beneficiary 2. Indirect Beneficiary		 						
INTERVIEW INFORMATION								
DATE://								
INTERVIEW START TIME:								
LANGUAGE OF QUESTIONNAIR	E:							
DATA QUALITY CHECK (If A	pplicable)							
SUPERVISOR	Accompanied by Supervisor	QC present						
NAME:	NAME:	NAME:						
DATE:	DATE:	DATE:						

	Section I: Farmer's Background Characteristics								
No.	Questions a	nd Filters	Coding Categories			Skip			
101.	Sex of farmer		Male	1					
	(Mark one with	out asking)	Female	2					
102.	How old are y	vou?	Age in completed years						
103.	What is the hi	ghest level of formal	None	0					
	education you (List Country	have completed? Specific Educational	Primary Incomplete						
	Levels, e.g., grade)		Primary Complete	2					
			Secondary Complete	3					
			Higher	4					
104.	Can you read	and understand a	In English	I					
	English or loca	al language?	In local language (Swahili)	2					
			Both English and local (Swahili)	3					
			Not at all	4					
105.	What is your	marital status?	Never married	I					
			Informal/Living together	2					
			Married	3					
			Widowed	4					
			Separated	5					
			Divorced	6					
106.	How many pe	ople live in your hous	ehold (including you and children)?						
	Total number	of people							
107.	How many ma	ales and females live	Number of males	1					
	in your housel	hold?	Number of females						
				<u> </u>					
108.	In total, how r	nany acres of ad did your	Farm size in acres						
	household cult	tivate last season?							
109.	Do you/your l	nousehold own the fo	llowing?						
	Litems which h	have been functioning	within the last 6 months]						
	a.	Radio?		ř		N			
	b.	l elevision?		Ý		N			
	с.	Mobile phone?		Y		N			
110.	What was the	main source of your	household income last year?						
	a.	Salaried employment	t/Job						
	b.	Sale of crops		2					
	с.	Sale of livestock		3					
	d.	Petty trade		4					
	e.	Sale of labor		5					
	f.	Remittances		6					
	g.	Masonry/Art crafts		7					

	Section I: Fa	armer's Background Characteristics				
	h.	Sale of trees products	8			1
	i.	Other: Specify	9			
111.	Which crops	were the main sources of your household income last year? (Mark all	that appl	y)		
	a.	None]]	
	b.	Maize	[]	
	с.	Beans	[]	
	d.	Irish potatoes	[]	
	e.	Cassava]]	
	f.	Fruits]]	
	g.	Spices]]	
	h.	Other: Specify]]	
112.	Do you or any	Yes	Ι		If 2	
	or committee	s?	No	2		skip -
						2
113.	What types of all that apply)	f groups/committees do you or any member of your household belon	g to? (Ma	rk		
	a.	Farmer-based organization]]	
	b.	Religious group]]	
	с.	Credit/Microfinance group (i.e., savings/merry-go-round)]]	
	d.	Mutual help/Insurance group (i.e., burial societies)	[]	
	e.	Trade and business association	[]	
	f.	Livestock keeping groups	[]	1
	g.	Welfare group]]	1
	h.	Social club]]	1
	i.	Other: Specify]]	1

	Section 2: General Exposure to <u>ANY</u> Improved Seeds & Other Agricultural Technologies										
	Interviewer Notes: Now, I'd like to ask you about improved seeds and other agricultural technology										
	you ar	e aware about in your area.				<u> </u>		•			
No.		Questions and Filters				Codii	Sкip				
201.	What	crops did you plant on your farm in last lon	g rainy	season?	(Select	all tha	it apply)				
		Maize					1				
		Beans					2				
		Irish potatoes			3						
		Cassava			4						
		Fruits			5						
		Spices		6							
		Other:					7				
202.	Have y	you ever heard of any improved agricultural	techno	ologies (i.	e., are	Yes	1				
	recom	imended for your area?	JIOGUC			No	2				
203.	vvnat practic all that	are the different improved agricultural tech es) used for crop production have you hear t apply]	nologie d abou	es (i.e., see t? [Sponte	eds, feri aneous	tilizer, (respon	or farmin ses only.	g Mark			
	a.	Improved seed varieties					[]			
	b.	Farm management practice					[]			
	C.	Fertilizer applications					Ι]			
	d.	Other agro-chemical use					[]	-		
	e.	Improved post-harvest processing					[]	-		
	t.	Improved post-harvest storage					l]	-		
	g.	Other: Specify					L	J			
204.	For ea (crosso	ch of the improved agricultural technologie: heck with 203), indicate when you first hear	s or far d abou This s	ming pra t it?	ctices	you ha	ve hear	d about			
	Agricultural Technologies			This season1Last season2Two years ago3Three years ago4More than 3 years ago5							
	a.	mproved seed varieties	Ι	2	3	4	5				
	b. I	arm management practice		2	3	4	5				
	c. Fertilizer applications I 2 3						5				
	d. (Jtner agro-chemical use		2	د د	4	5				
	e. I	mproved post-marvest processing	1	Z	3	4	5				
	f. I	mproved post-harvest storage		2	3	4	5				
	g. (Uther: Specify	3	4	5						

205.	Within the past three years, how have you heard about these improved agricultural technologies or											
	farmi	ning practices? (This list must include the specific radio or TV shows or ICT channels that SSTP is supporting, KLIAPA TV series in Ghana)										
	C.g., N				<u>г т</u>			7				
	а.	Demonstration					L	J				
	b.	Agro-dealer]]				
	с.	Neighbor/relative]]				
	d.	Field days]]				
	e.	Community events to promote agricult	Community events to promote agricultural technologies									
	f.	Agricultural show]]				
	g.	Government extension agent]]				
	h.	Village-based agent (VBA)]]								
	i.	TV show]]				
	j.	Radio program]]				
	k.	ICT (SMS) services]]				
	I.	NGOs]]				
	m.	Other: Specify]]				
206.	Have	1		If No ->								
	nave	neard about for yoursen on your farm:	2		Q211							
207	\\//bic	h improved agricultural technologies or	forming	Dractico								
207.	(Mark	all that apply)	iai iiiiig	practice	is ala you	use last s	eason:					
	a.	Improved seed varieties]]				
	b.	Farm management practice]]				
	с.	Fertilizer applications]]				
	d.	Other agro-chemical use]]				
	e.	Improved post-harvest processing]]				
	f.	Improved post-harvest storage]]				
	g.	Other:]]				
208.	On ho (Crossc	w many acres of land did you grow (CR heck with target crop in question 201).	ΟΡ ΧΧ	() during	g last seas	on?						
209.	What	was the reason for growing (CROP XX	() last se	ason?								
	a.	Food						I				
	b.	Sale						2				
	c.	Both food and sale						3				
	d.	Other (Specify)		4								

