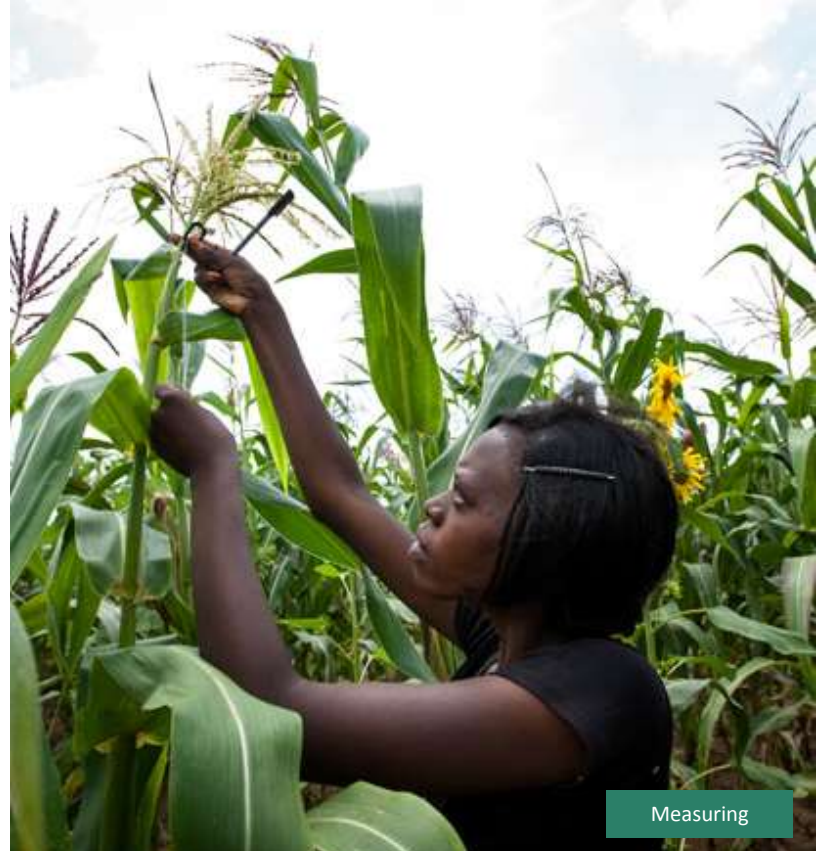




Sampling



Measuring

**ONE ACRE FUND**  
**Comprehensive Impact Report**  
A Decade of Measurement and Impact  
September 2016



Weighing



Harvest

# Contents

<b>EXECUTIVE SUMMARY</b>	<b>i</b>
<b>THEME 1: MEASURING DOLLAR IMPACT ON THE ONE ACRE FUND FARMER</b>	<b>1</b>
WHO IS THE AVERAGE ONE ACRE FUND CLIENT?	1
WHAT CROPS AND ACTIVITIES DOES ONE ACRE FUND SUPPORT, AND HOW DO WE MEASURE IMPACT FOR EACH?	6
HOW MUCH INCREMENTAL PROFIT DOES ONE ACRE FUND GENERATE, AND HOW SIGNIFICANT IS THIS PROFIT FOR THE FARM FAMILIES WE SERVE?	10
WHAT IS THE IMPACT OF THE INDIVIDUAL COMPONENTS OF ONE ACRE FUND'S MODEL?	13
COULD PROFITS FROM ONE ACRE FUND-SUPPORTED CROPS COME AT THE EXPENSE OF OTHER, MORE PROFITABLE CROPS?	17
HOW MUCH CONFIDENCE DO WE HAVE IN OUR IMPACT DATA?	19
HOW EVENLY DISTRIBUTED IS ONE ACRE FUND'S IMPACT?	22
DO LONGER TENURED ONE ACRE FUND FARMERS PERFORM BETTER THAN NEWER FARMERS?	26
WHAT HAPPENS TO FARMERS WHO LEAVE ONE ACRE FUND?	28
HOW COST EFFECTIVE IS ONE ACRE FUND AT DELIVERING IMPACT?	30
<b>THEME 2: MEASURING HOLISTIC IMPACT ON THE ONE ACRE FUND FARMER</b>	<b>33</b>
DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM REDUCE HUNGER AND IMPROVE HOUSEHOLD FOOD SECURITY?	34
DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM IMPROVE EDUCATIONAL OUTCOMES?	38
DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM INCREASE CONSUMPTION AND ASSET ACCUMULATION?	40
DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM AFFECT SOIL HEALTH?	42
DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM IMPROVE FARMER RESILIENCE?	43
<b>THEME 3: MEASURING IMPACT BEYOND THE ONE ACRE FUND FARMER</b>	<b>46</b>
WHAT IMPACT DOES ONE ACRE FUND'S CORE PROGRAM HAVE ON NON-PARTICIPANT NEIGHBORS?	46
WHAT BROADER ANTI-POVERTY IMPACTS DOES ONE ACRE FUND HAVE IN THE COMMUNITIES WHERE WE WORK?	48
HOW DOES ONE ACRE FUND MEASURE THE IMPACT OF OUR SYSTEMS CHANGEWORK, AND WHAT IMPACT HAS BEEN ACHIEVED TO DATE?	49
HOW DOES ONE ACRE FUND MEASURE THE IMPACT OF OUR FIELD-BUILDINGWORK, AND WHAT IMPACT HAS BEEN ACHIEVED TO DATE?	52
<b>CONCLUSION</b>	<b>55</b>

## EXECUTIVESUMMARY

### INTRODUCTION

At One Acre Fund, we often say that impact is our North Star. We provide remote smallholder families – the largest group of poor people on the planet – with the tools and training they need to improve their livelihoods and escape cyclical poverty and hunger. We also leverage our key strengths in rural distribution to scale-out an increasingly wide range of ‘add-on’ products that can generate additional and holistic impact for the families we serve. As of 2016, we extend our core program to more than 400,000 farm families per year across six countries.

One Acre Fund’s commitment to impact has always been bolstered by a strong focus on measurement. We firmly believe that program monitoring and evaluation (M&E) can and should be used to both prove and improve our organization’s impact. As a nonprofit, One Acre Fund recognizes that we have a responsibility to prove that we deploy donor resources toward high-impact, cost-effective interventions. Yet we are particularly passionate about using measurement to guide our work, improve our program delivery, and innovate our product and service offerings. As we have grown and matured, these twin aims have led to continuous enhancements in the rigor and scope of our M&E.

The purpose of this Comprehensive Impact Report is to take stock of One Acre Fund’s M&E as we complete our first decade of operation, highlighting lessons learned, methods we have refined, and areas for further improvement. The report is organized around the three key themes that have underpinned our measurement work. Each theme describes our most conclusive M&E methods and findings on a set of related learning questions. This Executive Summary follows the same thematic structure to distill key findings (the body of this report provides much greater detail on all findings):

- Theme 1: Measuring DollarImpact on the One Acre Fund Farmer
- Theme 2: Measuring HolisticImpact on the One Acre Fund Farmer
- Theme 3: Measuring Impact BeyondtheOne Acre Fund Farmer

Our underlying M&E aims of proving and improving have informed this report’s design. Accordingly, we highlight numerous instances of ‘M&E in Action’ -- real examples of how rigorous data has guided our decision-making on issues ranging from planting trainings in Burundi to loan liability in Kenya. We also strive to transparently report where our evidence remains inconclusive. For instance, many studies referenced in the report were only undertaken in Kenya (One Acre Fund’s first country program), and their findings are not necessarily extendable to our other country programs. Over time, we plan to significantly expand One Acre Fund’s evidence base in our other countries of operation. Ultimately, this report is intended to catalyze further learning, and we eagerly anticipate feedback from readers.

Before diving into the key material discussed throughout the report, we would like to extend our deep gratitude to One Acre Fund’s supporters. Your astute engagement has helped to continuously advance our measurement strategy. We are particularly indebted to the MasterCard Foundation for its generous and ongoing support of our M&E work. Thank you – this document, and the impact that One Acre Fund has achieved to date, would not be possible without your partnership.

### THEME 1: MEASURING DOLLARIMPACT ON THEONE ACRE FUND FARMER

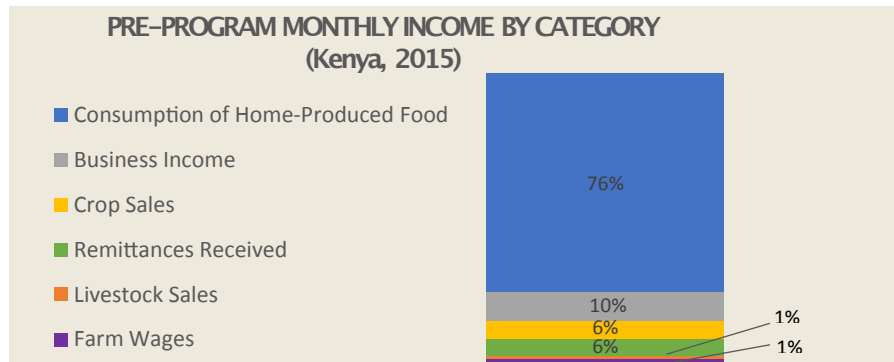
When One Acre Fund began a pilot to reach 40 farm families in 2006, it was with one central goal in mind: to increase the profits that farmers generated from their fields. We saw – and continue to see – a strong rationale for focusing on farmer profit; this metric, represented in dollars, directly correlates to clients’ poverty levels. It also translates across a wide range of contexts, allowing us to effectively compare the impacts of different

program decisions. Fundamentally, our emphasis on profit is grounded in an obligation to provide farmers with a strong return on their financial investment in One Acre Fund.

We therefore made a conscious choice early on to invest our measurement resources in continually increasing the rigor with which we measure farmer profits. Over time, we have also worked to understand our financial impact at a deeper level, for example, by exploring its distribution, its persistence once farmers leave our program, and its cost-effectiveness. The first theme of this report captures these points via ten key learning questions. The top-line findings are presented below:

1.1. [Who is the average One Acre Fund client?](#)

Our average client is a female farmer, in her early- to mid-40s, with a few years of primary school education. She is married with 4-5 children. Her main livelihood is growing staple crops (e.g., maize) on an average of 1.5 acres. As shown below, pre-program, 84% of her median monthly income comes from agriculture (with 76% coming from consumption of home-produced food):








Our most robust, yet still imperfect, poverty analysis (in Kenya) found a pre-program median daily expenditure (including cash expenditure and the value of home-produced consumption) of \$0.58/person in a ~6 person household. Kenya is one of the wealthier countries that we serve, so we believe that the overall average client expenditure is lower. By standard international criteria, our clients are 'extremely poor,' and in Rwanda and Burundi, 'ultra-poor.'

According to a World Bank/UNICEF study, 10% of families' children in the areas where we work do not live to age five, with hunger/malnutrition as the underlying cause of death in almost half of cases. One third of surviving children fit the international criteria for physical and mental stunting.

1.2. [What crops and activities does One Acre Fund support, and how do we measure impact for each?](#)

The table below highlights a small selection of the increasingly wide range of products that we distribute across our core countries of operation:

	KENYA	RWANDA	BURUNDI	TANZANIA	MALAWI	UGANDA
 Maize	X	X	X	X	X	X
 Trees	X	X	X	X		
 Beans	X	X	X	X (trial)	X	X (trial)
 Collards	X					

	Sorghum/ Millet	X					
	Vegetables	X	X	X	X (trial)	X (trial)	
	Solar Lights	X	X	X	X	X	X
	Cookstoves	X	X	X (trial)			
	Sanitary Pads	X	X (trial)	X (trial)			

□ Every season, in every country of operation, we implement a rigorous quasi-experimental analysis to measure the average profit that farmers generate from our core agriculture bundle compared to non-client farmers. We physically measure samples of each group’s harvests (16,000 total samples in 2015) and combine with local market data to calculate and compare average farm profits. We use a similar quasi-experimental approach to rigorously calculate clients’ profits from our non-crop products; for instance, for solar lights, we gather daily logs of cost-savings/income generated to measure discounted lifetime revenues against their costs. Much more detail on One Acre Fund’s standard annual M&E is available in the full report.

1.3. [How much incremental profit does One Acre Fund generate, and how significant is this profit for the farm families we serve?](#)

□ In 2015, our average client generated \$137+ in new annual profit, boosting their income on supported activities by 55%. At a scale of 305,000+ farmers, we thus generated over \$41,785,000 in new annual profit for our clients in 2015.

2015 Data	AG IMPACT \$/FARMER	ADD-ON IMPACT \$/FARMER	TOTAL IMPACT \$/FARMER	TOTAL % GAIN/FARMER
Kenya	\$165.70	\$ 45.16	\$210.90	48%
Rwanda	\$42.80	\$11.31	\$54.10	53%
Burundi	\$95.10	\$3.65	\$98.80	111%
Tanzania	\$72.30	\$13.50	\$86.70	14%
<b>Org-wide</b>	<b>\$111.84</b>	<b>\$25.36</b>	<b>\$137.20</b>	<b>55%</b>

□ We account for natural variation in yearly harvest size by often reporting our impact as a three-year rolling average. Our three-year (2013-2015) average farmer impact is \$129.37, a 53% profit increase on supported activities.

□ An internal study of farmer income and expenditures in Kenya found a median pre-program household income of ~\$850, and a median expenditure of ~\$1,200 per year (i.e., some purchases are financed through savings/loans). Our three-year rolling average impact in Kenya is \$189 – thus, we estimate that our program boosts the typical clients’ total household income by ~15% (in terms of expenditures). For families living on the margin, this is a large increase in the share of income available for productive investments.

□ Our clients spend the bulk of their One Acre Fund profits productively: a 2011-2012 study of our Kenya program found that the average One Acre Fund farm family consumes 30% of their incremental maize and sells 70%. About 33% of profits from the sale of this harvest portion went toward children’s education (e.g., school fees), 31% to new business

activities/livestock, and the remainder to diverse foods, health, housing, etc.

1.4. [What is the impact of the individual components of One Acre Fund’s model?](#)

- While each program component adds impact on its own, farmers realize the greatest impact when they are combined. For example, 2015 harvest data from Burundi shows that when coupled, One Acre Fund training and fertilizer boosted average bean yields by ~100kg more than either intervention alone.
- The credit we extend each season (as farm inputs) frees up other cash sources, enabling productive investments. A 2015 survey of recent major purchases found that, across all countries, clients made more large purchases between enrollment and harvest. We saw especially notable effects on purchases of animals (~12% boost) and farming tools (~20% boost).
- Much of our market access work aims to help clients delay the sale of grain (e.g., via improved storage) to reap greater profits in the off-season. Our analysis has found: a \$4/farmer impact from improved PICS storage bags in Rwanda; a \$2/farmer impact from actellic insecticidal dust; and a \$27/farmer impact from home storage loans offered at harvest in Kenya.

1.5. [Could profits from One Acre Fund-supported crops come at the expense of other, more profitable crops?](#)

- A 2014 randomized control trial of our Kenya program found that clients generally did not shift their crop mix (% of land devoted to particular crops, including crops not supported by One Acre Fund).
- When crop mix (of One Acre Fund-supported crops) does differ between clients and non-clients, it is generally because clients have shifted to more profitable crops (e.g., in 2016, Rwandan clients dedicated more land to climbing beans and less land to less profitable bush beans).
- To further test this phenomenon, and to assess optimal crop mixes for balancing profitability and nutrition, we are planning to undertake a difference-in-difference study in Rwanda in 2016-2017.

1.6. [How much confidence do we have in our impact data?](#)

- While we still see opportunities to improve, we have steadily enhanced the rigor of our M&E and are confident in the veracity of our data and analysis.
- Data integrity: We pre-test surveys and back-check 15% of survey respondents to verify their answers. We also collect data electronically on tablets, which safeguards data quality by reducing human error.
- Propensity score matching (PSM): As of 2015, all core countries use PSM in their impact measurements to help address selection bias. PSM estimates and controls for the chance of a person being selected to a study’s treatment or comparison group based on observable characteristics (e.g., wealth).
- Supplementary studies: We periodically engage in higher-quality measurements (e.g., Randomized Control Trials [RCTs] and difference-in-difference estimations) to test for any potential bias in our “regular” measurement methods. Although still subject to limitations, these higher-quality measurement methods have directionally confirmed that our more extensive, day-to-day measurements do not suffer from major biases.

1.7. [How evenly distributed is One Acre Fund’s impact?](#)

- In 2014 we explored this question by comparing mean and median impact across our core countries. Our organization-wide mean impact was only 2% higher than the median impact, suggesting a relatively even distribution.
- An examination of program ‘failure rates’ (the % of One Acre Fund farmers who do not make a profit on their harvest) shows that clients fail at an equal

or lesser rate than comparison farmers (e.g., in Tanzania in 2015, only 2.5% of One Acre Fund farmers failed, compared to 4.5% of comparison farmers).

□ In 2015, we explored whether our impacts vary across client segments based on household size, education, age, gender, and wealth. We did not find major differences in sub-group impact across crops or countries, suggesting that we are not “leaving behind” segments of our client population.

1.8. [Do longer tenured One Acre Fund farmers perform better than newer farmers?](#)

□ Administrative data show that returning farmers take larger package sizes with each additional year of enrollment. Such farmers both devote additional acreage to our program, and purchase more/higher impact add-on products. A 2015 analysis found that across almost all crops and core countries, longer-tenured clients realized significantly higher yields than new clients. This does not prove that program tenure drove the increase (since the study did not control for selection bias), yet the data are suggestive.

□ A 2015 study in Kenya found suggestive evidence that farmers’ average household consumption is higher for each year they spend in our program.

□ Taken together, we believe there is strong evidence longer tenured farmers experience a greater benefit from our program.

1.9. [What happens to farmers who leave One Acre Fund?](#)

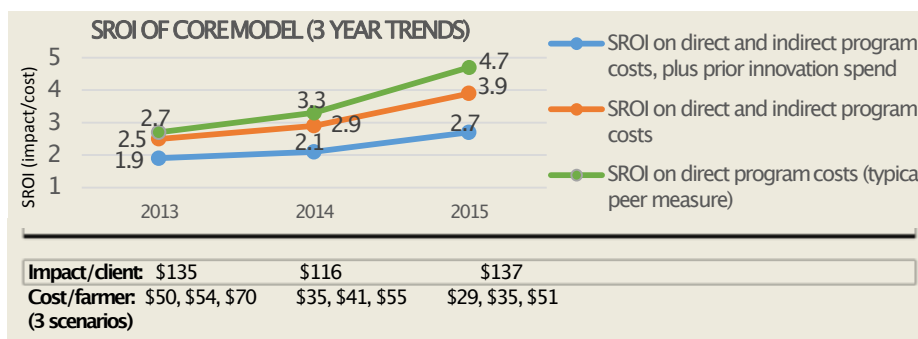
□ Farmers decide whether or not to re-enroll in our program. We experience a strong retention rate (~75% on average) across our core countries.

□ We hope that improved farming practices endure among clients who do not re-enroll. In a 2013-2014 study in Rwanda, ex-clients were 50% more likely to use fertilizer than ‘never-clients,’ and had stronger compliance in practices such as composting and row-planting. Ex-clients also saw a ~30% boost in average potato and rice yields, and roughly equivalent maize and bean yields.