210.	Which	ply)	Skip>Sect.						
	a.	Herbicide	Ι]		3			
	b.	Insecticide	Ι]					
	C.	Fungicide	[]					
	d.	Fertilizer]]					
	e.	None	[]					
	f.	Other:(Specify)]]					
211.	What are the main reasons for not having tried any improved agricultural technologies? [Spontaneous response only. Mark all that apply.]								
	a.	No interest in trying something]]				
	b.	Unable to afford the technology]]					
	C.	Don't know where to get the technology	re to get the technology						
	d.	Don't have enough/type of land		[]				
	e.	Don't have enough labor]						
	f.	Uncertain about market for outputs		[]	END			
	g.	Don't know how (no knowledge)]]				
	h.	Technology is time-consuming		[]				
	i.	[]						
	j. No difference in yield [
	k.	Unavailability of seed/agro-chemical]]				
	Ι.	Others]]				

Section 3: Ce	rtified Seed of Improved	Varieties	Tried or Tested					
Interviewer N	lotes: Now, I'd like to ask yo	ou about th	e Certified Seeds of	imp	proved (CROP X) varieties that ye	ou have		
ever used or tr	ied in your farm.	In your farm. Questions and Filters						
301	Have you ever tried and use	d any impr	oved seed varieties (of		JKIP If Yes		
501.	(CROP X) (maize, cassava.	beans. or l	lrish potatoes) on	51	103	skip to ->		
	your farm?				No2	303		
	(Some farmers may be growing	g improved :	seeds in a					
	group/communal farm, e.g., in	Tanzania)						
302.	Do you intend to use impro	you intend to use improved seed of (YesI	END		
	varieties on your farm in fut	ure?			No2			
		le vou ale co	t and afthe instance	بر م،				
Interviewer f	NOLES: INOW, I am going to as	к you abou indicata wh	ic each of the improv	rea	Seeu varieties of (CRUP X) you have	ve ever		
which of these	were tried but later abandon	ed (i.e. not	Dianted last season)		Select each variety the farmer mentions	n, and		
spontaneously, p	robe and mark all that apply).	ed (i.e., not	planeed lase season)	. (5	selece each valley are failler mendons			
303305. 303 : Could you please name all			304 : Was	30	05 : Why have you not planted this va	riety last		
	the improved seed variet	ies of	(Variety NAME)	season?				
	(CROP X) that you have	e ever	planted last					
	used or tried?		season (Yes=1/					
			No =2), if no go					
	Variety 303		to next variety		Reasons			
	Name	Code	304		305	Code		
a.						0000		
b.								
с.								
d.								
е.								
f.								
g.								
h.								
i.								

Section 3: Certified Seed of Improved Varieties Tried or Tested

305 Reasons	Code	305 Reason	Code	
No interest in trying something	I	Unavailability of variety/Seeds are not readily available	7	
Unable to afford the technology	2	It doesn't last long (short storage time)	8	
Don't know where to get the improved seed	3	Low yield/Less harvest	9	
Don't have enough/type of land	4	Other:	10	
Don't have enough/type of land	5			
Don't have enough labor	6			
Uncertain about market for outputs	7			

Codes for Variety - 303

Maize		Beans	Irish Potatoes		
Type of Variety	Code	Type of Variety	Code	Type of Variety	Code
Chapa pundamilia	1	Beans NJANO UYOLE	31	Arika	61
DK31	2	Brown Soybeans	32	Baraka	62
DK8031	3	Bukoba	33	CIAP	63
DK8053	4	Bwana shamba	34	CIP	64
DK80538053	5	Bwana shamba nyekundu	35	Kala	65
Dk9089	6	Calima Uyole	36	Kidinya	66
HB3253	7	JESCA	37	MERU	67
Kitale H513	8	Kichumba	38	Obama	68
Kitale H614	9	Kombati	39	Potatoes ASANTE	69
Kitale H625	10	LYAMONGO	40	SHEREKEA	70
Meru HB 515 - Nyati	11	Pundamilia	41		71
PAN15	12	Purple soybeans	42		72
PAN691	13	Red Soybeans	43		73
Pioneer P2859W	14	Soya njano	44		74
Pioneer PHB3253	15	Soya brown	45		75
Seedco SC403	16	Soya kijivu	46		76
Seedco SC407	17	Soya ndefu	47		77
Seedco SC513	18	Soya nyekundu	48		78
Seedco SC627	19	Soya nyeupe	49		79
Seedco SC709	20	Soya purple	50		80
Situka MI	21	Soybeans	51		81

Maize			Beans		Irish Potatoes		
Type of Variety Code		Type of Variety	Code	Type of Variety	Code		
Stuka		22	White Soybeans	52		82	
TMV I-2		23	Yellow soybeans	53		83	
Zamseed		24	Zebra/Jesca	54		84	
Zamseed ZMS606 25			55		85		
ZMS604	ZMS604 26			56		86	
		27		57		87	
		28		58		88	
		29		59		89	
		30		60		90	
306.	Of all the ir used last se (prefer) to (Name of fa	nproved s eason, whic grow in yc	eed varieties for (CROP X) you ch variety do you like the most our farm? rred Seed Variety ONLY)				
307.	Do you intend to use your preferred variety (<i>Name of Variety</i>) this season or next season?			Yes No	1 2	lf, N sk to Se 4	
308.	ls your pret	ferred vari	ety XX easily accessible?	Yes No	I 2		

Sectio	n 4: Technology Adoption – Use of Improved CROP X Varieties in La	ast Season					
Interviewer Note: Now, I am going to ask you about (VARIETY YY – choose name of the I st							
mentioned and an SSTP Variety) that you have said you planted in last season in your farm.							
401.	When did you first use or try out (VARIETY YY)?						
	Last season	I					
	Two years ago	2					
	Three years ago	3					
	More than 3 years ago	4					
402.	When you first used the (VARIETY YY) (N years ago), how did you acquire it?						
	Purchased at full cost	I					
	Purchased at reduced cost	2					
	Got it for free	3					
	In-kind or any exchange	4					
403.	When you first used (VARIETY YY) (N years ago), from whom did you acquire it?						
	(Mark all that apply)						
	a. Farmer-based organization	[]					
	b. NGOs/AID distribution	[]					

Section 4: Technology Adoption – Use of Improved CROP X Varieties in Last Season						
	c.	Seed company		[]	
	d.	Agro-input dealerGovernment extension agent]	
	e.]	
	f. Village-based agent (VBA)g. Other farmers or relativeh. Market trader			[]	
				[]	
				[]	
	i.	Other: (Specify)		[]	
404.	Wh was seec size	When you first used (VARIETY YY) (N years ago), what was the quantity of seed did you use? (Note : In most cases, the seed is supplied in packets of a known weight. Check seed packet sizes that are sold locally and convert their weight to kilograms).				
405.	When you first used (VARIETY YY) (N years ago), what was the distance (km) between your home to where you acquired it? (Indicate in zero kilometers (00 km) if the seed was acquired/received within the home village/town) Distance from home in (km)					

406.	How	did you first learn about (VARIETY YY)? (Mark all that apply)				
	a.	Farmer-managed demonstration	[]		
	b.	Seed company/project-managed demo []				
	с.	Agro-dealer	[]		
	d.	. Neighbor/relative []				
	e.	e. Field days []				
	f.	f. Community events to promote agricultural technologies []				
	g.	g. Agricultural show []				
	h	h Government extension agent []				
	i.	. Village-based agent []				
	j.	Farmer training course [
	k.	. Radio program []				
	I.	TV program []				
	m.	ICT (SMS)	[]		
	n.	Market trader	[]		
	0.	Cooperative society	[]		
	р.	Other: Specify	[]		
407.	What was the main motivation (source of information) that persuaded you to plant (VARIETY YY) for the first time? [Spontaneous response, indicate one answer only – that which was most important in persuading farmer to plant this variety]					
		Farmer-managed demonstration	I			
		Seed company/project-managed demo	2			
		Agro-dealer	3			
		Neighbor/relative	4			
		Field days	5			

		Community events to promote agricultural technologies	6				
		Agricultural show	7				
		Government extension agent	8				
		Village-based agent (VBA)	9				
		Farmer training course		10			
		Radio program	11				
		TV program	12				
		ІСТ	13				
		Other: Specify	14				
408.	Wha was	t is the size of the farm plot (in acres) where (VARIETY YY) planted last season?	Plot size in acres				
409.	Wha seaso	Vhat quantity of seeds of (VARIETY YY) did you plant last Quantity in cason? (kilograms)					
410.	Wha (Prob	t was the source of the seed of (VARIETY YY) that you plante e: Mark all that apply)	d last season?				
	a.	Self-saved seed	[]				
	b.	Farmer-based organization	[]				
	с.	NGOs/AID distribution	[]				
	d.	Agro-input dealer	[]				
	e.	Government extension officer	[]				
	f.	Village-based agent (VBA)	[]				
	g.	Other farmers or relative	[]				
	h.	Purchased in market	[]				
	i.	Seed company	[]				
	h.	Can't remember	[]				
	k.	Other: Specify	[]				
411.	When you acquired the seed of (VARIETY YY) last season, what was the distance (km) between your home to where you acquired it? (Indicate 00 km if the seed was acquired/received within the home village/town)						
412.	Wha YY) <i>apply</i>	t benefits have you experienced in your household from using th ? [Spontaneous response only. Do not read out loud the list of respons .]					
	a.	Increased yield with this variety	[]				
	b.	More income from crop sales of this variety	[]				
	с.	Reduced labor demands from this variety	[]				
	d.	Better tasting food products from this variety	[]				
	e.	Reduced fuel used in cooking this variety	[]				
	f.	Lasts longer in storage	[]				
------	----------------	---	-----	---			
	g.	High market demand	[]				
	h.	Quick harvesting time	[]				
	i.	No benefit.	[]				
	j.	Other: (Specify)	[]				
413.	Do y No, n	ou intend to use this (VARIETY YY) again next season? (If nake sure you complete Q415)	Yes	I			
			No	2			
414.	Since the f	e you started using (VARIETY YY), have you changed any of arm management practices because of the technology's	Yes	I			
	chara	acteristics or requirements?	No	2			

415.	Why hav	ve you decideo	d not to continue using (VARIETY YY) next season? (Mark all that ap	bly)						
	a. Ex	[]								
	b. Re	equires a lot c	of labor	[]						
	c. D	on't like taste	aste							
	d. N	lot marketable	2	[]						
	e. In	[]								
	f. Po	oor crop yield	ls	[]						
	g. Sł	nort storage d	luration	[]						
	h. A	ternative variety/Switched to another variety	[]							
	i. Sv	Switched to other crops.								
	j. No reason/none									
	k. O	other:	(Specify)	[]						
	After I h you disag	ave read each gree with the ngly agree wit	n interested in the extent to which you agree or disagree with each star statement, please indicate whether you strongly disagree with the stat statement, you are neutral about the statement, you agree with the sta ch the statement.	ement. ement, tement or						
416.	l like usi	ng	Strongly disagree	I						
	my farm.	. 	Disagree	2						
	,		Neutral	3						
			Agree	4						
			Strongly agree	5						
417	I would i	recommend	Strongly disagree	I						
	other far	TYYY) to	Disagree	2						
	relatives		Neutral	3						
			Agree	4						
			Strongly agree	5						
418			Strongly disagree	I						

	l intend to use	Disagree		2	
	(VARIETY YY)	Neutral		3	
	again in future?	Agree		4	
	S	trongly agree		5	
Secti	on 5: Tried and Discontir	nued Seed Variety			
Inter	viewer Notes: Now, I'd lik	e to ask you about (VARIETY ZZ) that you have tried but then	abandoned	Skip	
or dis	continued.			•p	
501.	When did you first use or	try out (VARIETY ZZ)?			
	Last season		I		
	Two years ago		2		
	Three years ago		3		
	More than 3 years	ago	4		
502.	What was the main motiva	tion (source of information) that persuaded you to plant this variet	y for the	1	
	first time? [Spontaneous re	esponse, Indicate one answer only—that which was most importa	nt in		
	Farmer managed domonst		1 1		
	Tarmer-managed demonstr				
	Seed company/project-mar	naged demo	2		
	Agro-dealer		3		
	Neighbor/relative 4				
	Field days 5				
	Community events to pror	note agricultural technologies	6		
	Agricultural show		7		
	Government extension age	ent	8		
	Village-based agent		9		
	Farmer training course		10		
	Radio program				
	TV program		12		
	ICT		13		
	Other:		14		
503.	For how many seasons or years did you use	Number of seasons			
504.	When you first used	Purchased at full cost			
	(VARIETY ZZ) (N years ago), how did you acquire	Purchased at reduced cost/subsidy	2		
	it?	Got it for free	3	+	
1		In-kind or exchange	4	<u> </u>	
505	When you first used (VAE	RIFTY 77) (N years ago) what was the quantity of seed that		<u> </u>	
505.	you acquired?	The Trans ago , what was the quality of seed that			
	Quantity in (kilograms)				