1.10. [How cost-effective is One Acre Fund at delivering impact?](#)

□ In 2016, ~80% of our program costs will be covered by farmer revenue, leaving a subsidy of \$26/farmer to be filled by donors. We strive to measure how our required donor subsidy per farmer compares to our per farmer impact; we call this key metric of cost-effectiveness ‘Social Return on Investment’ (SROI). We calculate SROI by dividing our average incremental profit per farmer by our average net cost (donor subsidy) per farmer.

□ SROI can include different costs (leading to different results): direct program costs only; direct + indirect program costs; and direct + indirect program costs + historical innovation costs. The chart below shows One Acre Fund’s overall SROI from 2013-2015, calculated under these three cost scenarios.



□ We believe that East African government agriculture programs (e.g.,

extension and fertilizer subsidy programs) are the best comparison for contextualizing our SROI; such programs have been rigorously evaluated, and often reach our target population at scale. Literature suggests that extension programs typically achieve negligible SROIs, while fertilizer subsidy programs average an SROI of 1.5 – roughly a third of One Acre Fund’s 2015 SROI.

## THEME 2: MEASURING HOLISTIC IMPACT ON THE ONE ACRE FUND FARMER

As One Acre Fund has grown and matured, so has our conception of impact. Our theory of change stipulates that the income boost generated by our program enables productive investments which, over time, meaningfully improve client families’ wellbeing. While this notion has always guided our work, in 2015, we reformulated our organizational vision to more explicitly focus on our downstream impact:

**We see a future where every farm family has the knowledge and means to achieve big harvests, support healthy families, and cultivate rich soil.**

We have expanded our measurement scope to gain a better picture of One Acre Fund’s progress toward this vision. As discussed above, our M&E to date has centered on gauging success in generating ‘big harvests’ for our clients; we have now begun supplementing our core seasonal harvest measurements with new analyses that rigorously measure our progress in supporting healthy families and rich soils. These analyses are already yielding new insights about the holistic impact of our program, and revealing important opportunities for enhancing our service to smallholder farm families.

Our Quality of Life (QoL) studies are key aspects of this more holistic M&E approach. These studies include our annual ‘mini-QoL’ study and our ongoing longitudinal QoL study, both launched in 2015:

- The mini-QoL is a year-long study that aims to serve as a ‘pulse check’ on farmers’ quality of life. It centers on a short (20 question) survey that assesses family hunger, education, health, and assets. Each year, M&E enumerators in all of our core countries administer the mini-QoL survey to 1,000-6,000 farmers, comparing those who have 1+ year of program participation (‘veteran’ farmers) with those who have enrolled with us but who have yet to harvest (‘new’ farmers). Because both groups have selected into the program, they constitute strong comparison groups.
- Meanwhile, the ongoing longitudinal QoL builds upon the results of the mini-QoL to provide a more comprehensive and rigorous understanding of One Acre Fund’s impacts. While the longitudinal QoL only focuses on Kenya and Rwanda (our most mature country operations), it examines a wider range of impact categories, such as financial literacy and child nutrition. Crucially, the study’s rigorous design follows the same farmers for 3-5 years to discern potential impacts over time. In Kenya, the study also allowed a one-time ‘impact snapshot’ (of veteran vs. newly enrolled One Acre Fund farmers) as it was undertaken in an existing area of operation (as a result of broader design and logistical considerations).

Differences between ‘new’ and ‘veteran’ One Acre Fund farmers in both QoL studies offer an early indication of our downstream impacts. While results are merely suggestive, these farmer categories have both self-selected into our program and share baseline characteristics, supporting attribution of impact to One Acre Fund. The table below highlights a selection of key favorable findings from the latest available mini-QoL (note, however, that the study has also revealed a lack of program impact on metrics such as family medical expenditures; female school attendance; and key asset purchases, e.g., land).

## 2015 MINI-QOL FINDINGS – ALL COUNTRIES



Metric	KENYA		RWANDA		BURUNDI*		TANZANIA	
	New n=1019	Veteran n=900	New n=1301	Veteran n=2930	New n=46	Veteran n=496	New n=341	Veteran n=245
<b>HUNGER</b>								
% with maize remaining from last season	49.6%*	69.0%*	6.2%*	11.7%*	nm	nm	86.8%*	94.7%*
% reporting no food to eat	15.0%*	8.3%*	11.3%*	8.6%*	9.0%*	2.0%*	15.0%*	7.3%*
FANTA score^	.33*	.20*	.55*	.45*	.28*	.08*	.26*	.10*
<b>EDUCATION</b>								
% of school-age children attending school	73.0%	74.0%	66.1%*	69.9%*	63.0%*	68.0%*	90.1%*	95.2%*
Average school fees per child in USD	47.75*	64.48*	4.77*	7.00*	8.78	8.71	22.97*	51.81*
<b>HEALTH</b>								
% of family member sick (in last week)	21%*	19%*	80.5%	80.1%	46%*	35%*	29.84%	29.89%

\*Difference between new and veteran farmers is statistically significant at 5% level (i.e., p<.05). ^Higher FANTA score signifies greater hunger/lower food security. nm = not measured

Additional findings on the five learning questions that comprise Theme 2 are highlighted below:

2.1 [Does participating in One Acre Fund’s core program reduce hunger and improve household food security?](#)

- The QoL studies assessed hunger and food security in each One Acre Fund country via the externally validated Food and Nutrition Technical Assistance Household Hunger Scale (FANTA HHS). As show in the table above, the mini-QoL found clear hunger reductions between new and veteran farmers in all countries studied. The longitudinal QoL also found that veteran farmers in Kenya had more remaining maize and less hunger than new farmers.
- The longitudinal QoL gathered anthropometric data on childhood nutrition and did not find significant impacts among veteran farm families in Kenya. This may be because it takes time for nutritional impacts to manifest, yet we are nonetheless making a concerted effort to deepen our impact in this area.

2.2 [Does participating in One Acre Fund’s core program improve educational outcomes?](#)

- Since it is difficult to obtain reliable data on the actual educational outcomes of children in our client families, the QoL studies examine preconditions for overall educational improvement: school attendance and expenditures (signs that children are attending higher-quality schools more regularly).
- Per the table above, the mini-QoL found significant increases in school expenditures across all countries except Burundi; we believe this is due to Burundi’s extremely low food security, which may require that clients’ incremental profits largely go toward immediate food consumption needs. The first year of the longitudinal QoL in Kenya also found that children were 6.5% more likely to attend private schools (perceived to be of higher quality).
- We also likely impact educational outcomes through other pathways – for example, by distributing solar lights, which enable children to study longer/in better conditions. Internal studies in Kenya show that the product enables an average of 3 hours/week in additional evening study time (a 30% boost in total study hours). We have sold 300,000+ solar lights to date and estimate that the product unlocks 90 million+ extra study hours annually.

2.3 [Does participating in One Acre Fund’s core program increase consumption and asset accumulation?](#)

- For farm families living on the margins, increasing levels of consumption and asset accumulation are central to the progression out of poverty.
- Early data from Kenya’s longitudinal QoL shows that our program leads to a \$130 total impact on incremental consumption per year (annualized impact of ~\$1.50 every two weeks plus a ~\$95 annual impact on large purchases).
- A separate Kenya study suggests a larger effect for longer-tenured farm families: a statistically significant effect was found in monthly expenditure, total income, and savings. Each increased with length of program enrollment.
- The Kenya longitudinal QoL also examined three main categories of assets: physical (e.g., radios), financial, and livestock. The study found that veteran farmers had more assets across each category, and greater total asset value than new farmers. For instance, veteran farmers were 11% more likely to have a cow and on average had .54 more cows than new farmers.

2.4 [Does participating in One Acre Fund’s core program affect soil health?](#)

- In 2015, we completed a rigorous soil health study in Kenya and Rwanda, analyzing ~2,400 soil samples for pH, carbon, and micronutrient levels.
- One Acre Fund farmers show statistically similar or better values on these dimensions than comparison farmers. Still, this one-time snapshot is not sufficient to conclude how our program affects soil health over time. Further, in some cases, our clients’ soils had below-optimal nutrient levels.
- Our Kenya program is now working to enhance soil carbon (e.g., by focusing on composting), while our Rwanda program is scaling up pH-boosting products (e.g., lime). Research shows that improved composting can generate yield increases of up to 26%, and lime can raise yields by 40%+.
- The study also informed a larger analysis that will collect soil samples and yield measurements from 4,000 One Acre Fund and comparison farmers annually for 3-5 years. The study launched in Kenya and Rwanda in 2015 and expanded to Burundi and Tanzania in 2016. First-round results from Kenya and Rwanda will be available in November 2016.

2.5 [Does participating in One Acre Fund’s core program improve farmer resilience?](#)

- Building our clients’ resilience – their capacity to withstand shocks and stressors – is crucial to ensuring the sustainability of our impact. Thus, we plan to more closely examine farmer resilience moving forward.
- One Acre Fund has adapted the UN FAO’s Resilience Index Measurement and Analysis (RIMA) model to create a preliminary approach for measuring our impact on resilience. We will focus on five pillars: income and food access, assets, agricultural practices, social safety nets, and adaptive capacity.
- Early evidence suggests that our clients are more resilient than comparison farmers. For example, directional (not statistically significant) results from the longitudinal QoL show that One Acre Fund clients are 16.8% less likely to face difficulty in meeting families’ basic needs after a death in the family. Also, a separate Kenya study showed that unenrolled comparison farmers experienced higher income and expenditure volatility, and spent a larger share of their income on food than One Acre Fund clients.

**THEME 3: MEASURING IMPACT BEYOND THE ONE ACRE FUND FARMER**

We are increasingly interested in understanding whether our core program impacts farmers’ neighbors and their communities, and how we might boost this impact. Moreover, One Acre Fund has recently had the opportunity to support the improvement of entire country/region-wide agricultural systems via implementation partnerships and targeted policy work. Theme 3 consists of four learning questions that discuss our measurement approaches and latest findings on community and system-level impacts.

3.1 [What impact does One Acre Fund’s core program have on non-participant neighbors?](#)

- We have abundant anecdotal evidence that unenrolled farmers learn/apply One Acre Fund farming methods from participating friends and neighbors.
- In 2015, we found strong evidence of program ‘spillover’ in more established sites, controlling for key factors (e.g., education and location). On average, unenrolled farmers who grew an average .5 acres of maize produced 45kg more maize/year in older program areas than newer ones – enough to feed a typical farm family for an entire month.
- Preliminary data show a similar program spillover impact in Rwanda with maize, but not with other crops we support (e.g., beans and potatoes). We will continue to examine this effect in Rwanda in the coming years.

3.2 [What broader anti-poverty impacts does One Acre Fund have in the communities where we work?](#)

- One Acre Fund employs 4,000+ staff, 95%+ of whom are local hires in rural communities, with limited opportunities for other career employment. A Field Officer can earn 4 times more per hour in the role than from farming.
- In 2015, we contributed \$10m in wages and benefits to our field and HQ staff. We expect this to grow to \$13.5m+ in 2016. We see these jobs/wages as highly incremental given severe underemployment in rural East Africa.
- In a mature operating district (10,000+ clients), our program generates \$1m+ per year in new profits. Money cycles more quickly in rural communities, thus multiplying the benefit of these cumulative wages and farm profits.

3.3 [How does One Acre Fund measure the impact of our systems change work, and what impact has been achieved to date?](#)

- One Acre Fund’s systems change unit works to improve the functioning of government agricultural systems via implementation partnerships that leverage our core competencies. Partnerships fall into three broad areas: training (improving government-run extension systems); input distribution and retail; and market stimulation (e.g., boosting demand for hybrid seed).
- We assess success in terms of scale (farmers reached), impact (profit gains), and cost (donor subsidy). Like our core program, our systems change M&E involves identifying counterfactuals, statistically adjusting for pre-existing differences, weighing farm yields, and using market data to calculate profits.
- Systems change projects usually deliver only 1-2 services, generating less impact per farmer than our core program. However, they have greater scale potential and lower costs per farmer. We believe that this unit can achieve 3x the scale of our core program at one third the impact and cost per farmer. We do not yet have conclusive evidence to favor one approach over the other, yet will continue to assess the SROI of these projects moving forward.
- The chart on the following page shows the 2015 results from our systems change work by partnership category and overall.

Partnership category	Scale (# families reached)	Impact per family	Cost per family	SROI (impact per cost)
Extension partnerships	404,000	\$19.1	\$6.1	3.1
Input distribution & retail partnerships	191,000	\$16.3	~\$0	N/A
Demand stimulation partnerships	2,000	Not yet measured	Not yet measured	N/A
<b>OVERALL</b>	597,000	\$18.0	\$3.9	4.6

- It is too early to measure permanent system-change impact for most partnerships, yet we see promising early signs from long-running projects.
- As we expand our systems change work, we anticipate that comparison farmers will benefit, lowering our core program’s relative impact. We are exploring new measurement approaches to account for such issues.

3.4 [How does One Acre Fund measure the impact of our field-building work, and what impact has been achieved to date?](#)

- One Acre Fund’s field-building work aims to influence key ecosystem actors to shape policies that benefit smallholders. This work falls into three buckets: farm microfinance, agricultural research, and agricultural policy.
- Measuring the impact of field-building work involves four key challenges: defining what to measure, navigating long time horizons, attributing policy changes to particular actors, and attributing policy changes to impact.
- Our field-building M&E aims to address such challenges with a framework focused on three time periods: ex ante (prior to project launch), in media res (while a project is underway), and ex post (after project completion).
- Ex ante: We focus on farmer profit, choose a measurable indicator that ties to profit, make key attribution estimations, and assess cost-effectiveness.
- In media res: We work to achieve and track concrete outputs and outcomes based on theories of change. We continuously adapt projects as they unfold.
- Ex-post: We refine impact hypotheses in light of output/outcome data, and may seek external validation of policy impact (we have not done so to date).
- It may be impossible for our field-building M&E to match the precision of our core program or systems change M&E. Still, this framework helps ensure that our field-building work creates real impact for smallholder farmers, and is a cost effective donor investment.

**CONCLUSION**

One Acre Fund’s commitment to measurement underpins our commitment to impact. In our ten years of operation, we have collected a vast amount of practical information about our clients, model, and results. We are pleased to share a range of key findings in this Comprehensive Impact Report. Ultimately, we are confident in the assertion that our program meaningfully improves the livelihoods and wellbeing of the farm families we serve; nonetheless, we remain focused on areas where we see potential for deeper impact. Similarly, while we have steadily increased the rigor of our measurement methodologies, we view this area as a constant work in progress. Our ethos of “proving and improving” continues to guide our M&E efforts as we look forward to our next ten years of serving smallholder farm families.

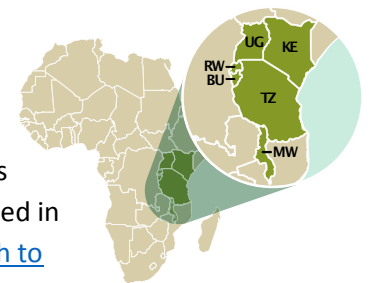


## THEME 1: Measuring Dollar Impact on the One Acre Fund Farmer

When One Acre Fund began a pilot to reach 40 farm families in 2006, it was with one central goal in mind: to increase the profits that farmers generated from their fields. We therefore made a conscious choice early on to invest our measurement resources in continually increasing the rigor with which we measure farmer profits. For instance, over time we've added more categories of cost into our profit equation, and we have worked to measure against an increasingly comparable control group, reducing selection bias. We have also worked to understand our financial impact at a deeper level, for example, by exploring its distribution, its persistence once farmers leave our program, and the cost-effectiveness with which it is achieved. The first theme of this report captures these points via ten key learning questions.

### 1.1. WHO IS THE AVERAGE ONE ACRE FUND CLIENT?

One Acre Fund targets subsistence farm families living in rural areas that experience high rates of poverty. As of mid-2016, we serve over 400,000 such families across Kenya, Rwanda, Burundi, Tanzania, Malawi and Uganda. All farmers that live in our areas of operation are eligible to join our program, so long as they have not previously defaulted in repaying a loan with One Acre Fund (a rare occurrence, as our [uniquely flexible approach to microfinance](#) has led to annual organization-wide repayment rates of 97% or higher).<sup>1</sup>



We place pre-eminent importance on understanding the needs of our clients and collect diverse demographic and asset data through an annual survey of thousands of farmers across our core countries. These surveys have revealed that our typical client is a female farmer<sup>2</sup> with a spouse and four to five children, she has only a few years of primary school education, and grows primarily staple crops on an average of 1.5 acres of land.<sup>3</sup> Her family resides in a 1-3 room mud-brick home with a roof of thatched materials or tin. While agriculture is her

<sup>1</sup> One Acre Fund also requires that farmers meet a small pre-payment requirement in order to receive our full program. We use demographic data to carefully set – and adjust – this requirement in order to ensure program affordability.

<sup>2</sup> Among our clients, 53% of contract-signers are women. However, we have found that over 62% of farmers attending our trainings are female. Additionally, planting surveys have revealed that women undertake at least an equal share of farm labor in over 88% of client families and carry out most or all farm labor in over 41% of families.

<sup>3</sup> Our average client's land size varies significantly by country. For example, in Rwanda and Burundi, the average One Acre Fund client farms less than one acre of land.

main livelihood, she lacks access to basic agricultural tools and training. As a result, her family struggles to meet their most basic needs: 10% of children in the areas we serve do not survive until age five, and roughly one in three fit the international criteria for physical and mental stunting.<sup>4</sup>

The table below summarizes selected client demographic information, collected in 2015:<sup>5</sup>

METRIC	KENYA	RWANDA	BURUNDI	TANZANIA	WEIGHTED TOTAL
<b>Basic Demographic Information</b>					
<b>Total # of clients (2015)</b>	136,500	111,300	40,200	17,400	305,000
<b>Average age</b>	45.6	44.6	42.88	44.7	44.9
<b>Average household size</b>	6.0	4.91	5.13	4.7	5.4
<b>% contract signers &lt;25</b>	3.5%	3.74%	2%	7.9%	3.5%
<b>Average # of children &lt;18</b>	4.0	—	4.64	2.5	4.0
<b>% female clients</b>	64%	44%	41.0%	51%	53.3%
<b>% widowed</b>	17.8%	13.0%	18%	12%	15.9%
<b>Education level</b> (% w/ secondary degree)	35%*	3.16%	2%	6%	—
<b>Productive Assets</b>					
<b># of chickens</b>	9.1	1.11	0.63	22.8	<b>9.3</b>
<b>% who own a cow</b>	66%	56%	7.01%	24.5%	<b>38.3%</b>
<b>Average acreage under cultivation</b>	2.3	0.89	0.78	3.05	<b>1.62</b>
<b>% of land planted w/ OAF inputs</b>	40.60%	50.36%	69%	48%	<b>53.7%</b>
<b>% who have electricity</b>	—	13.8%	—	5%	—
<b>% w/ permanent or semi-permanent walls</b>	20.4%	—	—	63%	—
<b>% who own a mobile phone</b>	96.43%	83%	—	49%	<b>89.1%</b>

\*Kenya’s 35% figure for “Education level” includes farmers who have completed “some” secondary schooling. Since other countries only track farmers who have completed secondary school, we do not provide a weighted total for this metric.