506.	When you first used	Farmer-based organization	I	
	(VARIETY ZZ) (N years ago), from whom	NGOs/AID distribution	2	
	did you acquire it?	Seed company	3	
		Agro-input dealer	4	<u> </u>
		Government extension officer	5	
		Village-based agent	6	
		Other farmers or relative	7	
		Market trader	8	
		Other: (Specify)	9	
507.	When you first used (VARIETY ZZ) (N	Distance from home in (km)		
	years ago), what was the			
	distance (km) between			
	acquired it?			
508.	Why did you decide not to	continue using (VARIETY ZZ)? (Mark all that apply)		
	a. Expensive to purchase	e the inputs]]
	b. Requires a lot of labor	-]]
	c. Don't like taste]]
	d. Not marketable]]
	e. Low yield]]
	f. Weather vulnerability]]
	g. Availability of alternat	ive variety/Switched to another variety]]
	h. Problem of storage/sh	ort storage duration]]
	i. Variety seeds not avai	lable]]
	j. No reason/none]]
	k. Other (S	pecify)]]
509.	Do you plan to use	Yes	1	
	future?	No	2	

ANNEX 4: ADDITIONAL DATA TABLES

Table A.I. Overall Percentage of Beneficiary Farmers Who Have Adopted or Applied SSTP-Promoted by Beneficiary Status

Adoption Types		Direct Ben	eficiaries	Indirect Be	neficiaries	All Countries	
		Wave I	Wave II	Wave I	Wave II	Wave I	Wave II
Pro SSTP Adoptors	N	1,018	839	446	332	I,464	1,171
Fre-SSTF Adopters	%	46.9	41.6	20.4	25.9	27.4	35.5
	N	619	742	195	260	814	1,002
SSTP Adopters	%	28.5	36.8	20.5	20.3	33.5	30.4
Non Adoptors	N	535	435	926	691	1,461	1,126
Non-Adopters	%	24.6	21.6	59.1	53.9	39.1	34.1
Total	N	2,172	2,016	I,567	1,283	3,739	3,299

Table A.2. Tanzania Wave II - Main Motivating Factors That Persuaded Farmers to First Plant the SSTP-Promoted Improved Variety by Sex

Motivating Easters	Se	Total		
Motivating Factors		Male	Female	TOLAI
Farmer-Managed Demonstration		121	89	210
		57.6	42.4	100.0
Sand Company/Project Managed Domo	Ν	22	4	26
Seed Company/Project-Managed Demo	%	84.6	15.4	100.0
Agra Daalar	Ν	97	42	139
Agro-Dealer	%	69.8	30.2	100.0
Naishhan/Dalatina		416	227	643
Theighbol/Relative	%	64.7	35.3	100.0
Field Days		16	7	23
		69.6	30.4	100.0
Community Events to Promote	Ν	40	19	59
Agricultural Technologies	%	67.8	32.2	100.0
		6	I	7
Agricultural show	%	85.7	14.3	100.0
Covernment Evitancian Acont	Ν	51	23	74
Government Extension Agent	%	68.9	31.1	100.0
	Ν	13	0	13
VBA	%	100.0	0.0	100.0
Former Training Course	Ν	9	2	11
Tarmer Training Course	%	81.8	18.2	100.0
Padia Program	Ν	8	4	12
	%	66.7	33.3	100.0
Other	Ν	I	3	4
	%	25.0	75.0	100.0
Total	Ν	800	421	1,221
lotai	%	65.5	34.5	100.0

Pearson Chi-Square 0.012* * p<0.05; ** p<0.01; *** p<0.001

Table A.3. Tanzania Wave II – Main Motivating Factors That Persuaded Farmers to First Plant the SSTP-Promoted Improved Variety by Poverty

		Poverty Level							
Motivating Factors		Poor	Less	Middle	Better	Highest	Total		
		FOOr	Poor	Level	Off	Income			
Farmer-Managed	Ν	27	23	58	76	26	210		
Demonstration	%	12.9	11.0	27.6	36.2	12.4	100.0		
Seed Company/Project-	N	-	4	8	8	5	26		
Managed Demo	%	3.8	15.4	30.8	30.8	19.2	100.0		
Agro Doolor	N	33	24	32	36	14	139		
Agro-Dealer	%	23.7	17.3	23.0	25.9	10.1	100.0		
Naighbor/Palativa	Ν	119	111	169	191	53	643		
Neighbol/Relative	%	18.5	17.3	26.3	29.7	8.2	100.0		
Field Dave	N	8	I	5	8	I	23		
Field Days	%	34.8	4.3	21.7	34.8	4.3	100.0		
Community Events to Promote	Ν	6	4	19	22	8	59		
Agricultural Technologies	%	10.2	6.8	32.2	37.3	13.6	100.0		
Agricultural Show	N	0	0	2	3	2	7		
Agricultural Show	%	0.0	0.0	28.6	42.9	28.6	100.0		
Covernment Extension Agent	N	9	5	22	28	10	74		
Government Extension Agent	%	12.2	6.8	29.7	37.8	13.5	100.0		
VBA	N	2	3	3	5	0	13		
*BA	%	15.4	23.1	23.1	38.5	0.0	100.0		
Former Training Course	N	2	0	3	5	I	11		
Tarmer Training Course	%	18.2	0.0	27.3	45.5	9.1	100.0		
Padia Program	N	0	I	2	8	I	12		
Radio Frogram	%	0.0	8.3	16.7	66.7	8.3	100.0		
Other	N	0	0	2	I	I	4		
	%	0.0	0.0	50.0	25.0	25.0	100.0		
Tatal	Ν	207	176	325	391	122	1,221		
i Utai	%	17.0	14.4	26.6	32.0	10.0	100.0		

Pearson Chi-Square 0.024* * p<0.05; ** p<0.01; *** p<0.00

Table A.4. Tanzania Wave II – Main Motivating Factors That Persuaded Farmers to First Plant the SSTP-Promoted Improved Variety by Social Marginalization

		Marginalization Level							
Motivating Factors		Very Marginalized	Marginalized	Less Marginalized	Not Marginalized	Total			
Farmer-Managed	Ν	7	14	79	110	210			
Demonstration	%	3.3	6.7	37.6	52.4	100.0			
Seed Company/Project-	Ν	0	0	12	14	26			
Managed Demo	%	0.0	0.0	46.2	53.8	100.0			
Agro Doalor	Ν	3	4	68	64	139			
	%	2.2	2.9	48.9	46.0	100.0			
Noighbor/Rolativo	Ν	32	27	324	260	643			
Theighbol / Relative	%	5.0	4.2	50.4	40.4	100.0			
E. 11 D.		I	2	16	4	23			
Field Days	%	4.3	8.7	69.6	17.4	100.0			
Community Events to	N	2	3	30	24	59			
Technologies	%	3.4	5.1	50.8	40.7	100.0			
Agricultural Show	Ν	0	0	3	4	7			
Agricultural Show	%	0.0	0.0	42.9	57.1	100.0			
Government Extension	Ν	I	0	32	41	74			
Agent	%	1.4	0.0	43.2	55.4	100.0			
	Ν	0	0	6	7	13			
Y DA	%	0.0	0.0	46.2	53.8	100.0			
Former Training Course	Ν	0	0	2	9	11			
Farmer Training Course	%	0.0	0.0	18.2	81.8	100.0			
Padia Program	Ν	I	I	6	4	12			
Radio Program	%	8.3	8.3	50.0	33.3	100.0			
Other	Ν	I	0	I	2	4			
Other	%	25.0	0.0	25.0	50.0	100.0			
Total	Ν	48	51	579	543	1,221			
TOTAL	%	3.9	4.2	47.4	44.5	100.0			