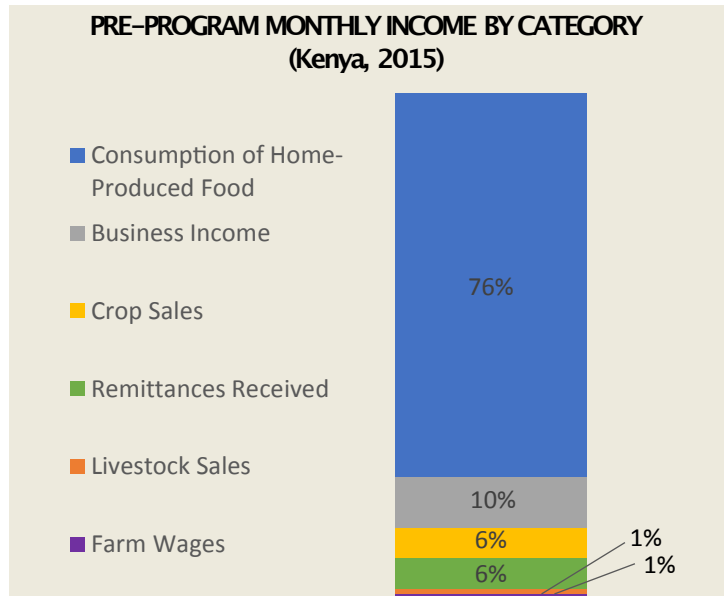
To complement the demographic and asset data collected from our annual crop mix survey, we have also undertaken extensive analyses of client farmers’ incomes and expenditures. For a variety of reasons, such analyses are notoriously difficult to undertake; for instance, questions on income and expenditures can be sensitive, and farmers’ self-reported data can be unreliable. Nonetheless, we have examined this subject in depth in two of our core countries, Kenya and Rwanda, in order to obtain a more usable picture of our clients’ level of poverty. One such study, undertaken in 2015, administered in-depth household surveys every month for a year to track all incoming cash, outgoing cash and total household consumption among 400 Kenyan households (200 clients and 200 unenrolled comparison farmers).

Although imperfect for a variety of reasons (e.g., small overall sample size, use of self-reported farmer data), the study offers robust insight into the financial realities of our target population in Kenya. Specifically, it found that

<sup>4</sup> UNICEF/WHO/World Bank (2012). Joint child malnutrition estimates. New York; Geneva; Washington DC.

<sup>5</sup> The gaps in this table are due to the fact that we were still standardizing our approach to the cross-country collection of demographic data in 2015. We have now instituted consistent plans to collect these data across countries, and we expect to fill in the gaps in our client demographic data moving forward.

the median<sup>6</sup> unenrolled comparison farmer had daily household expenditures of approximately \$3.30 (including the value of home agricultural production); this equates to \$0.58 in daily expenditure per person (~6 people per household). The median One Acre Fund farmer had daily household expenditures of roughly \$4.63 (including value of home agricultural production), or \$0.73 in daily expenditure per person (~6 people per household).



Importantly, the study also found that farm-related activities are by far the largest source of income for both the typical client and the typical comparison farmer. As shown in the chart to the left, such activities<sup>7</sup> accounted for 84% of household income for the median non-One Acre Fund farmer (the estimate declines to 65% for the mean farmer).<sup>8</sup> Moreover, consumption of home-produced crops was found to be an undeniably central income source. The study’s findings suggest that home crop production affords our target population the critical opportunity to spend their limited other cash income elsewhere (e.g., on children’s education or more diverse and nutritious foods).

Rwanda is the only other country to date where we have attempted to rigorously measure incoming (pre-program) poverty levels. Our 2015 Quality of Life baseline study found a mean daily expenditure (including value of home agricultural production) of \$2.80 per household. Undoubtedly, a typical One Acre Fund farm family in any of our countries of operation can be classified as ‘extremely poor’ or ‘ultra-poor.’<sup>9</sup>

### Similarities and differences between One Acre Fund farmers and neighboring non-clients

As described in the next section of this report, we typically use neighboring non-client farmers as a point of comparison for understanding the impact of participating in our program. Therefore, it is important to understand if there are meaningful differences between these two groups at baseline. In general, prior to program participation, One Acre Fund farmers are slightly better-off than comparison farmers on some criteria of wellbeing and slightly worse-off on others. For instance, newly enrolled One Acre Fund farmers (who have not

<sup>6</sup> We see median as a more appropriate measure of income and expenditures than mean as it is a better description of the ‘typical’ farmer (i.e., it is not as influenced by a relatively small number of extreme cases).

<sup>7</sup> Including consumption of home-produced food, crop sales, livestock sales, and farm wages.

<sup>8</sup> Estimates did not differ significantly for One Acre Fund farmers. Full results can be found in One Acre Fund’s Income and Expenditure Study (published September 2016)

<sup>9</sup> Converting our metric of ‘expenditure per person’ to the international standard metric of ‘expenditure per adult equivalent’ would easily categorize the typical Kenyan farmer pre-program as extreme poor (consuming <\$1.90 per adult equivalent per day, 2011 \$); moreover, we have reason to believe that this conversion would categorize the typical Burundian and Rwandan farmer as ultra-poor (consuming \$0.50 per adult equivalent per day, 2005 \$). The ‘per adult equivalent’ methodology is largely grounded in an assumption that children consume less than adults due to their lower caloric needs; since One Acre Fund aims to enable farmers to make greater investments in children’s health care and education, we see a possible rationale for measuring children’s consumption on a clear per person equivalent.

yet participated in our program) are sometimes slightly wealthier than comparison farmers, yet also may experience a slightly longer hunger season. Such differences vary by country and over time.<sup>10</sup>

The table below summarizes key baseline differences between incoming One Acre Fund farmers (before program impact) and comparison farmers, including in terms of previously highlighted demographic data:<sup>11</sup>

METRIC*	DEMOGRAPHIC AND ASSET INFORMATION FROM INCOMING ONE ACRE FUND FARMERS AND COMPARISON FARMERS (2015)							
	KENYA (n=3,500)		RWANDA (n=4,217)		BURUNDI (n=952)		TANZANIA (n=1,927)	
	OAF	Comp.	OAF	Comp.	OAF	Comp.	OAF	Comp.
Demographic Information								
Average age	45.6	41.7	44.6	44.57	42.88	40.58	44.7	40.5
Average household size	6.0	5.2	4.91	4.3	5.13	4.46	4.7	4
% widowed	17.8%	15.9%	13.0%	19.1%	18%	15%	12%	15%
Education level (% w secondary degree)	35%**	34%**	3.16%	1.38%	2%	2%	6%	5%
Productive Assets								
# of chickens	9.1	10.8	1.11	0.79	0.63	0.15	22.8	—
% who own a cow	66%	74%	56%	37%	7.01%	4.63%	24.5%	—
Average acreage under cultivation	2.3	2.2	0.89	0.6	0.78	0.55	3.05	—
Health								
% of family member sick in last week	21.0%	19.0%	80.5%	75.2%	46.0%	36.0%	29.84%	34.8%
% of sick who sought treatment	93.0%	91.0%	91.6%	86.0%	92.0%	91.0%	97.1%	97.5%

\*As of 2016 we have standardized our approach to collecting this data across our core countries; we will have fewer gaps in our baseline demographic information for clients and comparison farmers moving forward.

\*\*Kenya’s 35% figure for “Education level” includes farmers who have completed “some” secondary schooling. Since other countries only track farmers who have completed secondary school, we do not provide a weighted total for this metric.

Again, at baseline, farmers who decide to join One Acre Fund are better off than comparison farmers on some dimensions, and worse off on others – overall, the differences are marginal.

We have also undertaken studies specifically designed to examine why farmers do or do not decide to join One Acre Fund. One such study of nearly 4,000 newly enrolled clients and non-clients in Kenya’s 2016 season highlighted cash constraints, low perceptions of loan affordability, and risk aversion as key barriers to joining our program. While cash constraints and perceptions of loan affordability were found to be rooted in respondents’

<sup>10</sup> For example, we have recently observed a trend of comparison farmers in our more mature operating areas becoming wealthier over time. We believe that this trend is partly due to ‘spillover’ impacts from our program, as discussed in Section 3 of this report “Measuring Impact Beyond the One Acre Fund Farmer.”

<sup>11</sup> Health data was gathered in our 2015 mini-Quality of Life study, described in detail in Section 2 of this report.



poverty levels (i.e., lower monthly income), general risk aversion was not.<sup>12</sup> Thus, it appears that our average client is somewhat less risk averse than neighboring non-clients, a finding which is largely in-line with existing research on agricultural technology adoption.<sup>13</sup>

**M&E in Action:** Obtaining detailed knowledge about our average client allows us to design and offer products and services that can truly alleviate hunger and poverty in their households. Obtaining similarly detailed background knowledge on neighboring comparison farmers also serves important functions in our program design and delivery. In particular, understanding differences between clients and comparison farmers allows us to continuously improve our enrollment and marketing efforts. For example, after collecting data which demonstrated that Kenyan One Acre Fund farmers were slightly wealthier than comparison farmers (and after identifying that cash constraints impeded enrollment), we reduced the country's pre-payment threshold by half (from \$10 to \$5) and significantly reduced our minimum loan amount. Such efforts have since helped make joining our program a more feasible and attractive proposition for all smallholders in our areas of operation.

---









<sup>12</sup> Follow-up survey questions revealed that this driver of non-enrollment was partly linked to misinformation about One Acre Fund. Up to 30% of non-joiners surveyed reported that they were “afraid to join our program” because of the potential consequences of non-payment. This included the inaccurate belief that One Acre Fund would seize farmers’ land or assets as collateral in case of a loan default.

<sup>13</sup> Maurice, O., Wilfred, N., & Yesuf, M. (2010). Production risk and farm technology adoption in the rain-fed semi-arid lands of Kenya. *The African Journal of Agricultural and Resource Economics*, 4(2), 159-174.

## 12. WHAT CROPS AND ACTIVITIES DOES ONE ACRE FUND SUPPORT, AND HOW DO WE MEASURE IMPACT FOR EACH?

The primary focus of One Acre Fund’s core program is to improve the productivity of smallholder staple crop agriculture. We primarily focus on staples (e.g., maize, some beans) because such crops comprise the bulk of land cultivated by our target population and also pose the greatest potential for yield increases via improved inputs and training. Accordingly, we believe that staple foods represent the easiest-to-scale opportunity for global poverty alleviation: staple food farming is by far the most common economic activity of the world’s poor, and a few simple “tweaks” have the potential to make that activity dramatically more productive.

Outside of staple crops, we also utilize our key strengths in rural distribution to scale-out ‘add-on’ products that can generate additional holistic impact for the families we serve. Each year, we identify and rigorously test dozens of products that, at a minimum, are easily distributable through our network, trainable by One Acre Fund field staff, and hold potential for measurable impact. These add-ons include agricultural products (e.g., nutrient-rich vegetables and legumes) and appropriate technologies from diverse sectors including health and clean energy. For instance, we are now Africa’s fifth-largest seller of solar lamps, a product which generates numerous economic and social benefits, including reduced kerosene expenditures and increased study hours for children. The table below highlights crops and add-ons offered across each One Acre Fund country of operation:

	KENYA	RWANDA	BURUNDI	TANZANIA	MALAWI	UGANDA
 <b>Maize</b>	X	X	X	X	X	X
 <b>Trees</b>	X	X	X	X		
 <b>Beans</b>	X	X	X	X (trial)	X	X (trial)
 <b>Collards</b>	X					
 <b>Sorghum and/or Millet</b>	X					
 <b>Vegetables</b>	X	X	X	X (trial)	X (trial)	
 <b>Solar Lights</b>	X	X	X	X	X	X
 <b>Cookstoves</b>	X	X	X (trial)			
 <b>Sanitary Pads</b>	X	X (trial)	X (trial)			

### Our focus on farmer profit

Our primary impact goal is to boost clients’ incremental profits. Thus, our primary impact indicators are incremental profit generated per farmer from our core agriculture bundle and incremental profit per adopter from add-on products. Our average impact per farm family is calculated by adding the incremental profit gains from our core agricultural bundle with gains generated from each add-on product that we distribute at-scale.

We see a strong rationale for focusing our impact measurement on farmer profit. As a customer-driven social enterprise, we believe that we are obligated to verify that our clients receive a strong return (i.e., profit) on their investment in One Acre Fund. Additionally, since farmer profit is translatable across countries and products, this metric enables our organization to clearly compare the impact of different activities that we currently or plan to

undertake. Lastly, using this metric allows us to clearly evaluate the impact of each donor dollar we receive, helping ensure that our funding partners also receive a strong return on their investment in One Acre Fund.

### Measuring the profitability of our core agricultural bundle

Every season, in every country of operation, we implement a rigorous quasi-experimental analysis to measure the average incremental profit that farmers generate from our core agriculture bundle.<sup>14</sup> Our standard methodology involves comparing a random sample of One Acre Fund farmers – the ‘treatment’ group – against a ‘comparison’ group of neighboring farmers subject to the same agro-ecological conditions and identified as likely to eventually join our program.<sup>15</sup> We physically measure samples of each groups’ harvests (16,000 total samples in 2015) and calculate and compare their average farm revenues based on local market data.<sup>16</sup> Lastly, we subtract all farming costs (e.g., inputs, labor, and land rental, obtained via extensive household surveys) from farmers’ revenues to obtain the final average farm profit.

The table below presents a simple illustrative snapshot of some of the agricultural cost and revenue data that we collect from One Acre Fund and comparison farmers on an annual basis.<sup>17</sup>

Metric	COMPARISON FARMING METHOD (A)	ONE ACRE FUND PACKAGE (B)	CALCULATION NOTES
(1) Acres planted w/ One Acre Fund inputs	N/A	0.35	
(2) Acres planted w/o One Acre Fund inputs	0.68	0.45	
(3) Total harvest (# of 90kgbags)	9.3	13.4	
(4) Average sale price (per 90kgbag)	\$30	\$30	
(5) Total revenue	\$279	\$417	Row (4) * Row (3)
(6) Cost/acre on land planted w/ One Acre Fund inputs	N/A	(\$150)	
(7) Cost/acre on land planted w/o One Acre Fund inputs	(\$101)	(\$106)	
(8) Total cost	(\$69)	(\$100)	[Row (6) * Row (1)] + [Row (7) * Row (2)]
(9) Profit per farmer per year	\$210	\$317	Row (5) – Row (8)
(10) \$ gain in farm profit	—	\$106	Row (9, Column B) – Row (9, Column A)
(11) % gain in farm profit	—	50.6%	[Row (9, Column B) – Row (9, Column A)] / Row (9, Column A)
(12) Farmer return on investment	—	338%	Row (10) / [Row (8, Column B) – Row (8, Column A)]

<sup>14</sup> See our recent paper “[Measuring Farm Profitability](#)” for more detail on our rigorous measurement methodology.

<sup>15</sup> We take a strong focus on addressing bias in comparison group selection. For instance, as described later in this theme, in 2015, we adopted the technique of ‘propensity score matching’ to statistically adjust for key differences between clients and comparison farmers. Our recent paper, “[Getting the Counterfactual Right](#)” provides more detail on this critical issue.

<sup>16</sup> We do not formally adjust our revenue measurements to take into account post-harvest losses. However, we believe that this is a minimal challenge for our clients, as post-harvest support is a key element of One Acre Fund’s model. We provide extensive training on crop harvesting, as well as proven tools (e.g., PICS bags) to facilitate crop storage. Nonetheless, this is currently a question of interest for our M&E team, and more detailed information may be available in a future report.

<sup>17</sup> All data are illustrative. Model assumes that farmers plant only one crop (maize), and that any additional land planted is a direct result of participating in our core program (e.g., due to the greater availability of credit). Detailed information on our actual program impact is provided in the following sub-section of this report.

Our annual harvest M&E only calculates impact for crops that our program directly affects. In Kenya’s 2015 season, for example, we only measured harvests of the four crops (maize, beans, sorghum and millet) for which we offered fertilizer, improved seed, and training, even though our average client may grow numerous other crops. Conversely, in Rwanda, we typically offer training and fertilizer for over ten different crops, yet for logistical considerations, we only collect data on the five most popular crops grown across our program (for which over 88% of our inputs are used). We estimate impact for the remaining crops by assuming an average profit per acre and extrapolating a total based on acreage data gathered from our annual crop mix survey.

We apply several important modifiers to improve the accuracy of the method described above. Most of our country programs conservatively equalize their impact assessments for differences in land size between One Acre Fund clients and comparison farmers.<sup>18</sup> This is because, as noted earlier, One Acre Fund farmers tend to cultivate slightly more land than comparison farmers – equalizing for land size ensures that we do not credit our program for impact achieved through this extra land. However, in Kenya and Tanzania we have collected evidence showing that program participation actually encourages farmers to plant crops on more of their existing farmland. Thus, we only partially equalize our impact estimates in these countries to account for the fact that some of the difference in land size is indeed attributable to program participation.<sup>19</sup>

### **Measuring the profitability of our add-on products**

We employ a similar quasi-experimental method to calculate incremental income generated from add-on products. Broadly speaking, One Acre Fund distributes two types of “add-on” products: crop and non-crop.

The impact of crop “add-on” products (e.g., collard greens) is also calculated by physically weighing the crop’s harvest and combining yield and market data. The profit difference between test and comparison farmers is our impact. If the crop is a long-term product (e.g., trees, where revenue is earned several years after planting) a discount rate is applied to projected future yearly revenues and costs to get a net present value (NPV); we divide the NPV by the useful life of the product to obtain an average annual impact figure.<sup>20</sup> Finally, we weight this figure – impact per adopter – by the product’s overall adoption percentage (the percent of that country’s clients that receive the product) to obtain average impact per client.

Non-crop products, meanwhile, require calculations specific to the product. For example, to calculate the dollar impact of solar lights, One Acre Fund tracks clients’ self-reported expenditures on items that the light displaces (e.g., batteries and kerosene) and combines this number with any new income that clients report generating from the product (e.g., by using the light’s battery charger to recharge neighbors’ mobile phones). We then subtract the product’s cost from these revenues to find its Year 1 impact, and apply a discount rate to obtain a final per adopter impact figure for its entire lifespan. As above, we divide this number by the product’s useful life to obtain an average annual figure, and finally, weight by average adoption percentage to obtain a figure for average impact per client.

---

<sup>18</sup> This involves equalizing the acreage planted by One Acre Fund and control farmers, even if our surveys suggest that the One Acre Fund farmer planted more acres than the control farmer for that given crop.

<sup>19</sup> A recent difference-in-difference analysis in Kenya revealed that program participation conservatively explains roughly 50% of the total increase in clients’ cultivated land size. In Tanzania, a similar analysis undertaken with a relatively large sample found that program participation explains roughly 20% of the increase in cultivated land size.

<sup>20</sup> We also measure and adjust for product breakage in our NPV calculations.

While incremental farmer profit is One Acre Fund’s primary impact metric, it is ultimately only one component of how we understand our impact. Our [theory of change](#) postulates that farmers spend their incomes productively, and in doing so, improve their families’ wellbeing along a range of dimensions in the short, medium, and long-term. Accordingly, an increasing proportion of One Acre Fund’s M&E work aims to generate a more holistic picture of our impact. Section 2 of this report describes preliminary results from our first ever longitudinal quality of life (QoL) study, as well as early data from our baseline soil health study, both undertaken in Kenya and Rwanda. These studies are now helping us identify and understand the specific areas where we are meaningfully and permanently changing lives, as well as the areas where we still have room to improve.