Pearson Chi-Square 0.031*

* p<0.05; ** p<0.01; *** p<0.001

Table A.5. Ghana Wave II – Main Motivating Factors That Persuaded Farmers to First Plant the SSTP-Promoted Improved Variety by Sex

Mativating Eastava	Se	Total		
Motivating Factors		Male	Female	Total
Former Pased Organization	Ν	7	3	10
Farmer-Based Organization		1.6	0.9	1.3
Seed Company/Project-Managed	Ν	12	5	17
Demo	%	2.8	1.5	2.2
Agra Daalan	Ν	13	6	19
Agro-Dealer	%	3.0	1.8	2.5
Neighbor/Relative		223	224	447
		51.1	67.7	58.3
Field Days		2	2	4
		0.5	0.6	0.5
Community Events to Promote		2	3	5
Agricultural Technologies	%	0.5	0.9	0.7
A minuteural Shaw		3	0	3
Agricultural show	%	0.7	-	0.4
		131	57	188
Government Extension Agent	%	30.1	17.2	24.5
VRA	Ν	7	3	10
VBA	%	1.6	0.9	1.3
Padia Program	Ν	26	15	41
Radio Frogram	%	6.0	4.5	5.4
T)/ Program	Ν	5	4	9
TV TTOgraffi	%	1.2	1.2	1.2
No Particular Mativation	Ν	3	6	9
INO Farticular Piotivation	%	0.7	1.8	1.2
Other (SPECIEY)	Ν	2	3	5
	%	0.5	0.9	0.7
Total	Ν	436	331	767
i Utai	%	100.0	100.0	100.0

Pearson Chi-Square 0.002* * p<0.05; ** p<0.01; *** p<0.001

Table A.6. Ghana Wave II - Main Motivating Factors That Persuaded	I Farmers to First Plant the SSTP-Promoted Improved
Variety by Poverty	

Motivating Factors		Poor	Less Poor	Middle Level	Better Off	Highest Income	Total
Purchased at Full Cost	N	85	80	62	78	140	445
ruichased at rui Cost	%	19.1	18.0	13.9	17.5	31.5	100.0
Purchased at Reduced Cost	N	10	I	2	6	15	34
Turchased at Reduced Cost	%	29.4	2.9	5.9	17.6	44.I	100.0
Cot It for Free	N	42	35	29	45	109	260
Source and the	%	16.2	13.5	11.2	17.3	41.9	100.0
In Kind on Any Evchange	N	4	2	3	12	7	28
In-Kind of Any Exchange	%	14.3	7.1	10.7	42.9	25.0	100.0
Total	N	141	118	96	141	271	767
	%	18.4	15.4	12.5	18.4	35.3	100.0

Pearson Chi-Square 0.004** * p<0.05; ** p<0.01; *** p<0.001

Table A.7. Ghana Wave II – Main Motivating Factors That Persuaded Farmers to First Plant the SSTP-Promoted Improved Variety by Social Marginalization

		Marginalization Level							
Motivating Factor	s	Very Marginalized	Marginalized	Less Marginalized	Not Marginalized	Total			
Farmer-Managed	Ν	0	0	0	10	10			
Demonstration	%	0.0	0.0	0.0	100.0	100.0			
Seed	Ν	0	I	0	16	17			
Company/Project- Managed Demo	%	0.0	5.9	0.0	94.1	100.0			
Asia Distan	Ν	0	I	2	16	19			
Agro-Dealer	%	0.0	5.3	10.5	84.2	100.0			
Nlaighhan/Palativa	Ν	3	75	14	355	447			
Neighbor/Relative	%	0.7	16.8	3.1	79.4	100.0			
Field Dave	Ν	0	2	0	2	4			
Field Days	%	0.0	50.0	0.0	50.0	100.0			
	Ν	0	0	0	5	5			
Community Events to Promote Agricultural Technologies	%	0.0	0.0	0.0	100.0	100.0			
	Ν	0	0	0	3	3			
Agricultural show	%	0.0	0.0	0.0	100.0	100.0			
Government	Ν	I	24	2	161	188			
Extension Agent	%	0.5	12.8	1.1	85.6	100.0			
	Ν	0	0	3	7	10			
VDA	%	0.0	0.0	30.0	70.0	100.0			
Padia Program	Ν	0	I	I	39	41			
Radio Program	%	0.0	2.4	2.4	95.1	100.0			
T\/ Due group	Ν	0	2	0	7	9			
i v Program	%	0.0	22.2	0.0	77.8	100.0			
No Particular	Ν	0	4	I	4	9			
Motivation	%	0.0	44.4	11.1	44.4	100.0			
Other	Ν	0	0	0	5	5			
Ouler	%	0.0	0.0	0.0	100.0	100.0			
Total	Ν	4	110	23	630	767			
TOTAL	%	0.5	14.3	3.0	82.1	100.0			

Pearson Chi-Square 0.004** * p<0.05; ** p<0.01; *** p<0.001

Table A.8. How "	'Adopter" F	armers Acquired	Seed by Poverty	Level ((Wave II) in	Ghana
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Ghana: How Farmers Acquired Seed							
		Poor	Less Poor	Middle Level	Better Off	Highest Income	Total
Purchased at Full Cost		85	80	62	78	140	445
		19.1	18.0	13.9	17.5	31.5	100.0
Purchased at Reduced		10	I	2	6	15	34
Cost	%	29.4	2.9	5.9	17.6	44.1	100.0
Cot It for Free	N	42	35	29	45	109	260
Got it for thee	%	16.2	13.5	11.2	17.3	41.9	100.0
In Kind on Exchange	Ν	4	2	3	12	7	28
IN-KING OF EXchange	%	14.3	7.1	10.7	42.9	25.0	100.0
Tatal	Ν	141	118	96	141	271	767
IOLAI	%	18.4	15.4	12.5	18.4	35.3	100.0

Pearson Chi-Square 0.04* * p<0.05; ** p<0.01; *** p<0.001

Table A.9. How Farmers Acquired Seed by Poverty Level, Wave II in Tanzania

Tanzania: How Farmers Acquired Seed							
		Poor	Less Poor	Middle Level	Better Off	Highest Income	Total
Purchasod at Full Cost	Ν	195	163	307	379	117	1,161
rui chased at ruii Cost	%	16.8	14.0	26.4	32.6	10.1	100.0
Purchased at Reduced	Ν	3	2	3	4	0	12
Cost	%	25.0	16.7	25.0	33.3	0.0	100.0
Cot It for Fron	Ν	8	10	15	8	3	44
Got it for free	%	18.2	22.7	34.1	18.2	6.8	100.0
In Kind on Evolution	Ν	I	I	0	0	2	4
III-KIIIG OF EXchange	%	25.0	25.0	0.0	0.0	50.0	100.0
Total	Ν	207	176	325	391	122	1,221
TOLAI	%	17.0	14.4	26.6	32.0	10.0	100.0

Chi-Square not significant * p<0.05; ** p<0.01; *** p<0.001

Ghana: How Farmers Acqu	S	Total		
Seed	Male	Female	TOLAI	
Runshaged at Full Cost	N	251	194	445
Furchased at Full Cost	%	56.4	43.6	100.0
		26	8	34
Furchased at Reduced Cost	%	76.5	23.5	100.0
Cot It for Free	N	148	112	260
Got it for free	%	56.9	43.1	100.0
In Kind or Evchange	N	11	17	28
III-KING OF Exchange	%	39.3	60.7	100.0
Total	N	436	331	767
Total	%	56.8	43.2	100.0
Pearson Chi-Square 0.031*				
Tanzania: How Farmers Acc	uired	S	Total	
Seed		Male	Female	I ocui
Purchased at Full Cost	Ν	776	385	1,161
Turchased at Full Cost	%	66.8	33.2	100.0
Purchased at Reduced Cost	Ν	9	3	12
Turchased at Reduced Cost	%	75.0	25.0	100.0
Got It for Free	Ν	16	28	44
Got it for thee	%	36.4	63.6	100.0
In-Kind or Exchange	Ν	2	2	4
	%	50.0	50.0	100.0
Total	Ν	803	418	1,221
lotai	%	65.8	34.2	100.0

Table A.10. How Farmers Acquired Seed by Sex, SSTP Adopters Only

Pearson Chi-Square 0.000** * p<0.05; ** p<0.01; *** p<0.001

	5	Total		
Seed From		Male	Female	TOLAI
Farmer Based Organization	Ν	3	3	6
Taimer-Based Organization	%	50.0	50.0	100.0
	Ν	2	2	4
NGO/AID Distribution	%	50.0	50.0	100.0
Sood Company	Ν	2	I	3
Seed Company	%	66.7	33.3	100.0
Agro Input	Ν	33	32	65
Agro-Input	%	50.8	49.2	100.0
Covernment Extension Agent	Ν	36	17	53
Government Extension Agent	%	67.9	32.1	100.0
\/B A	Ν	3	I	4
VBA	%	75.0	25.0	100.0
Other Former or Polative	Ν	52	45	97
Other Farmer of Relative	%	53.6	46.4	100.0
Mankat Tradan	Ν	5	10	15
Market Trader	%	33.3	66.7	100.0
Total	Ν	136	111	247
Tanzania: Erom Whom Ear	•			
Tanzania. From Whom Fari	ners		bex	Total
Acquired Seed	ners	Male	Female	Total
Acquired Seed	N	Male 5	Female 2	Total 7
Acquired Seed Farmer-Based Organization	N %	Male 5 71.4	Female 2 28.6	Total 7 100.0
Farmer-Based Organization	N % N	Male 5 71.4 3	Female 2 28.6 5	Total 7 100.0 8
Acquired Seed Farmer-Based Organization NGO/AID Distribution	N % N %	Male 5 71.4 3 37.5	Female 2 28.6 5 62.5	Total 7 100.0 8 100.0
Farmer-Based Organization NGO/AID Distribution Seed Company	N % N % N	Male 5 71.4 3 37.5 56	Female 2 28.6 5 62.5	Total 7 100.0 8 100.0 67
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company	N % N % N %	Male 5 71.4 3 37.5 56 83.6	Female 2 28.6 5 62.5 11 16.4	Total 7 100.0 8 100.0 67 100.0
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro Input	N % N % N % N	Male 5 71.4 3 37.5 56 83.6 426	Female 2 28.6 5 62.5 11 16.4 172	Total 7 100.0 8 100.0 67 100.0 598
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input	N % N % N % N %	Male 5 71.4 3 37.5 56 83.6 426 71.2	Female 2 28.6 5 62.5 11 16.4 172 28.8	Total 7 100.0 8 100.0 67 100.0 598 100.0
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Covernment Extension Agent	N % N % N % N % N % N % N % N %	Male 5 71.4 3 37.5 56 83.6 426 71.2 4	Female 2 28.6 5 62.5 11 16.4 172 28.8 0	Total 7 100.0 8 100.0 67 100.0 598 100.0 4
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent	N % N % N % N % N % N % N %	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent	N % N % N % N % N % N % N % N % N % N	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0 15	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0 3	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0 18
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent VBA	N % N % N % N % N % N % N % N % N %	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0 15 83.3	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0 3 16.7	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0 18 100.0
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent VBA Other Farmer or Belative	N % N % N % N % N % N % N % N % N % N % N % N	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0 15 83.3 212	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0 3 16.7 153	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0 18 100.0 365
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent VBA Other Farmer or Relative	N % N % N % N % N % N % N % N % N % N %	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0 15 83.3 212 58.1	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0 3 16.7 153 41.9	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0 18 100.0 365 100.0
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent VBA Other Farmer or Relative	N % N % N % N % N % N % N % N % N % N % N % N % N	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0 15 83.3 212 58.1 221	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0 3 16.7 153 41.9 111	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0 18 100.0 365 100.0 332
Acquired Seed Farmer-Based Organization NGO/AID Distribution Seed Company Agro-Input Government Extension Agent VBA Other Farmer or Relative Market Trader	N % N % N % N % N % N % N % N % N % N % N % N %	Male 5 71.4 3 37.5 56 83.6 426 71.2 4 100.0 15 83.3 212 58.1 221 66.6	Female 2 28.6 5 62.5 11 16.4 172 28.8 0 0.0 3 16.7 153 41.9 111 33.4	Total 7 100.0 8 100.0 67 100.0 598 100.0 4 100.0 18 100.0 365 100.0 332 100.0

Table A.II. Who SSTP Adopters Acquired Seed From, by Sex

ANNEX 5: INNOVATIVE APPROACHES USED BY SSTP GRANTEES TO PROMOTE THE USE OF IMPROVED TECHNOLOGIES

Innovative Approaches Used by SSTP Grantees to Promote the Use of Improved Technologies

(Extracted from Longley, et al., 2017)

In each of the SSTP countries there is at least one grantee specializing in communication and promotion of improved technologies. Also, the application of ICT-based extension approaches is supported through SSTP's link with the ICT Challenge Program. This section describes three particularly innovative approaches encouraging use of improved seed and technologies that have the potential to be very effective. Unfortunately, none of the areas where these approaches are being implemented were included in the beneficiary farmer survey, but it is possible to extrapolate relevant findings from the survey to draw lessons on the approaches and methodologies likely effective.