M&E in Action: Monetizing our program impact enables clear and direct comparisons of potential modifications to our core services and product offerings. Such comparisons are central to our program leadership’s ability to make informed, impact-driven decisions about resource allocation and the direction of our future service to smallholder farmers. This is most clearly embodied in our growing organizational emphasis on social return on investment (SROI), addressed in detail in a later sub-section of this report.





### 13. HOW MUCH INCREMENTAL PROFIT DOES ONE ACRE FUND GENERATE, AND HOW SIGNIFICANT IS THIS PROFIT FOR THE FARM FAMILIES WE SERVE?

We assess the impact of our program in two main ways:

- **Total dollar gain in farmer profit:** This is the absolute dollar increase in the average One Acre Fund farmer’s profit compared with a control farmer’s profit on One Acre Fund supported activities.
- **Percent gain in farmer profit:** This is the relative increase in the average One Acre Fund farmer’s profit compared with a control farmer’s profit on One Acre Fund supported activities.

Measuring both the absolute and relative gain in farmer profit generated by our program supports a more complete understanding of our impact. For example, our Kenya program tends to achieve higher dollar gains than our other country programs because farmers there are somewhat wealthier and more able to invest in their livelihoods. Meanwhile, in Burundi, which is comparatively poorer, our lower absolute impact translates to a higher percent gain, revealing that every incremental dollar we generate there goes further than in our other country programs. Together, these two metrics offer a highly usable picture of our annual impact, ensuring that our work meaningfully impacts farmers’ livelihoods across diverse contexts.

In 2015, the last year for which final impact data is currently available, One Acre Fund achieved our largest average farmer impact to date in both absolute and relative terms. The table below provides the total and percentage per farmer profit gain achieved in each of our core countries,<sup>21</sup> breaking down total profit gain between our core agricultural program and add-on products:

2015 Data	AG IMPACT \$/FARMER	ADD-ON IMPACT \$/FARMER	TOTAL IMPACT \$/FARMER	TOTAL % GAIN/FARMER
KENYA 	\$165.70	\$ 45.16	\$210.90	48%
RWANDA 	\$42.80	\$11.31	\$54.10	53%
BURUNDI 	\$95.10	\$3.65	\$98.80	111%
TANZANIA 	\$72.30	\$13.50	\$86.70	14%
<b>WHOLE PROGRAM</b>	<b>\$111.84</b>	<b>\$25.36</b>	<b>\$137.20</b>	<b>55%</b>

Organization-wide, our 2015 clients generated over \$137 in new annual profit, boosting their income on supported activities by 55%. Of this total, approximately \$112 in new income stemmed from our core agricultural program, and roughly \$25 was derived from add-on products. At a scale of over 305,000 farmers, we therefore generated over \$41,785,000 in new annual profit for our clients in 2015. The impact figures in the table above each stem from a range of complex country-specific factors.<sup>22</sup>

<sup>21</sup> This table does not include our 2015 impact in Malawi or Uganda, since One Acre Fund did not launch full operations in these countries until May 2016.

<sup>22</sup> For more detail on our 2015 impact and overall performance, please review our [2015 Annual Report](#).

- **Kenya:** Our 2015 impact in Kenya was driven in part by the country's robust innovations laboratory and pipeline of powerful new products. For example, Kenyan farmers have relatively high household energy expenditures, making renewable solar lamps an excellent investment. Last year, nearly 50% of our 136,500 Kenyan clients purchased a solar lamp on credit, supporting our per-farmer add-on impact figure of \$45+, the highest of any One Acre Fund country.
- **Rwanda:** Our 2015 Rwanda impact was affected by a reduction in the relative profitability of the country's potato and rice crops. These crops are usually highly profitable for One Acre Fund farmers versus control farmers. Additionally, M&E shows that Rwandan One Acre Fund farmers used slightly less fertilizer in 2015 than in the prior year; we have adjusted our planting guidance accordingly.
- **Burundi:** Since Burundi's government already subsidizes farmers' fertilizer costs, our primary driver of program impact in the country is our intensive training on improved farming practices. We suspect that these practices helped One Acre Fund farmers cope with the irregular rains that Burundi experienced in 2015, resulting in robust yields and a strong \$95 impact from our core agricultural program. This translated to our highest relative impact organization-wide (111%), since the base profit for farmers in Burundi is substantially lower than in our other countries of operation.
- **Tanzania:** Our impact in Tanzania is affected by the relatively large average land sizes of the country's farmers. Specifically, our relative profit increase is diminished by the fact that farmers dedicate a comparatively small proportion of their total land to planting with our core program. We are currently working to boost uptake of our improved farming methods while investing in program modifications to complement Tanzanian farmers' larger land sizes (e.g., larger input packages).

### Impact trends over time

Agriculture is an inherently unpredictable enterprise. Unusual weather fluctuations, the arrival of a new pest or crop disease, or other singular events may significantly affect crop yields in any given year. Accordingly, we can account for natural variation in year-over-year harvest size by reporting our impact as a three-year rolling average. Our three-year (2013-2015) average farmer impact is \$129.37, equating to a 53% profit increase on supported activities.<sup>23</sup>

Since our inception, we have steadily increased our three-year average impact. This is due to the focused efforts of our program and R&D teams, who continually introduce new improvements to our core agricultural trainings, boost adoption of existing add-on products, and introduce new add-ons targeting an increasingly wide range of expenditure areas (e.g., last year we introduced reusable menstrual pads, a new cost-saving health product, to our entire Kenya farmer network). We expect this trend to continue over the long term. Nonetheless, other factors may drive our impact downward, for example, increased competition in markets where we operate, or agronomic challenges related to climate change, pests, and disease. As described later in this report, our organization is now pursuing a deeper focus on farmer resilience in order to mitigate such risks.

---

<sup>23</sup> In 2013, One Acre Fund generated \$135 in average per farmer profit organization-wide, a 47% gain in the profitability of supported activities compared with comparison farmers. In 2014, One Acre Fund generated \$116 in average per farmer profit organization-wide, a 57% gain in the profitability of supported activities compared with comparison farmers. In 2015, One Acre Fund generated \$137 in average per farmer profit organization-wide, a 55% gain in the profitability of supported activities compared with comparison farmers.

### What does \$130 mean to a farm family?

Appreciating the significance of our average impact requires some additional context. As noted, our program regularly boosts clients' incomes by 50% or more **on unsupported activities** (e.g., growing maize, or lighting the home with a solar lamp versus kerosene). Yet this figure should not be conflated with a 50% boost in **total household income**, including activities that One Acre Fund does not support. It is difficult to precisely measure clients' total household incomes (as the rural economies where we work are underdeveloped), yet internal studies show that, in Kenya, clients typically have a pre-program household income figure of about \$850 per year and a median expenditure of roughly \$1,200 per year.<sup>24</sup> Since our three-year rolling average impact in Kenya is \$189<sup>25</sup>, we estimate that our program boosts a typical client's **total household income** by ~15% (in terms of expenditures).

Poor farm families typically live on the margins, and this income boost has the potential to place client families on pathways out of poverty. While our average client may have relatively diverse income sources, not all of these income streams are readily expandable (e.g., remittances). Moreover, extensive research has illustrated that rural farm families frequently spend 50-80% of their total income on food consumption alone.<sup>26</sup> Thus, our organization-wide average of \$130 in new profit represents a significant increase in the share of income that our client families can productively invest toward their futures. This supports outside academic findings that the poorest 30% of households in Sub-Saharan Africa realize a 2.5x anti-poverty multiplier effect for every percentage point increase in their income.<sup>27</sup>

Indeed, rigorous analyses have underscored that our clients spend the bulk of their One Acre Fund profits productively. An internal 2013 study of our Kenya program found that \$40 can help to fill the annual food deficit faced by our client families.<sup>28</sup> The study found that, after covering this deficit (by consuming 30% of their incremental maize), clients spent their new profits (from selling 70% of their incremental maize) productively: roughly 33% of new profits went toward children's education (e.g., school fees) and 31% went to new business activities (e.g., livestock). Ultimately, our average impact is enough for a typical farm family to fill part or all of their food deficit and have additional income left over to invest in their livelihoods and broader wellbeing.

**M&E in Action:** Understanding our impact in context helps us identify new opportunities to improve farm families' wellbeing. For instance, we tailor our product offerings to encourage farmers to re-invest their added profits. Internal research demonstrating that Kenyan farmers spend a significant share of their One Acre Fund profits on livestock purchases has supported our decision to develop livestock product offerings ranging from live chick delivery to dairy cow breeding packages. Similarly, we are increasingly pursuing multi-year product loans that leverage our average annual impact to support more expensive yet impactful home improvements (e.g., larger scale solar electrification via solar home systems).

<sup>24</sup> This figure includes the value of monetized food. Our aforementioned 2015 Kenya Income and Expenditure Study and baseline data from our ongoing longitudinal quality of life study in Kenya and Rwanda both support this finding.

<sup>25</sup> The rolling average is based on a 2013 average Kenya impact of \$187 per farmer, a 2014 average Kenya impact of \$171 per farmer, and a 2015 average Kenya impact of \$211 per farmer.

<sup>26</sup> Anderson, Jamie, and Wajiha Ahmed. (2015). Early Insights from Financial Diaries of Smallholder Households. Focus Note 102. Washington, D.C.: CGAP.

<sup>27</sup> Ligon, Ethan, and Elisabeth Sadoulet. (2007). Estimating the Effects of Aggregate Agricultural Growth on the Distribution of Expenditures. Background paper for the WDR 2008.

<sup>28</sup> Study undertaken by Marshall Burke, a researcher affiliated with the University of California, Berkeley.



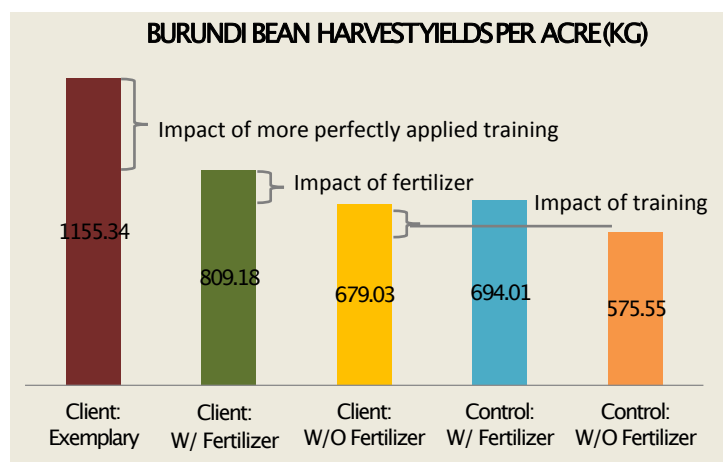
## 1.4. WHAT IS THE IMPACT OF THE INDIVIDUAL COMPONENTS OF ONE ACRE FUND'S MODEL?

One Acre Fund provides our clients with a “bundle of services,” including flexible financing, doorstep delivery of farm inputs, agricultural trainings, and post-harvest support. This bundled approach is one of the key strengths of our model, allowing us to systematically address the multiple barriers that impede remote smallholders’ livelihoods. While recognizing the distinctive power of our complete package, we have nonetheless made several attempts to measure the impact of its individual components in order to guide internal investments and strategic decision-making. This sub-section shares our most complete impact measurements disaggregated by core program activity.

### Impact of training versus fertilizer use

We regularly collect harvest yield data from several different types of farmland in order to assess our program impact. In Burundi, for example, we collect harvest yield data from five land categories:

1. Non-One Acre Fund farmer land without fertilizer
2. Non-One Acre Fund farmer land with fertilizer
3. One Acre Fund farmer land without fertilizer
4. One Acre Fund farmer land with fertilizer
5. One Acre Fund “exemplary” farmers who adhere to almost all of our recommended practices.<sup>29</sup>



Comparing outcomes among these land types allows us to understand the relative impact of fertilizer, training, and various combinations of the two. The graphic to the left, which draws on bean harvest data from Burundi’s 2015A season, illustrates the value added by each program component. One Acre Fund training conferred a measurable advantage over simply using fertilizer, boosting farmers’ average bean yields by roughly 100kg. Further, more perfectly applied training boosted the bean yields of ‘exemplary’ farmers by an additional 300kg+.

While the relative impact of each program component inevitably varies by crop and country, the overall pattern remains: farmers’ realize the largest impact through a combination of improved inputs and training.

### Impact of fertilizer use

We have also tested the impact of fertilizer experimentally.<sup>30</sup> In early 2015, we conducted an experiment to estimate the true returns of fertilizer on beans in Rwanda; the study was intentionally carried out with non-One

<sup>29</sup> This category was added in the early years of our Burundi program after internal M&E revealed that farmers were not fully complying with One Acre Fund’s recommended farming practices. To address the challenge, we asked our clients to commit to utilize all of our recommended practices on one small portion of their total land; this is the “exemplary” land.

<sup>30</sup> Simple comparisons against unfertilized land may underestimate the true impact of fertilizer, since farmers often apply fertilizer to particularly degraded land in the hopes of improving its performance. Roughly 40% of farmers in a Rwandan crop mix survey (of 1,350 farmers) confirmed that they typically apply fertilizer to their “poorest” maize or bean fields.

Acre Fund farmers in order to identify the impact of fertilizer, independent of focused agricultural training. Participating farmers were asked to split their field into fertilized and unfertilized portions and treat both identically, with the presence of fertilizer as the only difference between the two.<sup>31</sup>

The table below demonstrates that fertilized land generated significantly higher yields than unfertilized land (the difference was highly statistically significant, at  $p < .001$ ). After monetizing the respective harvests (using local market prices) and subtracting the costs of fertilizer and labor involved in fertilizer application, we estimated that the economic returns to fertilizer use for beans in Rwanda were roughly 200%.

	CLIMBING BEANS		BUSH BEANS	
	Unfertilized	Fertilized	Unfertilized	Fertilized
Harvest boxes weighed	95	95	73	73
Harvest (kg/acre)	428.6	609.0	260.9	399.3
Sale Price (RWF/kg)	411	411	411	411
Revenue (RWF/acre)	RWF 176,156	RWF 250,308	RWF 107,239	RWF 164,131
Fertilizer (RWF/acre)	0	20,525	0	17,041
Labor (RWF/acre)	39,477	43,424	33,330	36,663
Costs (RWF/acre)	39,477	63,950	33,330	53,704
Profit (RWF/acre)	RWF 136,679	RWF 186,358	RWF 73,909	RWF 110,427
Profit (\$/acre)	\$198.09	\$270.08	\$107.11	\$160.04
<b>Incremental profit (\$/acre) from fertilizer use</b>	\$72.00		\$52.92	
<b>Return on investment from fertilizer use</b>	203%		179%	

### Impact of training

We have also rigorously examined the impact of our improved agricultural trainings. Our burgeoning partnerships to enhance the extension services of African governments (discussed in greater detail in [Theme 3](#)) present the most direct cases for such analyses. While training delivered through government extension agents is not a perfect match for the core training delivered by One Acre Fund’s field officers, the impact of these extension programs does give us a good (albeit conservative) sense of the impact that can be achieved by a ‘lower touch’ training intervention.

One of our largest extension partnerships is with the government of Rwanda. This partnership, launched in 2014, follows a “train-the-trainers” model: One Acre Fund trains government-supported ‘Farmer Promoters,’ who then train smallholder farmers in nearly all of the country’s 14,000 villages. We supply materials on best farming practices and techniques (e.g., crop planting techniques and pest management) and encourage farmer fertilizer adoption by distributing educational fliers.

We evaluated the impact of this program in Rwanda’s 2015A season, surveying nearly 1,200 maize-growing farmers about their input use, agricultural knowledge, and experience with Farmer Promoters. We also weighed

<sup>31</sup> To ensure proper fertilizer application, compensation in the study was conditional on adherence to these guidelines.

a random selection of their harvests to assess the program’s impact on yields relative to non-participating farmers. We found that the Farmer Promoter program generated \$17.55 in new profit per participating farmer – a 10% increase in annual agricultural profit compared to non-participating farmers.<sup>32</sup> This profit increase was underpinned by improvements in knowledge and practice. Specifically, participating farmers demonstrated large, statistically significant increases in knowledge of three important planting practices: row spacing, seed placement, and compost application.

### Most crucial aspects of training

We have also undertaken analyses to assess which aspects of our agricultural trainings generate the greatest impact. In 2015, we supplemented our standard harvest yield measurements with planting practice surveys. Running this data through regression models revealed which of our recommended planting practices generated the greatest impact on particular crops. As shown below, correct fertilizer dosage and plant spacing drove the bulk of our impact for beans in Burundi. However, these impactful practices had relatively low compliance among farmers – 24% and 30% respectively. This points to a clear opportunity for enhanced impact, and we have aggressively encouraged the use of simple planting technologies (e.g., fertilizer scoops and pre-measured planting strings) in Burundi’s subsequent season.

	IMPACT OF PLANTING PRACTICES ON HARVEST WEIGHTS	
	Bean harvest weight (kg/acre)	Compliance rate
Sample size	1,381	
Applied compost to any part of field	23.00	61%
Correct fertilizer dosage (assessed by enumerator)	<b>77.92**</b>	<b>24%</b>
Correct fertilizer application method	25.00	16%
Correct spacing (holes within 3 cm lines within 4 cm)	<b>144.32**</b>	<b>30%</b>
* p<0.05; ** p<0.01		

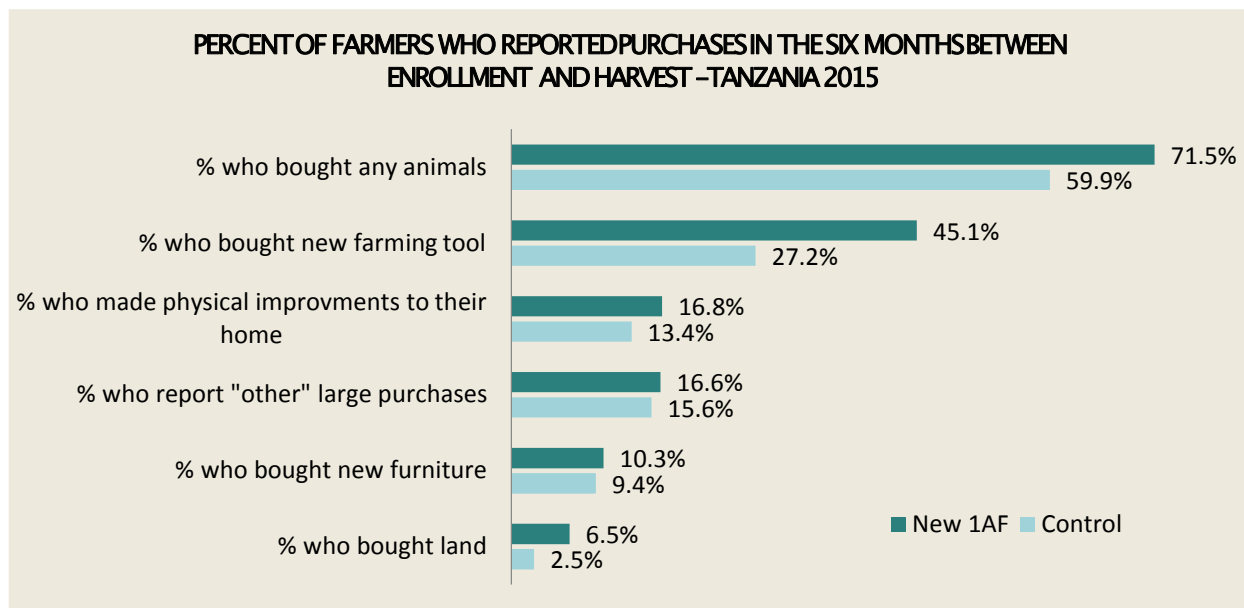
### Impact of credit

Most of the farmers in our target population are unbanked by microfinance institutions, which are often geographically inaccessible and largely serve wealthier clientele. With limited cash and credit, remote smallholders typically struggle to make productive investments that can help lift them from poverty. We hypothesize that the credit extended by One Acre Fund at the start of each growing season (distributed in the form of farm inputs) frees up other sources of cash, allowing smallholders to make such investments.

We have some support for this hypothesis from a 2015 survey of farmers’ recent major purchases. We asked newly enrolled One Acre Fund farmers and non-participant neighbors to report any major purchases they had made in the six months preceding the harvest (when smallholders are typically cash scarce). Across all of our core countries, One Acre Fund farmers were significantly more likely to make large purchases in the period between program enrollment and harvest, as illustrated in the graph below, for Tanzania. We see particularly significant effects on purchases of new animals (a ~12% boost) and farming tools (a ~20% boost). This suggests

<sup>32</sup> Three key caveats apply: first, this was a combined effect of both the training and the pamphlets/encouragement to utilize fertilizer; second, this analysis assumes that the training impact on the crop measured, maize, is representative of all cereal crops supported by Farmer Promoters; and third, the analysis assumes similar impact in Rwanda’s A and B seasons.

that the credit we offer to clients allows them to make new investments in their livelihoods and/or families' wellbeing before they even complete their first harvest with our program.



**Impact of post-harvest support and market facilitation**

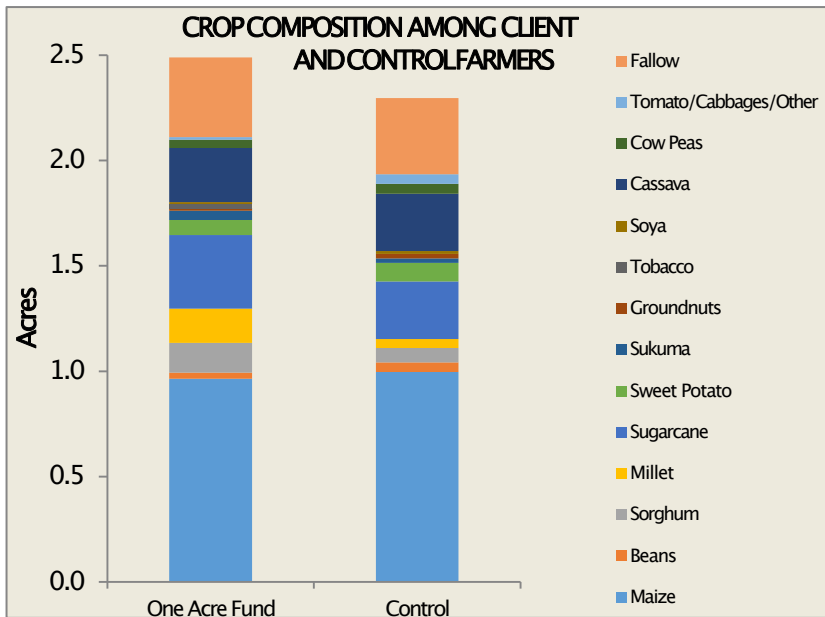
Finally, we have also assessed the impact of the post-harvest support that we offer to farmers. Subsistence farmers must frequently sell their crops immediately following the season’s harvest in order to avoid rot, or to pay for priority items such as children’s school fees. Yet the increase in local cereal supply during this period typically depresses prices; extensive research has shown that simply holding onto a portion of harvests for 3-4 months can dramatically increase smallholders’ profits. In fact, we have found that delaying the harvest sale to capture seasonal price increases is significantly more profitable than the near-term transport of grain to higher priced markets. Thus, much of our market access work has focused on enabling clients to delay the sale of their grain via improved storage technologies and other methods, for example:

- **PICS bags** are improved storage bag technology which reduce the need for pesticides while minimizing grain loss due to pests. Internal farmer studies in Rwanda have found that they generate an average per farmer profit increase of \$4.
- **Actellic storage dust** kills pests in grain and prevents further infestation, maintaining a higher quantity and quality of marketable grain. Our annual impact evaluations have revealed that this highly popular product conservatively generates an additional \$2 per farmer in profit.
- **Maize home storage loans** provided at harvest time help farmers address their immediate spending needs, enabling them to hold on to their grain until later in the season. Our studies have found these loans (which we are trialing in Kenya) can lead to a \$27 increase in profit per farmer.

More detailed information on our post-harvest and market access work is available in [this trial report](#).

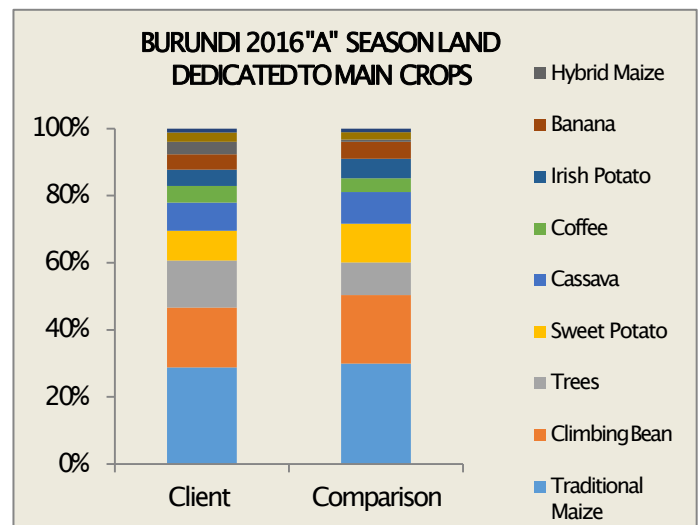
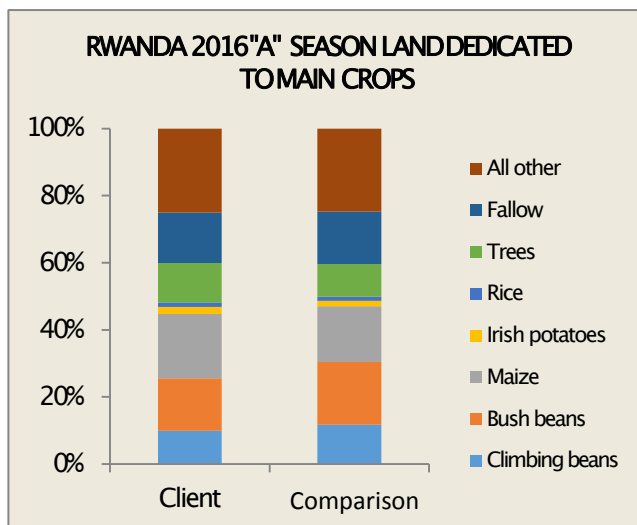
### 15. COULD PROFITS FROM ONE ACRE FUND-SUPPORTED CROPS COME AT THE EXPENSE OF OTHER, MORE PROFITABLE CROPS?

One Acre Fund only measures incremental profit improvement on those crops for which we provide inputs and training. Generally, these crops cover the majority of farmers' land. However, in addition to One Acre Fund-supported crops, many of our clients also cultivate their land with comparatively more profitable crops such as bananas, tea and sugar cane. This raises the question of whether participating in our program encourages farmers to shift land away from more profitable crops in favor of supported crops.



To rigorously test this hypothesis, we can examine behavior from the 2014 randomized control trial of our Kenya program (discussed in the next subsection of this report). As shown in the chart to the left, the study's randomly-selected client farmers generally did not shift their crop mix (the percentage of land dedicated to different crops). Instead, they increased their total amount of cultivated land. Additional land was primarily planted with millet and sorghum, which One Acre Fund was actively encouraging farmers to plant at the time of the study.

We find similar results in our other country programs. When the crop mix does differ between One Acre Fund farmers and comparison farmers, it is generally because our clients have shifted toward more profitable crops. For example, the charts below demonstrate that, in 2016, Rwandan One Acre Fund clients dedicated more of their land to maize, and a smaller portion to less profitable bush beans. In 2016 in Burundi, clients dedicated more land to profitable hybrid maize and trees, and less toward less profitable potatoes.



---

To explore this question in greater depth, we plan to carry out a difference-in-difference estimation of the crop mix of Rwandan One Acre Fund and comparison farmers between 2016 and 2017. The study will explore whether the slight variations in crop mix observed between One Acre Fund farmers and neighboring comparison farmers stem from pre-existing differences or participation in our program.

Finally, it should be noted that even though clients' apparent changes in crop mix generally favor more profitable crops, we recognize that farmers' crop mixes raise important considerations beyond profit. In particular, we also aim to encourage farmers to plant more nutritious and/or resilient crops. The potential trade-offs between the profitability and nutritional value of various crop mixes remains an ongoing area of exploration for our program. Moving forward, we will undertake additional analyses to understand how our clients can optimize their crop mix and obtain their most beneficial harvests along multiple dimensions.

## 16. HOW MUCH CONFIDENCE DO WE HAVE IN OUR IMPACT DATA?

Since our impact data is central to our organizational strategic decision-making, we place a strong emphasis on ensuring its quality. In our 2013 Annual Report, we publicly pledged to improve the rigor and precision of our impact measurement efforts. While we still see opportunities to improve in this regard, we feel increasingly confident about the veracity of our data and analysis.

### Data integrity

There is abundant room for error as a piece of information travels from a field survey conversation, to a spreadsheet, and into analysis. And since analyses are ultimately only as good as their underlying data, we have invested heavily in the crucial process of ensuring data quality. For example:

- We back check 15% of all of our impact surveys. This means that we re-visit or call 15% of survey respondents to verify selected answers that were documented by enumerators.
- We closely supervise enumerators and provide them with real time feedback in the field.
- We pre-test all new survey instruments and ensure that respondents understand all questions before they are deployed at full scale. We also translate and back-translate survey questions to ensure that their meaning is not “lost in translation.”
- Most of our core countries now collect data electronically on tablets. Tablets help safeguard data quality by reducing opportunities for human error, for instance, by automating skip patterns and disallowing illogical responses. For data still collected on paper, we double enter each survey into our computer system and reconcile any differences that emerge.

### Addressing selection bias through Propensity Score Matching

Selection bias is another challenge that can affect the reliability of our impact results. As explained in the earlier overview of our core M&E methodology, we evaluate our impact by comparing clients’ harvests to those of neighbors who did not join One Acre Fund. While neighbors offer a strong comparison (e.g., because they farm under the same general agro-ecological conditions), they may still embody important differences when compared to farmers who select into our program. For example, they may be comparatively less motivated, less educated, or more risk-averse, or they may already have access to farming inputs and knowledge. Such differences could lead to over- or under-estimations of our impact.

Propensity score matching (PSM) is one statistical technique that we use to help control for such pre-existing differences. The method involves developing a “propensity score” for each farmer in our sample; this score shows her likelihood of being in our treatment or comparison group based on observable characteristics (e.g. wealth, family size). We then look at the distribution of the propensity score among treatment and comparison farmers and use the overlap to generate a matched sample; for each customer in the program region, we find a statistical “twin” farmer who has a similar propensity score but who did not join our program. We use these matched pairs to calculate a more robust program impact figure. In 2015, One Acre Fund applied PSM in almost all core countries; as of 2016, we are incorporating PSM into all of our core country impact measurements.

### Supplementary studies: randomized control trials

We have also undertaken more rigorous evaluations to verify our standard M&E estimates. For example, we have carried out two randomized control trials (RCTs) of our program to date. RCTs are considered the “gold

standard” in social science research because they involve randomly selecting participants to either receive or be excluded from an intervention, eliminating selection bias. However, RCTs also have notable drawbacks:

- They require us to withhold services – and prolong hunger – for farm families we could otherwise serve
- They risk damaging our reputation, as farmers are de-enrolled as a result of the randomization design
- They are expensive, time-consuming, and operationally complex
- They cannot be implemented over broad geographic expanses, and therefore pose less strategic value than our internal M&E, which is conducted across our entire operating territory

Nonetheless, One Acre Fund has committed to undertake periodic RCTs, largely in order to verify that our internal M&E methods are providing accurate signals of our impact.

The first RCT of One Acre Fund’s program was conducted in Western Kenya in 2009 by an external research team from the Poverty Action Lab (JPAL). A key purpose of the study was to assess the validity of our early impact measurement methodology; indeed, the RCT found percent and dollar profit impacts that were substantially lower than the associated results from our internal M&E. These findings spurred important modifications to both our M&E and broader program. In terms of M&E, we enhanced our data quality, made our impact measurement assumptions more conservative, and overhauled our hiring and training of M&E agents. Beyond M&E, the RCT’s findings encouraged the strategic decision to diversify our programming for greater impact – today, we estimate that a majority of our impact comes from non-maize crops and add-on products.

In 2014, we conducted another RCT in Western Kenya. One Acre Fund conducted the data collection for this study, while IDinsight (an NGO devoted to supporting the use of rigorous evidence in global development work) advised on the design and conducted independent data analysis.<sup>33</sup> Ultimately, the 2014 RCT identified impact results that were highly similar to our internal M&E efforts in that same year. In fact, the RCT estimated a greater maize profit increase than our internal M&E, at \$91 compared to \$87 (see below).

Measurement Effort	ESTIMATED% IMPROVEMENT IN MAIZE PROFIT DUE TO ONE ACRE FUND’S PROGRAM	TRANSLATED\$ (USD) IMPACT ON CLIENTS’ FARM PROFIT, FROM MAIZE ALONE
2014 randomized control trial	31% <sup>1</sup>	\$91
2014 internal M&E	21%	\$87

<sup>1</sup>Significant at the 0.09 level using wild-cluster bootstrap to adjust for low number of randomization units (we believe this to be the correct regression specification). Naive regression specification without adjustment is significant at the 0.01 level.

[This recent paper](#) provides a much more detailed summary of the methodology and results of both of our RCTs.

**Supplementary studies: difference-in-difference estimates**

Finally, we also validate our internal M&E through the use of difference-in-difference estimations, which are a common approach for mitigating selection bias. Difference-in-difference estimations involve comparing 1) the change in harvest yields among farmers who participate in One Acre Fund’s program, with 2) the change in harvests among those who do not participate in our program.

<sup>33</sup> IDinsight’s full analysis of the 2014 RCT may be found [here](#), and their view of study limitations may be found [here](#)



In 2015, we implemented small-scale difference-in-difference studies in three of our core countries: Kenya, Tanzania and Burundi.<sup>34</sup> We measured the yields of several hundred farmers, none of whom had participated in our program in 2014, but some of whom joined in 2015.<sup>35</sup> This allowed us to compare the year-over-year yields of farmers who joined our program with the year-over-year yields of similar farmers who did not. The studies found strong evidence of program impact on yield. Further, their results were very similar to our standard M&E:

Country	DIFF-IN-DIFF SAMPLE SIZE	DIFF-IN-DIFF ESTIMATE (KG/ACRE)	ANNUAL M&E ESTIMATE (KG/ACRE)
Kenya (maize)	281	445	476***
Kenya – Western Province	205	641***	559***
Kenya – Nyanza Province	76	Not statistically significant	331***
Tanzania (maize)	104	490**	478***
Burundi (beans)	148	56***	48.8***

\*\*\* p-value < .01; \*\* p-value < .05; \* p-value < .10

Additional information on our difference-in-difference studies is available in [this memo](#). While these estimates are not a perfect comparison to our regular M&E (which cover a much larger geographic area), they nonetheless suggest that selection bias is unlikely to explain measured differences between One Acre Fund and comparison farmers post-program. Ultimately, we believe that our standard rigorous internal M&E, along with the various more rigorous studies we have undertaken to date (e.g., RCTs and difference-in-difference studies), form a strong body of evidence that One Acre Fund positively impacts farmer profits.

**M&E in Action:** We take external validation of our M&E results very seriously. As noted, One Acre Fund’s 2009 RCT drove significant organizational learning and improvement. In terms of M&E, the study led us improve our approach to control group selection, strengthen our requirements for M&E staff hiring and training, and increase the rigor of our harvest sampling (see [this blog post](#) for more information on our sampling approach).

The results from the 2009 RCT also drove program modifications to support deeper impact. After finding that some of the study’s farmers experienced negative returns to program participation, we took key steps toward client protection; specifically, we enhanced our customer screening and began a crop insurance program that we believe is now the largest for staple-crop smallholders in Sub-Saharan Africa. Further, results from the study were an important factor in the establishment of One Acre Fund’s Agricultural Innovation team, which works to diversify and boost our crop program impact. Today, this team runs dozens of trials with thousands of farmers, testing everything from fertilizer dosage to appropriate spacing practices for new crops. Successful trials are introduced to our client network via improved farmer trainings, unlocking greater yield increases.

We believe that these M&E and programmatic enhancements are directly responsible for bringing our internal measurement results much closer in line with the findings from our second (2014) RCT.

<sup>34</sup> We did not undertake a difference-in-difference study Rwanda because the study’s scope did not fit the season’s timeline.

<sup>35</sup> It was challenging for our M&E staff to obtain larger samples for these studies because of the difficulty in predicting how many control farmers would become One Acre Fund farmers in year two of the study.

## 1.7. HOW EVENLY DISTRIBUTED IS ONE ACRE FUND'S IMPACT?

Since we typically measure and report our program impact in terms of averages, it is important to understand how consistently our clients achieve One Acre Fund’s average seasonal impact figure. For example, one might wonder if our impact is bolstered by a small number of “super farmers” who mask the relatively weak impact achieved by a large share of our client base – a potentially problematic situation. Beyond validating our overall impact, understanding our “impact distribution” can also help us to identify and better support areas or client subsets that routinely experience lower program impacts. While there is no standard way to measure impact distribution, the three different approaches shared below all point to the same result: One Acre Fund’s impact is well-distributed, and we do not experience disproportionate failure rates among any subset of clients.