Farm Input Promotions Africa Ltd.

In Tanzania, FIPS is a grantee working across three Southern Highlands districts. The FIPS approach involves five closely integrated components: 1) when initiating work in a new area, a <u>farmer needs assessment</u> is undertaken with local partners, which includes a representative from the district agricultural office; 2) <u>partnerships</u> are established with the district agriculture office, agricultural research organizations, NGO development partners, and private sector agricultural input companies (for seed, fertilizer, etc.); 3) <u>Farming System Improvement</u> is promoted through mother-baby demonstrations³⁰ using a range of different technologies based on initial needs assessment, and provided through the private sector partners; 4) self-employed <u>VBAs</u> identified by members of the community and trained to promote the technologies and sell inputs to farmers (the VBAs tend to be respected farmers or experienced "organizers" and develop close links with the local government extension officer); and 5) <u>a Small</u> <u>Pack/Whole Village method</u> that allows everyone to be involved, rather than a single group-based approach.

The FIPS approach is particularly innovative in relation to scaling and adoption in five ways: 1) links with a range of seed and input companies and research organizations allow for a wider range of varieties and technologies to be promoted; 2) the use of VBAs allows for demo plots in more communities than if relying on government extension workers alone; 3) the mother-baby approach allows for more demonstrations in each community, and potentially reaches more farmers and allows the same variety to be tried over different farm conditions; 4) the free seed samples (for the "baby" demos) allow farmers to learn about a new variety by trying it out for themselves (the assumption is that a farmer is more likely to adopt a variety that they have learned about in practice, not just by seeing it on someone else's demonstration plot); and 5) where the baby demonstration involves a self-pollinating crop (e.g., rice, beans), this allows for the harvested seed to be shared with other farmers. In relation to scaling, the authors of one study state that, *"FIPS-Africa seems to have developed a system that has no limit to scale"* (Zaal, van der Lee and Mwongela, 2012: 94). The same authors also highlight the major role of the private sector in FIPS-Africa's success.

Farm Radio International

Also, in Tanzania, FRI—supported through the ICT Extension Challenge Fund—has partnered with SSTP grantees, Aminata Seed Company and Kibaha SRI, to promote improved maize and cassava varieties and associated best management practices. To do so, they are using radio, integrated with and supported by short messaging service (SMS) and interactive voice response (IVR) services. The radio programs consist of a series of 16-20 weekly broadcasts focusing on specific issues or technologies such as use of clean

³⁰ The "mother" demonstration plot includes a range of different varieties and/or technologies, and the associated "baby" demonstration plots are small plots within individual farmers' fields where a small amount of a single technology or variety is tested. The baby demonstrations are made possible through the provision of small seed packs.

planting material and new varieties, early weeding, pest management practices, and production of clean cuttings. A panel of technical experts from the partner organizations and elsewhere develops the content of the programs and listens to each show before it is broadcast to check for program quality. SMS is used to directly reinforce the content on the radio programs and promote the radio programs and boost series listenership. The SMS service is supported by Commonwealth Agricultural Bureau International (CABI) through Direct2Farm, a service that turns technical factsheets into short SMS and voice messages delivered straight to farmers. Up to September 2016, over 200 individual SMS messages were developed and validated by experts. Over 108,045 SMS on cassava, and 13,444 on maize farming had been disseminated to 6,536 and 3,439 cassava and maize farmers, respectively. In one case, an SMS message broadcast on improved cassava varieties sparked immediate SMS requests from farmers in four districts asking where planting material could be obtained. FRI anticipates that similar SMS requests in the future can be resolved by automating the system where keywords trigger a SMS response with the contact details for suppliers within the farmer's residential zone.

Each weekly radio broadcast involves one key question developed by agricultural experts to illustrate the message or topic of the episode. Using call-back, listeners can respond to the question by pressing a number on their keypad, which prompts a series of four or five follow-up questions designed to gather indepth information. One of these questions might be about local weather conditions (Have the rains started in your area?), and one or two of these questions are open-ended, which allows the caller to leave a voice message or a question for the experts. All calls, voice polls, and interactions are hosted and logged through an online ICT platform developed by FRI called *Uliza* ("to ask" in Kiswahili). Broadcasters select interesting messages to use in "Vox Pop" features in the programs, while technical questions left by listeners are sent to experts who answer them in a Question and Answer session (either live or recorded).³¹ The information collected through the *Uliza* platform allows for shifts in the focus of future programs in accordance with seasonal changes on the ground and listener preferences. The information is also used for internal web-based monitoring.

Results from an outcome evaluation survey conducted in late September 2016 among 632 farmers, revealed that 55 percent of respondents had heard of the programs. Of these farmers, 80 percent had listened to at least one episode. Nearly half of all those who listened to one or more episode started using a practice promoted through the radio programs. Approximately one quarter of all listeners started using two of the promoted practices (FRI and CABI, 2016).

Story Workshop Educational Trust

SWET is a Malawian creative media organization with community mobilization expertise. They use social and behavior change communication (SBCC) approaches to promote the adoption of improved technologies for seven crops supported by SSTP. SBCC is based on a three-step process of message delivery, internalization, and participation. SWET's first SSTP grant³² in Malawi started in April 2015 and was implemented across four districts, using radio, TV, village cinema, and community mobilization to disseminate information. SMS, phone-ins, and personal visits allowed for audience participation in the radio and TV broadcasts.³³ A series of mobile agricultural clinic "performances" brought together 55,987 farmers in total. This provided them with an opportunity to watch, learn, and apply relevant farming practices as well as meet with agricultural experts, private input suppliers, and output marketing

³¹ One might assume that if farmers can get satisfactory, effective responses to particular concerns through the *Uliza* platform then they would likely be able to address any potential management problems that would allow them to continue to use an improved variety instead of abandoning it as soon as there is a problem.

³² SWET has recently been awarded a second SSTP grant to extend the Master Farmer approach to three new districts and address the three challenges faced in the four districts targeted by the first grant, *i.e.*, access to improved seed varieties, access to markets, and long-term adoption of positive behaviors in the face of climate change.