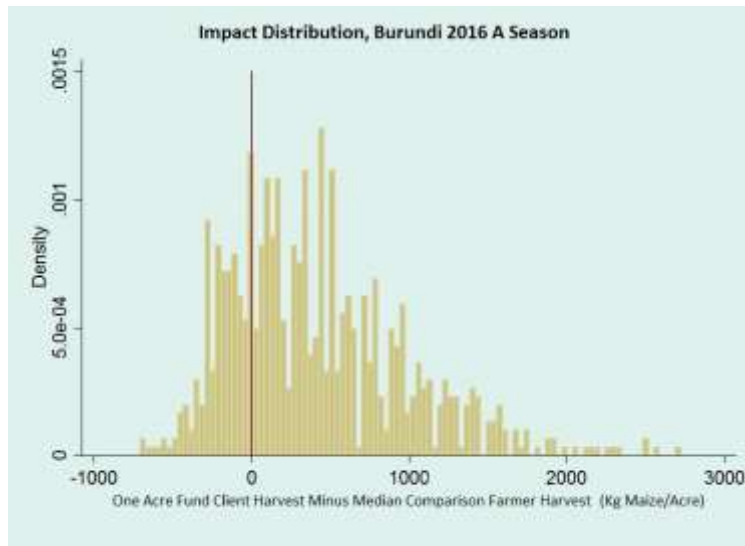
We first explored this question in 2014 by simply comparing our mean and median impact across our core countries. If a small number of especially successful farmers were pushing our average results upward, then we would expect our mean impact to be significantly greater than the median impact figure. We did not find this to be the case; organization-wide, our mean and median agricultural impact per farmer were highly similar, with the mean only 2% higher than the median impact. However, as shown in the chart below, the analysis revealed some country variation. In Burundi and Rwanda, the “typical” (median) farmer performed better than the mean farmer. This was likely due to a minority of under-performing farmers who pulled down the average. Meanwhile, in Kenya and Tanzania the “typical” (median) farmer did perform slightly worse than the mean farmer.<sup>36</sup>

Country	MEAN IMPACT/FARMER	MEDIAN IMPACT/FARMER	% DIFFERENCE
Kenya	\$117	\$95	23%
Rwanda	\$94	\$110	-15%
Burundi	\$66	\$83	-20%
Tanzania	\$94	\$89	6%
<b>WHOLE PROGRAM (weighted by program size)</b>	<b>\$100.78</b>	<b>\$98.67</b>	<b>2%</b>

In 2015, One Acre Fund took a more detailed look at the distribution of impact in our core countries. In general, we expect our farmer impact to follow a normal/Gaussian distribution (i.e., a bell curve): some farmers will respond particularly well to our program, some will achieve a median impact, and others will respond less well. This impact distribution can be affected by a number of factors, such as differences in farmers’ inherent motivation, or issues such as weather and soil conditions. Our 2015 analysis sought to measure whether there was a significant proportion of individual One Acre Fund farmers whose impact was worse than the median impact per farmer, relative to what would be anticipated in a normal distribution.

<sup>36</sup> The mean and median impact estimates for Tanzania have since changed to more fully account for One Acre Fund’s program fees. However, this adjustment likely does not change the difference between mean and median estimates.

The study measured the yields of median comparison farmers in One Acre Fund districts (thus accounting for geographic variation) and subtracted these figures from the yields of hundreds of individual One Acre Fund farmers.<sup>37</sup> This produced a distribution of actual program impact, rather than client harvest size.



The analysis revealed a relatively ‘normal’ distribution of impact across our core countries. For example, the image to the left illustrates that our impact in Burundi essentially follows a bell curve, and is not driven upward by an unusually large number of “super farmers” (which would result in a longer right ‘tail’ of the histogram). Moreover, the image shows that the vast majority of One Acre Fund farmers achieve significantly better yields than the median comparison farmer in their district. In a normal distribution, we should mathematically expect 16.8% of One Acre Fund farmers to achieve yields below the median comparison

harvest in their district – instead, we see this result among only 11% of clients. This suggests that One Acre Fund’s distribution of impact is well within mathematical reason, and is not cause for concern.

However, we are not satisfied with simply knowing the percentage of One Acre Fund farmers who underperform relative to comparison farmers – we want to know who our underperforming clients are, in order to better meet their needs. Thus, we undertook a close examination of farmers at the lower end of the distribution, analyzing differences vis-à-vis our more successful farmers. Unsurprisingly, we found that underperforming farmers were less likely to adopt key planting practices such as correct seed spacing and fertilizer dosing. We also found some demographic differences; for example, in Rwanda, underperformers were slightly more likely to be women, and in Burundi, they were more likely to farm less land, and have smaller families. We are now leveraging such insights at the country level (e.g., via tailored trainings) to maximize the likelihood of success for all clients.

Beyond poor performance, we have also examined ‘failure rates’ in our program. We define our failure rate as the percentage of One Acre Fund farmers who do not make a profit on their harvest (i.e., where farm revenues are less than input costs). As it is particularly important to understand how our clients’ failure rate compares with the corresponding failure rate of unenrolled comparison farmers, we examined this question at the district level in 2015. Across all core countries, we found our clients’ failure rates to be quite low, and similar to or lower than the corresponding failure rates of comparison farmers. In Tanzania’s 2015 season, for example, only 2.5% of One Acre Fund farmers failed, compared with an estimated 4.5% of comparison farmers in the same season.

Finally, we have also examined whether our program impacts vary across the different segments of our target population. Our most in-depth analysis to date, undertaken in 2015, focused on five key dimensions: household

<sup>37</sup> While the median comparison farmer is not necessarily the perfect counterfactual for each individual client (e.g., in the case of One Acre Fund farmers who reside on particularly degraded land), we nonetheless see this method as a fair proxy.

size, education level, age, gender, and wealth level. After defining criteria for the sub-groups within each dimension (e.g., males and females), we compared the mean harvests of One Acre Fund and comparison farmers within each sub-group (e.g., female One Acre Fund farmers and female comparison farmers) to measure the impact of program participation. We then compared the outcomes of both sub-groups in each category (e.g., impact for males versus impact for females) to identify any statistically significant divergent program impacts. The table below summarizes key findings by sub-group, country, and crop.

**Program impact on yields of key subgroups**

Sub-Group	KENYA	RWANDA			BURUNDI		TANZANIA
	Maize (kg/acre)	Climbing beans (kg/acre)	Maize (kg/acre)	Bush beans (kg/acre)	Climbing beans (kg/acre)	Maize (kg/acre)	Maize (kg/acre)
Older client <sup>38</sup>	441.8***	168.68***	238.36**	84.60	156***	128.8**	515.4***
Younger client	327.7***	100.2**	219.4*	57.08	132.4***	156	376.1***
Above average wealth index <sup>39</sup>	434.8***	89.88*	275.4**	59.600	157.2***	95.2**	312.7***
Below average wealth index	467.2***	149.84***	208**	53.760	134.8***	84.4**	597.1***
More education <sup>40</sup>	444.2***	118.88***	250***	56.76*	137.6***	137.6**	58.4
Less education	403.9***	192.84***	153.88	145.2*	154.8***	120.4*	548.4***
Large household <sup>41</sup>	377.3***	196.72***	293.92*	21.68	136.4***	35.6	519.1***
Small household	442.6***	114.12***	218.8***	77.2**	149.2***	188***	501.6***
Respondent female	406.7***	83.92**	213.44**	70.08*	136.8***	170.8**	577.9***
Respondent male	476.3***	220.52***	251.6**	65.08	151.2***	90	369***

\*\*\*p-value < .01; \*\* p-value < .05; \* p-value < .10 in program impact for that sub-group.  
 Shaded indicates a statistically significant difference **between** sub-groups

Overall, we found strong program impacts on yields of almost all sub-groups. The analysis revealed very few statistically significant differences between sub-groups, and few consistent trends across crops and countries. This suggests that we are not systematically failing any particular sub-group. Still, two key points emerged:

- We do seem to have a greater impact among older clients (though the differences between sub-groups are not statistically significant). This might be due to the fact that younger farmers who do not enter our program have easier access to knowledge, training and credit, so our impact (relative to non-participants) is not as great. The difference might also be because younger farmers are less agriculture-

<sup>38</sup> “Older clients” in Rwanda and Burundi are older than 35, whereas in Kenya and Tanzania they are older than 30. These cutoffs were informed by the distribution of the data.

<sup>39</sup> We created a wealth index based on survey data of clients’ assets; this sub-group was cut off at the median of the index.

<sup>40</sup> Education levels, and thus education sub-group definitions, varied significantly by country. In Burundi, for example, the lower-educated group had almost no education, whereas in Tanzania this group had completed primary school.

<sup>41</sup> Cut off at the median household size

dependent and invest less in their farming. As a result of these findings, we have begun to research ways to better retain and attract younger farmers (e.g., in our approach to program marketing).

- Tanzania showed the largest differences between sub-groups, with the less educated and the less wealthy benefiting the most from our program. This might be because wealthier farmers in Tanzania have greater access to credit and knowledge, therefore decreasing our relative impact in that population. This may be viewed as a positive finding, as it means that we are having the greatest impact on the subset of the country's population facing the greatest need.

**1.8. DO LONGER TENURED ONE ACRE FUND FARMERS PERFORM BETTER THAN NEWER FARMERS?**

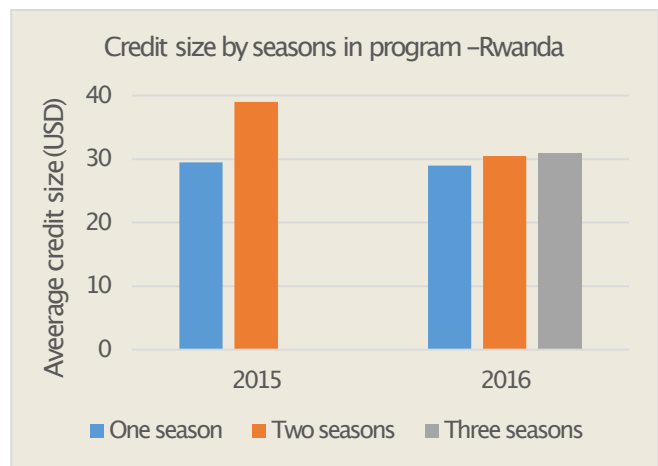
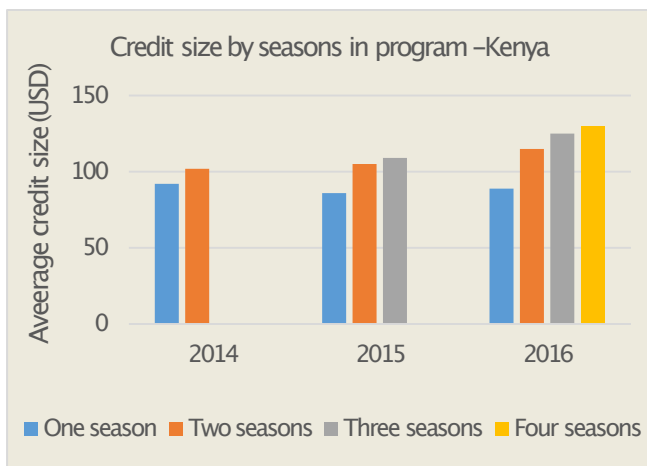
Many One Acre Fund farmers choose to re-enroll in our program year after year. A 2015 survey of nearly 2,000 Kenyan One Acre Fund farmers showed that almost half had previously farmed with One Acre Fund, and over half of returning farmers were joining for at least their third season. Incredibly, several farmers in the study reported participating in our program for eight seasons. In Rwanda (our second oldest country program), a 2015 survey of over 4,000 clients revealed that roughly two thirds of One Acre Fund farmers had previously enrolled in our program, with 4.7 seasons as the average length of participation (One Acre Fund supports two program seasons per year in Rwanda).

In 2015, we took a critical look at whether longer-tenured farmers reap greater harvests. This analysis compared average harvest yields between veteran farmers and newer farmers (cut-off at the median length of program participation). As shown below, across almost all crops, in all countries, we saw a statistically significant increase in yields for farmers who had been in the program longer than the median. While this finding does not necessarily mean that program tenure is driving the increase (since the study did not rigorously control for selection bias) the data are nonetheless suggestive.

	KENYA	RWANDA				BURUNDI			TANZANIA
	Maize (kg/acre)	Climbing bean	Bush bean	Maize	Bean 15A	Maize 15A	Bean 15B	Potato 15B	Maize (kg/acre)
Veteran farmers' yield increase (kg/acre)	+112.68***	+128***	+31.6	+92*	+136.8***	+123.08**	-20.4	+724.2**	-106.6
Sample size	1174	524	322	396	584	351	2881	80	422

\*\*\* p-value < .01; \*\* p-value < .05; \* p-value < .10

Moreover, our administrative data show that returning farmers take increasingly larger package sizes with each additional year of enrollment, as shown in the figures below.



---

This suggests that many longer-tenured farmers take advantage of One Acre Fund's ever-expanding catalog of add-on products, which now includes offerings from diverse sectors including energy (e.g., solar lights, cook stoves) and health (e.g., reusable sanitary pads). These products have the potential to create significant additional impact for adopting farm families.

Therefore, greater package size coupled with improved harvest yields does imply that, in general, longer-tenured farmers experience a greater benefit from our program. Our longitudinal Quality of Life study (discussed in detail in Theme 2 of this report) will provide a more rigorous look at this question by tracing individual farmers' progress over an extended time period. In this study too, we find strong evidence that longer-tenured farmers perform better in our program (albeit, again, with imperfect control for selection bias).

### 19. WHAT HAPPENS TO FARMERS WHO LEAVE ONE ACRE FUND?

Participation in One Acre Fund’s program is voluntary – farmers can choose to re-enroll with us as long as they see a benefit and have paid off the prior season’s loans. We currently experience a strong retention rate, estimated at over 75% across our core countries. Nonetheless, we aim for certain program benefits to endure among clients who choose not to re-enroll in One Acre Fund. In particular, we intend for ex-clients to retain the improved agronomic practices shared through our program trainings, and hope that they can continue to access improved farm inputs for achieving strong harvests.

It can be difficult to rigorously track outcomes among ex-clients. Farmers typically leave our program for individualized reasons, which can have divergent impacts on their ensuing harvests (e.g., if the head of the household secures a job, they may leave One Acre Fund because they are less focused on farming, or they may leave our program because they are more able to obtain farm inputs without credit). Setting aside such challenges, data collected from Rwandan ex-clients in 2013 and 2014 found that ex-clients’ fertilizer use was measurably greater than among farmers who had never enrolled in our program. These differences varied by crop, yet overall, ex-clients were considerably more likely (50%) to use fertilizer than comparison farmers when controlling for gender, dependents, education and possession of a radio (a proxy for wealth).

Crop	OLS REGRESSION: % OF FARMERS WHO USE ANY FERTILIZER (controlling for gender, dependents, education and possession of radio, as a wealth proxy)			
	% of Ex-clients	% of Never-clients	% Difference	Sample size
Climbing beans	27.1%***	13.8%***	96.6%***	1,061
Bush beans	13.6%**	7.5%**	80.4%**	1,190
Maize	42.0%***	28.8%***	46.1%***	1,039
Potatoes	20.6%***	3.6%***	472.7%***	237
Rice	0.0%	2.8%	-100.0%	83
<b>Overall</b>	<b>62.3%***</b>	<b>42.4%***</b>	<b>46.9%***</b>	<b>1,957</b>

\*\*\* p-value < .01; \*\* p-value < .05; \* p-value < .10

The same data also revealed that ex-clients achieved greater yields than ‘never-clients’ for some crops. Specifically, we found a statistically significant ~30% average yield increase for potatoes and rice in both of Rwanda’s planting seasons (A and B). However, the data did not find significant yield increases for other crops, including maize. This is somewhat surprising given the fact that ex-clients were more likely to retain practices and inputs for such crops. The results could be due to the study’s relatively small sample size.

Crop	OLS REGRESSION: % OF FARMERS WHO USE ANY FERTILIZER (controlling for gender, dependents, education and possession of radio, as a wealth proxy)			
	Ex-clients (kg/acre)	Never-clients (kg/acre)	% Difference	Sample size
Potatoes (14A)	4,930***	3,752***	31.4%***	154
Potatoes (14B)	3,709**	2,791**	32.9%**	117
Rice (14A)	3,091***	2,423***	27.6%***	125
Rice (14B)	2,818***	2,150***	31.1%***	86

\*\*\* p-value < .01; \*\* p-value < .05; \* p-value < .10

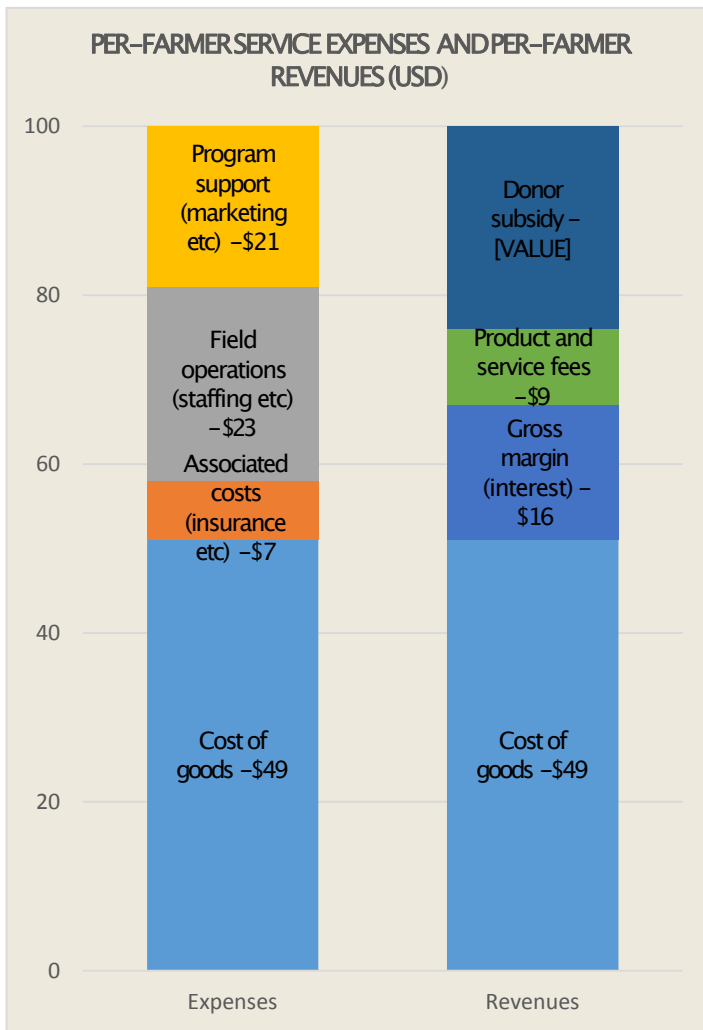


This data allows us to extrapolate One Acre Fund's average impact among ex-clients. We estimate that former One Acre Fund clients in Rwanda retain roughly one-fourth of the incremental yield increase achieved through our program. It should be noted that this finding can only be extended to our Rwandan ex-clients. We will undertake a similar study to measure the impact of our program on Kenyan ex-clients in the 2016 season.

M&E in Action: In contrast to other organizations whose projects have pre-set end dates, every aspect of our work is designed to deliver sustainable long-term results to farm families. One Acre Fund aims to generate permanent impact in the countries and communities we serve, and we do not have an explicit 'exit strategy.' This philosophy, encapsulated in our organizational focus on 'commitment strategies,' is bolstered by the results from our 2013-14 Rwandan ex-client study, discussed above. While we were heartened to see that ex-clients in the study achieved higher yields than farmers who had never joined One Acre Fund, we believe that the relatively small proportion of incremental yield retained (25% of current clients' incremental yields) is not strong enough to justify exiting existing areas of operation. Simply put, our clients' livelihoods would suffer. We continue to investigate this question, yet overall, we see a strong strategic rationale for pursuing a continued commitment to clients in our current areas of operation.

**1.10. HOW COST EFFECTIVE IS ONE ACRE FUND AT DELIVERING IMPACT?**

One Acre Fund is a social enterprise, and farmers pay to receive our ‘bundle’ of goods and services. However, because of the depth of poverty experienced by our target population, we currently require a ‘donor subsidy’ to fill the gap between our core program revenues and expenses.



The chart to the left shows a 2016 forecast of One Acre Fund’s average per-client costs and revenues across our core countries. One Acre Fund charges our customers the full cost of goods (inputs and add-on products) that we distribute, plus a relatively small amount in fees and interest. In 2016, we project that we will require \$26 in donor funding to balance our costs and extend our program to a farm family for the growing season.

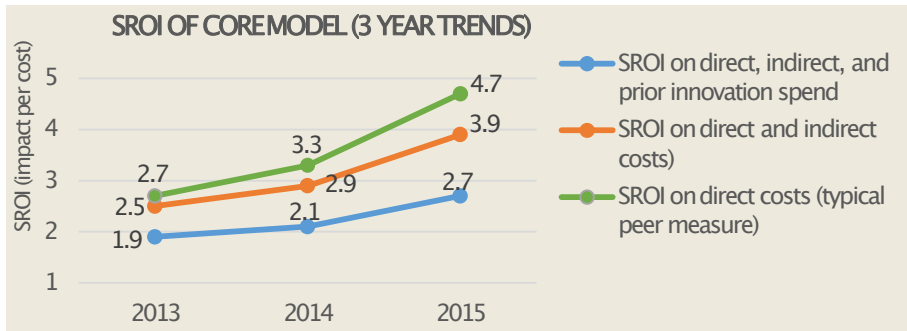
We place critical importance on understanding how the incremental profit that we achieve for each farm family served compares to the donor subsidy that we require to generate this profit. We call this key cost-effectiveness ratio ‘Social Return on Investment,’ or SROI.

In the simplest sense, calculating SROI involves dividing our average impact per farmer by our average costs per farmer. The earlier sections of this report go into great detail on how we obtain the numerator (impact per farmer) of this metric; however, the denominator (costs per farmer) is less straightforward, requiring certain assumptions about the appropriate costs to include.

We have identified three main cost constructs, which would lead to reasonably different SROIs:

1. Direct field (program) costs: These are the direct costs required to deliver our core program in the current year, as shown in the figure above. Note that we do include what some might consider indirect costs (e.g., HR, finance, technology), but only to the extent they are fully related to extending our core program to clients. This is our standard definition of costs in SROI, since our research suggests that this definition is the one most commonly used by peer nonprofits in reporting their costs per client.
2. Direct field costs + indirect organizational costs: This cost construct uses a line-item allocation methodology to include organization-level indirect costs that are allocated to our core program as well as other business units (e.g., executive and corporate finance departments).
3. Direct field costs + indirect organizational costs + prior innovation costs: This most conservative cost construct also includes an allocation of prior innovation spending, recognizing that prior R&D investments

have contributed to our core program’s current impact. For instance, our 2016 investment in product innovation (e.g., trials of new planting techniques and products) will not contribute to our 2016 impact per farmer, but it should contribute to future years’ impact, up until the R&D becomes obsolete. This construct thus involves taking into account the average of the preceding five years of innovation costs, reflecting the assumption that R&D spending takes one year to be productive, and has a productive ‘lifetime’ of five years.







The chart to the left demonstrates One Acre Fund’s organization-wide SROI for the past three years, calculated under these three different scenarios. As can be clearly seen, regardless of the cost calculation, we have steadily

boosted our organization-wide SROI between 2013 and 2015 (the last year for which data is currently available.)

<b>Impact/client:</b>	\$135	\$116	\$137
<b>Cost/farmer:</b>	\$50, \$54, \$70	\$35, \$41, \$55	\$29, \$35, \$51
	<b>(3 scenarios)</b>		

One Acre Fund also calculates SROI at the country level. The table below shares our 2015 per country SROI (cost per farmer is shown utilizing method 1, direct costs only). These more granular calculations can be particularly valuable in strategic decision-making about resource allocation.

2015 Data	IMPACT \$/FARMER	DONOR SUBSIDY \$/FARMER	SROI (IMPACT/COST)
KENYA 	\$211	\$24	8.8
RWANDA 	\$52	\$31	1.7
BURUNDI 	\$99	\$17	5.8
TANZANIA 	\$87	\$42	2.0
<b>WHOLE PROGRAM<sup>42</sup></b>	<b>\$137</b>	<b>\$29</b>	<b>4.7</b>

A final, important question is how One Acre Fund’s SROI compares to other organizations and models seeking similar outcomes with our target population. Admittedly, this is a difficult topic to address. While for-profit organizations can compare their success along the common metric of ‘profit,’ nonprofits all define impact differently. Even among those focused on our primary metric (incremental profits generated), slight differences in measurement rigor and target population can make a huge difference in SROI calculations. Further, and crucially, SROI is just ‘one part of the puzzle’ – the scale over which that SROI is generated is equally important.

<sup>42</sup> Whole program SROI here includes costs of operations in Uganda and Malawi, which were still in the pilot stage in 2015.

With these challenges in mind, we believe that the best comparison for our program is East African government agriculture programs (e.g., extension services and fertilizer subsidy programs). Unlike most similar non-profit programs in our areas of operation, these government programs have been rigorously evaluated, often reach our target population, and operate at large scale. Literature suggests that relevant extension programs typically achieve negligible SROI,<sup>43</sup> while fertilizer subsidy programs average an SROI of 1.5 – roughly a third of One Acre Fund’s SROI.<sup>44,45</sup> For these reasons, we believe that One Acre Fund’s SROI does compare favorably.

In publishing our SROI figures and cost-effectiveness methodology, our strong hope is that we can expand the use of this approach among interventions that work with staple crop smallholder families. We provide a deeper discussion of this metric – and the impact that it has had on our work – in a 2015 blog entry titled “[Measuring Social Return on Investment Before You Invest.](#)”

**M&E in Action:** We believe that SROI can and should serve as a tool to help results-oriented donors and policymakers decide where to direct their support. As briefly noted in this section, SROI is also a highly useful metric for guiding the internal decision-making of implementing organizations. In 2015, One Acre Fund began using SROI as part of a new ‘investment framework’ for resource allocation (which also includes criteria such as scale potential, proof level, and complexity). We have committed to biannual SROI reviews of our various activities at the program and country levels (e.g., Burundi core program, Rwanda systems change extension partnership), with an eye towards reallocating resources to their most efficient use.

For example, and as shown in the table above, our Kenya and Burundi core programs had above-average SROIs in 2015. Accordingly, we are now challenging these countries to deploy additional resources (at their favorable SROIs) to grow more quickly. On the other hand, since our Rwanda and Tanzania programs showed lower-than-average 2015 SROIs, we have challenged these countries to grow more efficiently. In light of these findings, our Rwanda core program team embarked on a successful exercise to cut nearly \$1 million from its core program deficit in 2016 (about \$6 per farmer). Ultimately, SROI is a key tool for ensuring that our work – and impact – is achieved as cost-effectively and sustainably as possible.

---

<sup>43</sup> See [3ie’s 2014 systematic review](#), [World Bank 2000 study](#) of Kenya’s extension system. Both suggest that at-scale, government-delivered agricultural programs were largely ineffective.

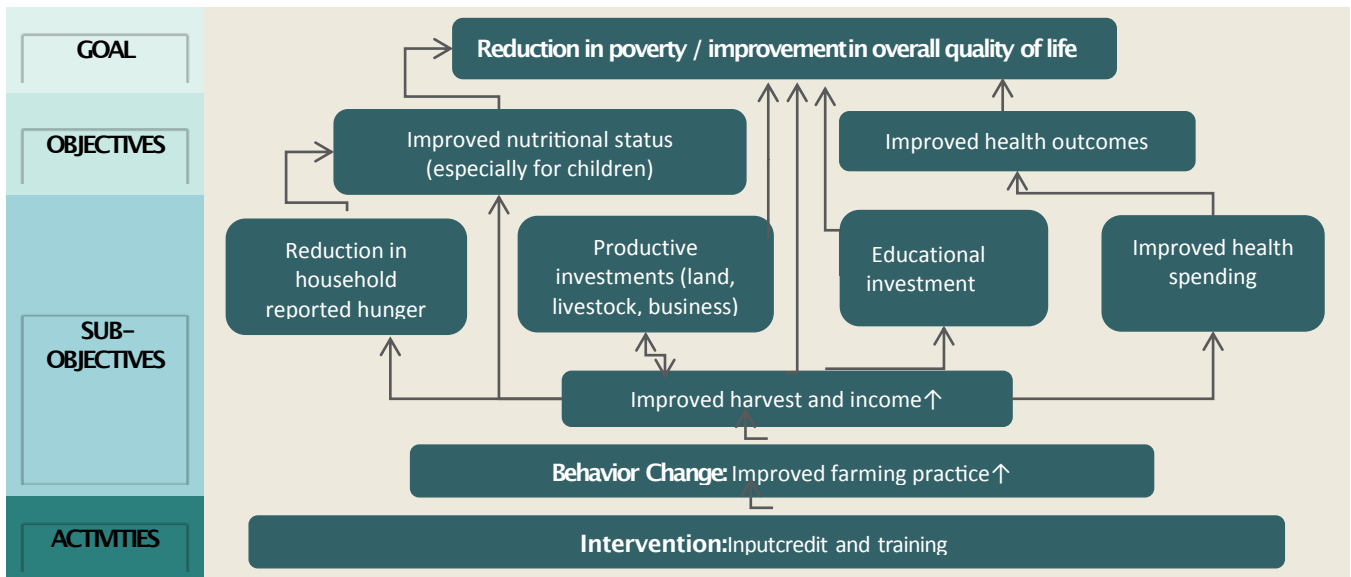
<sup>44</sup> See [JPAL 2008 study](#) of fertilizer subsidies in Western Kenya – which suggests a 1.36 SROI. See also [Campbell Collaboration’s 2014 forthcoming systematic review](#), which notes “empirical studies generally revealed negative impacts and difficulties in cost control, diversion [...], overuse of inputs and capital \*...†, regressive benefits, and market distortions inhibiting private investment in agricultural services.”

<sup>45</sup> Moreover, this is consistent with our own experience. As noted earlier in this report, findings from an internal study in Burundi demonstrated that, in isolation, training or fertilizer has a limited impact on yield. In the study, comparatively massive yield gains were achieved by farmers who used farm inputs and fully adopted methods introduced in trainings.



## THEME 2: Measuring Holistic Impact on the One Acre Fund Farmer

As One Acre Fund has grown and matured, so has our conception of impact. Specifically, we have steadily broadened our focus beyond incremental farmer profit; this is in line with our organizational theory of change. As shown below, we stipulate that the income boost generated by our program enables productive investments which, over time, lead to meaningful improvements in the wellbeing of client families.



While this notion has always guided One Acre Fund’s work, in 2015, we reformulated our organizational vision to more explicitly focus on our downstream impacts: we see a future where every farm family has the knowledge and means to achieve big harvests, support healthy families, and cultivate rich soil.

We have adjusted our M&E efforts to obtain a better picture of One Acre Fund’s progress toward this vision. As explained in Theme 1, our M&E to date has centered on gauging our success in supporting ‘big harvests’ for our clients. We have now begun to supplement our core harvest M&E with new analyses to rigorously measure our progress in supporting healthy families and rich soils. Early results from these studies are shared below.

## 2.1. DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM REDUCE HUNGER AND IMPROVE HOUSEHOLD FOOD SECURITY?

Our clients frequently report that joining One Acre Fund helps to eliminate chronic hunger in their households. However, we are not satisfied with anecdotal evidence. Therefore, in 2015 we launched two rigorous analyses that explore our program's impacts on hunger and food security: our annual mini-quality of life study (mini-QoL) and our longitudinal quality of life study (longitudinal QoL).

### Mini-QoL findings on hunger and food security

The mini-QoL is an annual study intended to serve as a 'pulse check' on farmers' quality of life. Here we refer to the 2015 study, which includes our latest available results. The 2015 mini-QoL included a short survey with modules covering hunger, education, major purchases, and health. M&E enumerators in each of our core countries (Kenya, Rwanda, Burundi, and Tanzania in 2015) administered this survey to three categories of farmers: new One Acre Fund farmers, veteran One Acre Fund farmers (who had participated in our program for one year or more), and unenrolled comparison farmers. Each country's sample was geographically diverse and large, ranging from roughly 1,000 total farmers in Burundi and Tanzania to over 6,000 total farmers in Rwanda.

The most rigorous assessment of One Acre Fund's program impact in the mini-QoL is between the category of new One Acre Fund farmers (who have entered our program but have yet to see a harvest) and veteran One Acre Fund farmers (who have already benefited from our program in the prior year). This is because 'new' and 'veteran' One Acre Fund farmers have both self-selected into our program and are thus presumably highly similar, allowing us to attribute measured differences to One Acre Fund's impact.<sup>46</sup> Accordingly, this is the measure of impact most frequently utilized in this report.

The mini-QoL assessed hunger and food security in each One Acre Fund core country through the externally validated Food and Nutrition Technical Assistance Household Hunger Scale ([FANTA HHS](#)). The FANTA HHS is a streamlined indicator consisting of the following three questions<sup>47</sup>:

- In the past 30 days, was there ever no food in the household? (Number of occurrences recorded)
- In the past 30 days, did you or any household member go to sleep at night hungry because there was not enough food? (Number of occurrences recorded)
- In the past 30 days, did you or any household member go a whole day and night without eating anything at all because there was not enough food? (Number of occurrences recorded)

Responses to these questions were then scored based on frequency of occurrences. The total FANTA HHS score is the sum of the numerical score for all three questions, with 0 as the minimum cumulative score, and 6 as the maximum. In addition to the FANTA HHS, the mini-QoL assessed hunger and food security through several

---

<sup>46</sup> Nonetheless, focusing on these farmer categories does not entirely eliminate the possibility of selection bias. For example, early adopters (i.e., those more likely to sign up for our program) may be healthier and wealthier on average than late adopters. While we admittedly cannot entirely control for such factors within this study, numerous client demographic analyses suggest that the likely magnitude of such bias is small if any.

<sup>47</sup> The mini-QoL survey was administered close to the hunger season to maximize our ability to capture hunger and food security impacts through the FANTA HHS.

survey questions concerning maize availability from the prior harvest. For example, farmers with no remaining maize were asked when they ran out of food in order to determine the average length of their hunger season.

In all four countries, the mini-QoL found statistically significant reductions in hunger between new and veteran farmers. Farmers who had participated in our program were significantly more likely to have some quantity of maize remaining from the prior season; veteran One Acre Fund farmers in Kenya and Rwanda had over 55% more maize remaining than new farmers. Additionally, the mini-QoL found meaningful improvements in FANTA scores across all countries, ranging from an 18% improvement in Rwanda to a 61% improvement in Tanzania.

Metric	KENYA		RWANDA		BURUNDI*		TANZANIA	
	New (n=1019)	Veteran (n=900)	New (n=1301)	Veteran (n=2930)	New (n=46)	Veteran (n=496)	New (n=341)	Veteran (n=245)
% with maize remaining from last season	49.6%	69.0%	6.2%	11.7%	–	–	86.8%	94.7%
% reporting no food to eat	15.0%	8.3%	11.3%	8.6%	9.0%	2.0%	15.0%	7.3%
FANTAscore***	.33	.20	.55	.45	.28	.08	.26	.10

All values are statistically significant at the p-value < .01 level (highly significant). The only exception is % of Rwandan farmers with maize remaining from last season, which is also highly significant with a p-value of .02

\*Burundi data was collected in 2016. Due to a lack of reliable survey data, we were unable to measure the percentage of farmers with maize remaining from the prior season in Burundi.

\*\*Higher FANTA score signifies greater hunger/lower food security

Ultimately, the mini-QoL has provided strong evidence that our program improves food availability and reduces hunger among the smallholder farm families that we serve.

### Longitudinal-QoL findings on hunger and food security

Meanwhile, our ongoing longitudinal QoL is building upon the results of the mini-QoL to provide a more rigorous and comprehensive understanding of One Acre Fund’s impacts on hunger and food security.

Like the mini-QoL study, the longitudinal study assesses the diverse downstream impacts of our program. Unlike this study however, the longitudinal QoL study will run for 3-5 years following the same farmers year after year, focusing only on Kenya and Rwanda (our most mature country operations) and investigating a wider range of indicators over time. The study uses a difference-in-difference approach comparing the change in indicators among those who join the One Acre Fund program, and those in a directly neighboring region in which we have committed to withhold expansion. We also utilize the technique of propensity score matching to further increase the rigor of this design and reduce potential bias.<sup>48</sup>

<sup>48</sup> In this design, One Acre Fund farmers reside in new program areas while comparison farmers reside in (highly similar) adjacent areas where our program will not operate for the duration of the study. The geographic boundaries of new One Acre Fund program areas thus serve to maximize comparability while minimizing potential bias from training spillover. Meanwhile, the difference-in-difference adjustment will help account for pre-existing differences among farmers by comparing and validating the year-over-year changes in outcomes among the different farmer categories. Lastly, PSM will help mute the differences in key baseline characteristics between the study’s different farmer groups.

While we have only completed baseline surveys in both countries, the Kenya baseline did include some farmers (about 300) who had participated in the year before. Because of this, we are able to compare newly enrolled farmers with those who have at least one year of impact to get an early indication of results. As in the mini-QoL, the first year results of the longitudinal QoL have revealed that veteran One Acre Fund farmers experience a clear reduction in hunger compared to new farmers. We validated our findings by subjecting the data to further analysis, running statistical regression models controlling for average age, household size, gender, and physical assets. As shown in the table below, results from the more rigorous OLS-regression models remained highly similar and highly statistically significant:

Metric	Data Controlling for Key Characteristics via OLS Regression	
	Difference between new and veteran farmers	P-value*
% with maize remaining from last season	25.1%	0.000
Amount of maize remaining (kg per acre)	59.6	0.048
% reporting “difficult” or “severe” hunger	4.2%	0.099

\*P-values are an indicator of statistical significance: smaller values (< thresholds of .1, .05, .01) typically denote significance

### Does One Acre Fund’s program impact nutrition?

Beyond short-term hunger and food security, the longitudinal QoL also focuses on longer-term health and nutrition outcomes, particularly child health. The longitudinal QoL uses anthropometric measures to gather data on key aspects of childhood health and nutrition (e.g., levels of stunting). For the duration of the study, field staff will record the physical weight, height and MUAC measurements<sup>49</sup> of children (under age six) in One Acre Fund and comparison households. In 2015, the longitudinal QoL captured such data for a total of 2,284 children.

Year one of the longitudinal QoL did not find significant nutritional impacts among veteran farm families. Rates of malnourishment, stunting, and wasting were highly similar between new and veteran farmers, with differences for each characteristic not statistically significant. We attribute this finding in part to the fact that it likely takes several years of program participation to see measurable nutritional impacts. However, we also recognize that this is an area where we can improve our programming. We are now working to deepen our analysis of nutrition and dietary diversity via the longitudinal QoL (e.g., by adding new survey questions), and we aim to see improvement in our related impact in the coming years.

<sup>49</sup> MUAC is an abbreviation for mid-upper-arm circumference, which is measured in conjunction with weight and height to identify malnourishment in children under five.