³³ It is relevant to note that research conducted by FRI across five countries in Africa has shown that farmers who participate in the design and implementation of radio programming with the help of ICTs are four times more likely than those in passive listening communities to adopt agricultural improvements promoted on the radio (FRI, 2011).

companies. The content of the radio and TV programs (each involving 30 episodes) was based on the seasonal activities of eight Master Farmer clubs. These clubs were established by SWET, and their members were trained by agricultural experts and communication specialists at a four-day "boot camp." The boot camp was an opportunity for farmers to meet potential seed suppliers and farm produce processors. So-called "Baby Clubs" were formed by the Master Farmers within the target communities, and 2,010 farmers (three members from each Baby Club) were trained to use SSTP-supported technologies at a series of two-day community-based boot camps. Master Farmers and others trained at the community boot camps were expected to pass their knowledge on to other farmers through drama, demonstration plots, and regular group meetings.

An evaluation undertaken in early 2017 (Kabuli, 2017) included a survey among 200 beneficiary farmers. The survey revealed high levels of awareness about improved varieties of the different crops (77-99 percent), and relatively high levels of application of the improved varieties for most crops (55-64 percent): 98 percent for maize and 24 percent for rice. Of the communications media SWET used to disseminate information, drama was the preferred (cited by 48.5 percent of beneficiaries), followed by radio (23 percent). The boot camps, community cinema, mobile cinema, and TV were each cited by 10 percent or fewer of beneficiaries interviewed.³⁴ The evaluation noted that the three-tier approach of TV/community cinema, radio, and community mobilization (including drama, meetings, demonstration plots, and radio listening clubs) complemented each other and produced synergies that effectively triggered behavior change towards adoption of quality seed and technologies.

The evaluation further noted that the three-tier approach also created linkages between farmers and seed suppliers, farm equipment companies, extension services, locally available agro-dealers, and other interested companies (Kabuli, 2017: 24). Despite this, however, most groups experienced challenges in accessing the seed needed for the demonstration plots. Therefore, some plots could not be planted. The project stimulated the local extension officers to be more active, improved the marketability of most locally grown crops, and linked farmers to new market opportunities. The project increased demand among targeted farmers for seed of improved varieties, but many farmers experienced challenges in accessing seed, and this led the evaluation to suggest "proper structures" to facilitate networking between farmers and agro-dealers as well as encouraged involvement of more agro-dealers in the project areas. The evaluation noted that there was sometimes a lack of availability of certified seed on the market, forcing farmers to buy "fake seed" from vendors.

Summary and Lessons

The three approaches described above are each very different, but all rely on an integrated set of methods and communication channels that mutually reinforce each other to potentially powerful effect. FIPS has adapted and combined key elements of traditional outreach and private sector marketing strategies so that they operate at scale. FRI works closely with agricultural experts to deliver technically sophisticated, integrated radio, SMS, and IVR services based on accurate agricultural information, which is fine-tuned to farmers' interests and seasonal changes as they happen on the ground. SWET applies a wide range of training and communication approaches, including the use of drama, which has proven to be very popular in the project areas.

Each of the three cases involves a highly specialized and experienced organization applying or adapting tried-and-tested approaches developed and honed over many years of practical implementation: in the case of FIPS, over 14 years, and nearly 30 in the case of FRI. In the case of SWET, the conceptual basis for its SBCC approach has been developed and applied within the health sector over the past 20-30 years, and it is only very recently that SBCC has started being used within the agriculture sector. This suggests that there will be many lessons to learn from its utilization. Similarly, one of the SSTP grantees in Ghana, MAP, a TV production company, has developed a TV program called Kuapa. The program shows promise

³⁴ Demonstration plots were not among the list of media from which farmers could select their preferences.

but, in the view of the ET, it still has a long way to go in developing and honing its approach. MAP has not previously worked in the agricultural sector or targeted rural populations, and in the views of three different members of the panel responsible for reviewing each episode, it took several episodes before developing an appropriate format for its TV program, and some still felt it could be further improved. Although the program primarily targets rural youth, the ET did not come across anyone, extension agents, agro-dealers, or farmers, who regularly watched the show. Only one or two had even heard of it.³⁵ This suggests that TV alone is insufficient to reach farmers at scale and must be integrated with other communication channels to be effective.

The survey results for the ownership of radios, TVs, and mobile phones (see Table A. I below) show that mobile phone ownership is most widespread (79.0 percent of sampled farmers in all three countries), followed by radio (66.2 percent), and TV (29.3 percent). Although the rate of TV ownership is considerably higher in Ghana than the other two countries, it is still much less available than mobile phone and radio.

Device		Ghana	Mozambique	Tanzania	Total
		N=1,205	N=1,209	N=1,325	N=3,739
Padia	N	911	525	I,039	2,475
Naulo	%	75.6	43.4	78.4	66.2
TV	N	636	151	307	I,094
	%	52.8	12.5	23.2	29.3
Mahila	N	I,068	603	1,283	2,954
TIODILE	%	88.6	49.9	96.8	79.0

Table A.12. Radio, TV, and Mobile Phone Ownership Among Beneficiary Farmers

Recognizing that farmers will test or try out a new variety over several seasons before deciding to adopt it (Okali, et al., 1994), one question is whether the length of time over which new varieties are promoted in a particular community has an impact on adoption. For example, is it sufficient to implement a demonstration plot in a single season, or is it more effective to have repeated demonstration plots over more than one season in the same community? Given that not all farmers will immediately be convinced of the benefits of trying out new technologies (majority adopters and late adopters), the assumption is that repeated demonstration plots over more than one season in the same community would be beneficial. However, given the costs and logistics involved, a seed company or implementing agency might feel that their investments have greater impact among more farmers by increasing the number of demonstration plots geographically instead of concentrating for longer time periods in fewer locations. The survey findings clearly show that other farmers and neighbors have the greatest impact in influencing farmers' decisionmaking. Seed companies or other implementing agencies would do best to tap into these social networks by encouraging farmer to interact and learn from each other.

SSTP grantees are currently doing this in at least four different ways:

- 1. By taking a small pack/whole village approach (as opposed to a group-based approach), FIPS aims to reach as many farmers as possible and provides small quantities of seed for farmers to test new varieties for themselves. By allowing more farmers to test the varieties for themselves, then more neighbors will also potentially see and learn about the varieties as well.
- 2. SWET uses drama to encourage farmers to interact and learn from each other.

³⁵ This was surprising, given that the ET was talking to many different people closely associated with the SSTP project. Farmers, extension officers, and agro-dealers that the Team met with all agreed that radio is more effective than television in rural areas.

- 3. FRI, SWET, and MAP all interview farmers on their own farms, allowing them to explain the advantages of the improved varieties and other technologies in their own words so that other farmers can learn directly from them.
- 4. FIPS uses VBAs who are themselves farmers to influence other farmers; it is important to note that an FGD with VBAs revealed that it took time for them to gain the trust of the farmers in order to influence them.

ANNEX 6: GRAPHS SHOWING CUMULATIVE INCREASES IN THE NUMBERS OF FARMERS USING SSTP-PROMOTED IMPROVED VARIETIES BY CROP AND COUNTRY (2013-2017)