M&E in Action: The mini-QoL and longitudinal QoL have revealed that while our program meaningfully impacts hunger and food security, nutrition remains an area where our impact might be improved. Data from these studies is now supporting One Acre Fund's strategic decision to integrate a new nutrition focus across our core countries. Since 2015, we have begun pursuing a direct and multifaceted approach to improving client families' nutritional outcomes, including by trialing and rolling out client nutrition trainings (all countries), emphasizing the adoption of more diverse and nutritious crops (all countries), and trialing the delivery of new micro-nutrient supplements (to date, in Kenya). Moving forward, we will rigorously evaluate the impacts of these initiatives and will scale up efforts that pose significant potential to improve the nutritional outcomes of our client families.

## 2.2. DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM IMPROVE EDUCATIONAL OUTCOMES?

As with hunger and food security, we have significant anecdotal evidence suggesting that our program enables clients to send their children to school with fewer interruptions due to a lack of fees. Both the mini- and longitudinal QoL include education modules designed to rigorously explore whether and how One Acre Fund improves children’s education. Since it is difficult to obtain reliable data on the actual educational outcomes of children in our client families, the QoL studies use attendance, school expenditures, and study hours to gauge overall educational improvement.

### Mini-QoL findings on educational expenditures and children’s school attendance

Data from the mini-QoL study shows large, statistically significant increases in educational expenditures across three of our four core countries. We view higher educational expenditures as a sign that more of our clients’ children are attending higher-quality schools. Burundi was the only country where we did not see this increase; we believe that this is due to Burundi’s extremely low food security, which potentially requires a greater share of our Burundian clients’ incremental profits to go toward meeting immediate food consumption needs. The mini-QoL also found statistically significant increases in school attendance across all countries, except for Kenya. We suspect this is because school attendance in Kenya is already quite high.

Metric	KENYA		RWANDA		BURUNDI		TANZANIA	
	New (n=1019)	Veteran (n=900)	New (n=1301)	Veteran (n=2930)	New (n=46)	Veteran (n=496)	New (n=341)	Veteran (n=245)
% of school-age children attending school	73.0% (not sig)	74.0% (not sig)	66.1%	69.9%	63.0%	68.0%	90.1%	95.2%
Average school fees per child, USD*	47.75	64.48	4.77	7.00	8.78 (not sig)	8.71 (not sig)	22.97	51.81

All values are statistically significant at the p-value < .01 level (highly significant). The only exceptions are: % of Burundian children attending school (highly significant with a p-value of .03); % of Kenyan children attending school (not significant with a p-value of .91); and average school fees per child in Burundi (not significant with a p-value of .92)

\*Average school fees paid to date for the current school term

### Longitudinal-QoL findings on educational expenditures and children’s school attendance

Data from the first year of the longitudinal QoL in Kenya also supports the claim that One Acre Fund improves children’s educational outcomes. While the longitudinal QoL did not detect any impact on overall school attendance, the study did reveal differences in the percentage of children attending private schools, which are perceived to be of a higher quality than alternatives.<sup>50</sup>

We subjected these results to regression models controlling for clients’ age, education, household size, gender, and physical assets. In this follow-up analysis, differences in education spending were no longer statistically significant, yet differences in private school attendance remained significant, with veteran farmers 6.5% more likely to have children in private school. It is unclear why the analysis did not detect a robust impact on school spending, since private school enrollment would presumably affect this indicator. It is possible that the study’s

<sup>50</sup> While there is a chance that this finding reflects a pre-existing difference, anecdotal evidence suggests that parents in the families we serve tend to move their children to better schools when given the opportunity.

self-reported education expenditures are imprecise, making it difficult to detect an impact in a sample of this size – the longitudinal QoL will reassess this question in future years.

Metric	Data Controlling for Key Characteristics via OLS Regression	
	Difference between new and veteran farmers	P-value*
% of children attending private school	6.47%	0.000
Average school costs over last term, USD	4.16	0.153 (not sig)

\*P-values are an indicator of statistical significance: smaller values (< thresholds of .1, .05, .01) typically denote significance

### Other educational impacts

One Acre Fund has the potential to impact children’s educational outcomes through a variety of additional pathways. For example, substantial research has shown that improved nutrition is strongly linked to higher achievement in school.<sup>51</sup> Thus, by reducing household hunger, One Acre Fund enables children to attend school more regularly and supports greater learning while there.

Additionally, One Acre Fund enables children to study longer and in better conditions by distributing cost-saving solar lights. Highly rigorous internal studies of thousands of clients across our core countries have confirmed that this product enables an average of 3 hours per week in additional evening study time – a 30% increase in total study hours. Since we have now sold well over 300,000 solar lights across our countries of operation, we estimate that this incredibly popular program offering<sup>52</sup> unlocks a total of more than 90 million extra study hours for children in One Acre Fund farm families each year.<sup>53</sup>

**M&E in Action:** Extensive internal and external studies have demonstrated that One Acre Fund farmers use a significant portion of their new incremental profits to pay for children’s school fees. Yet because school fees are typically due a short time after harvest, many farmers are forced to sell their maize stores when prices are low, foregoing increased income later in the year, when prices can rise by an average of 30%.

To address this situation, our Kenya program is now in the late stages of trialing a maize storage loan linked to the amount of maize that farmers pledge to save until the off-season. Over four years of internal analyses have shown promising results. We estimate that the farmer adoption rate of these loans is roughly 20%, and that they generate an average impact of just under \$30 per adopter. Moreover, in an initial small-scale randomized control trial of the maize storage loan, 61% of participants reported that the intervention allowed them to pay children’s school fees when they otherwise could not. Pending further cost-benefit analyses, we may scale this promising educational product across our entire Kenya network in the coming season.

<sup>51</sup> Bain LE, Awah PK, Geraldine N, Kindong NP, Sigal Y, Bernard N, et al. (2013). Malnutrition in Sub-Saharan Africa: burden, causes and prospects. *Pan Afr Med J.* 15:120.

<sup>52</sup> One Acre Fund’s client roster reveals that the adoption rates of solar lights in Kenya are upwards of 50%.

<sup>53</sup> Assuming 2.5 school-aged children per household and 120 extra study hours per year.

### 2.3. DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM INCREASE CONSUMPTION AND ASSET ACCUMULATION?

For smallholder farm families living on the margins, levels of consumption and asset accumulation are central to the progression out of poverty. Researchers who study rural poverty often focus on consumption as a preferred metric over income because it is less vulnerable to under-reporting bias, and because it is a more direct measure of material well-being than income.<sup>54</sup> Meanwhile, ownership of productive assets is often seen as a key prerequisite for taking advantage of opportunities to reduce household poverty and improve overall wellbeing. Data from the first year of the longitudinal QoL in Kenya has demonstrated that One Acre Fund's program does indeed result in improvements in these two important areas.

#### Longitudinal-QoL findings on consumption

The longitudinal QoL in Kenya has revealed that veteran One Acre Fund farmers consume more than new One Acre Fund farmers, both in the short-term and on an annual basis. As with other findings from the longitudinal QoL, we confirmed results via regression models controlling for age, household size, education, and gender. One Acre Fund's impact on short-term and annual consumption remained large and statistically significant when controlling for these demographic factors. Specifically, program participation was correlated with a consumption impact of 147 Kenyan shillings every two weeks and 9,490 Kenyan shillings annually. At a conversion rate of 95 Kenyan shillings to the US dollar, this translates to ~\$1.50 in consumption impact every two weeks (\$38 per year) and a ~\$95 impact on large purchases each year, or ~\$130 in total annual consumption impact.

Metric	Data Controlling for Key Characteristics via OLS Regression	
	Difference between new and veteran farmers	P-value*
Value of all purchases in last 2 weeks, USD	1.55	0.042
Value of large purchases in the last year, USD	99.90	0.028

\*P-values are an indicator of statistical significance: smaller values (< thresholds of .1, .05, .01) typically denote significance

A separate study in Kenya – while subject to key limitations<sup>55</sup> – generated suggestive evidence that our program's impact on consumption may be even larger for longer-tenured client households. The study found that each additional season of enrollment in One Acre Fund increased farm families' average monthly consumption by \$10. A statistically significant program effect (at the p-value=.1 level) was also found in total income and in total savings, with each increasing as duration of program enrollment increased.

#### Longitudinal-QoL findings on asset accumulation

Beyond consumption, the longitudinal QoL also examined three main categories of assets: physical (e.g., home furniture, radios), financial (e.g., savings, cash) and livestock. Farmers were asked to estimate the current value of each respective asset (i.e., the price that they would be able to sell each item for today); outliers were removed to present a more typical farmer experience.

<sup>54</sup> Meyer, B. D., & Sullivan, J. X. (2003). Measuring the well-being of the poor using income and consumption (No. w9760). National Bureau of Economic Research.

<sup>55</sup> Specifically, the study's comparison group was not as rigorously selected as in our typical studies, potentially leading to omitted variable bias. Moreover, the analysis had a small sample size, and findings were only significant at the 10% level.

Regression models controlling for age, household size, education, and gender revealed substantial and significant differences in the number of key assets owned by veteran versus new One Acre Fund farmers. For example, we found that veteran farmers were ~11 percentage points more likely to have a cow and on average had .54 more cows than newly enrolled farmers.

Metric	Data Controlling for Key Characteristics via OLS Regression	
	Difference between new and veteran farmers	P-value*
% who own a cow	11.3%	0.001
Average # of cows	0.540	0.000
Average # of chicks	3.53	0.075
% who own a motorcycle	4.3%	0.065
% who own a bicycle	7.0%	0.030

\*P-values are an indicator of statistical significance: smaller values (< thresholds of .1, .05, .01) typically denote significance

The first year of our longitudinal QoL study also found statistically significant differences between new and veteran farmers in terms of total assets, total physical assets, and total livestock assets. However, it remains to be seen whether pre-existing farmer differences played a role in this result. Therefore, we will await results from later years of the longitudinal QoL study before making any firm conclusions regarding our impact in this area.

**M&E in Action:** Understanding the consumption and asset accumulation patterns of the farmers we serve allows us to better tailor our product offerings to meet demand. For example, the mini- and longitudinal QoL data highlighted above has supported our decision to develop livestock product offerings ranging from live chick delivery to dairy cow breeding packages. This data has supported substantial new program investments in logistical infrastructure to distribute an increasingly wide range of products to veteran One Acre Fund clients.

## 2.4. DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM AFFECT SOIL HEALTH?

In impoverished smallholder systems, low soil fertility is closely linked to poverty.<sup>56</sup> Thus, One Acre Fund recognizes that in order to support our clients' prosperity, we must understand and prioritize the factors that contribute to their long-term soil health. While One Acre Fund has always placed an emphasis on sustainable soil usage, we have recently begun to take a much more concerted look at how our program impacts the availability of soil nutrients and other elements of soil health. Capturing such information helps our agricultural staff determine and implement precise recommendations for fertilizer usage and agronomic best practice for maintaining soil fertility, ultimately enabling sustained yield increases.

One Acre Fund completed our most rigorous soil health study to date in our Kenya and Rwanda programs in 2015. Our M&E staff collected roughly 2,400 soil samples from One Acre Fund and comparison farmers across Kenya and Rwanda and submitted them for spectral analysis at the World Agroforestry Center Spectral Diagnostics Lab in Nairobi, Kenya. This analysis – which tested for soil pH as well as levels of important micro- and macro-nutrients, including carbon – revealed several key findings:

- One Acre Fund farmers did not see negative effects on soil health compared to comparison farmers, a promising preliminary sign that our program is 'doing no harm' to farmers' soils.
- While better off than comparison farmers, many One Acre Fund farmers still fell below critical soil health indicator thresholds for ensuring long-term sustainable productivity. Also, it remains unclear whether the positive difference in soil health between program and non-program farmers is attributable to One Acre Fund, or to other contextual differences (e.g., geography).
- Soil organic matter (carbon) levels in Rwanda were significantly higher (and healthier) than in Kenya, while soil pH levels in Kenya were in a healthier range than in our Rwanda program. These differences were reflected among both One Acre Fund farmers and non-One Acre Fund farmers, suggesting that they may stem from contextual differences unrelated to our program.

The 2015 baseline analysis is now supporting One Acre Fund's further research in the area of soil health. In particular, the study has informed the design of a more ambitious cross-country analysis that will collect soil samples, survey data, and yield measurements from 4,000 One Acre Fund and comparison farmers annually for 3-5 years. After launching in Kenya and Rwanda in 2015, our longitudinal soil health study expanded to Burundi and Tanzania in 2016. We plan to share results from Kenya and Rwanda's first round of analysis in November 2016. Taken together with the 2015 baseline findings, we believe that the longitudinal study will provide a more conclusive picture of One Acre Fund's impact on farmers' soil health.

**M&E in Action:** The baseline soil health findings highlighted above have already led to important program modifications. In Kenya, we are now pursuing the scale-up of products and behaviors to enhance soil carbon (e.g., composting), while our Rwanda program is distributing pH-improving products (e.g., lime). In initial evaluations undertaken at One Acre Fund research stations, improved composting has generated yield increases of up to 26%, and lime application has boosted yields by 40% or more. We are firmly committed to expanding these efforts and prioritizing sustainable impact for our client families in the coming years.

<sup>56</sup> Sanchez, Pedro A. (2002). Soil fertility and hunger in Africa. *Science* 295.5562: 2019-2020.

## 2.5. DOES PARTICIPATING IN ONE ACRE FUND'S CORE PROGRAM IMPROVE FARMER RESILIENCE?

As described above, One Acre Fund's target population lives an existence close to the margins, and our program impact helps bring these farmers into a more stable and prosperous existence. Building our clients' resilience – their capacity to withstand shocks and stressors – is essential to ensuring the sustainability of our impact. To date, One Acre Fund has not undertaken direct evaluations of our impact on farmer resilience, and we are eager to advance our understanding of this important area. Crucially, we recognize that resilience can have different meanings across different contexts, income levels and program interventions. Thus, to better understand how to operationalize the concept, One Acre Fund undertook a landscape analysis of measurement approaches employed by similar organizations, assessing their fit with our clients and current data collection capabilities.

This review concluded that the related efforts of the United Nations' Food and Agriculture Organization (FAO) are most relevant to One Acre Fund's operating context. Specifically, we saw significant complementarity with FAO's Resilience Index Measurement and Analysis (RIMA) model, which uses a multidimensional approach to measure resilience among primarily rural populations. We adapted the pillars of the RIMA model to create a preliminary set of pillars that 1) accurately describe resilience in One Acre Fund's context, and 2) capture the aspects of farmer resilience where we see a reasonable opportunity for generating impact. We are tentatively planning to center our resilience measurement efforts on the following five pillars:

- **Income and Food Access:** Indicators include total income earned, and household food quality and quantity. This pillar measures the primary factors used to deal with shocks.
- **Assets:** Including indicators such as productive and non-productive assets owned by a household. Assets afford households the opportunity to trade and earn income that may be required to cope with a shock.
- **Agricultural Practices:** Including fertilizer and pesticide use, compliance with correct planting methods (e.g., row spacing), and adoption of soil management techniques. This pillar assesses the technologies deployed in farming to gauge the sustainability of farmers' livelihoods
- **Social Safety Nets:** Indicators focus on the degree of social cohesion in an area, and households' levels of outside cash and in kind transfers (which can be formal or informal in nature). Such safety nets protect households in case of unexpected shocks or losses.
- **Adaptive Capacity:** Indicators include household income diversity, diversity of crops grown, and number of dependents per income-earning family member. This pillar gauges the ability of a household and its members to adjust their livelihoods in the face of shocks.

The table on the following page summarizes examples of preliminary indicators that may be used to comprise a streamlined 'resiliency index.' The table also highlights the fact that our current M&E efforts already collect a range of data that could readily contribute to such an index. We are still in the process of vetting the relevance and fit of each indicator, including by engaging farmers through structured focus groups. The information below represents our current thinking; however this data collection plan may evolve as more research is undertaken.

Resilience Pillars	INDICATORS	CURRENTLY COLLECTED	PROPOSED DATA COLLECTION
<b>Income and food access</b>	Profit Per Household (for select primary crops harvested and measured by One Acre Fund M&E team)	X	
	FANTA Score (higher is more hunger)	X	
	% eating food from harvest during hunger season	X	
	# kg of staple grain per acre available from harvest during hunger season	X	
<b>Assets owned by farmers</b>	Farmland owned (acres)	X	
	Total livestock assets per household		X
	% who own a mobile phone	X	
<b>Adaptive capacity</b>	% of school-age children attending school	X	
	% of family member sick (in last week)	X	
	% of sick who sought treatment	X	
	Dependency ratio (total children under 18 divided by total number of adult household members)	X	
	% who have a bank account		X
	Total # of businesses per household		X
	Crop diversity (number of crops grown per household)	X	
	Net debt		X
	Net savings		X
	Total # of income streams per household		X
Total # of businesses per household		X	
<b>Social safety nets</b>	Remittances received in the last two weeks		X
	Degree of social connectedness		X
<b>Agricultural practice and technology</b>	Adoption of agricultural practices most effective for increasing yield	X	
	% who are accessing agricultural insurance		X



Although we have not yet undertaken analyses specifically focused on One Acre Fund farmers' resilience, we do have some evidence demonstrating clients' ability to recover from shocks and stressors relative to non-clients:

- **Ecological Shocks:** The FANTA score (a hunger metric where a higher score indicates greater hunger) can indicate how farmers have coped with ecological shocks that impact harvest size (crop failure, maize disease, climate change). As shown above, our clients across Burundi, Rwanda, Kenya and Tanzania have reported significantly lesser hunger than comparison farmers.
- **Death Shocks:** Emerging results from the longitudinal quality of life (QoL) study provide directional<sup>57</sup> information that a smaller share of One Acre Fund farmers found it very (or somewhat) difficult to meet their families' basic daily needs after the death of a family member, as compared to comparison farmers (16.8 percentage points lesser).
- **Income Consumption Smoothing:** Our 2015 income and expenditure study in Kenya, highlighted in Theme 1, shows greater income and expenditure volatility among comparison farmers relative to One Acre Fund clients. The study also shows that comparison farmers spent a larger share of their income on food, indicating lower food security and a more marginal existence overall.

We have recently added resilience-focused questions to the 2016 version of the longitudinal QoL survey, and we hope to be able to share deeper insights on this question in the coming year.

**M&E in Action:** Many elements of our core program either implicitly or explicitly work to enhance farmer resilience. For example, we fundamentally work to boost farmers' incomes and food security, and we train our clients on sustainable planting methods that improve their resilience to ecological shocks.

Crop insurance is perhaps the key element of our farmer resilience platform. Such insurance acts as a critical safety net against ecological shocks, ensuring cash payouts in the event of poor weather or crop disease. Yet most smallholder farmers have difficulty accessing this support, as few insurers are equipped to serve such a vulnerable population. One Acre Fund resolves this barrier by acting as a trusted intermediary, taking out group policies on behalf of our clients. These policies pay out when rainfall or yields fall outside historical norms, and we then administer funds to farmers based on our detailed field data. Crop insurance also helps resolve farmers' debt burden by improving their ability to repay their loans. We currently offer crop insurance to nearly every farmer we serve (except in Burundi, since the country has a dearth of potential insurance provider partners), and we believe that we are the largest provider of staple-crop, smallholder crop insurance in Sub-Saharan Africa.

Looking forward, we plan to develop and deliver innovative new insurance products to mitigate the varied risks facing our target population. For example, we are working to offer insurance to cover a variety of crops beyond maize. Simultaneously, we are also expanding our insurance offerings outside of crop coverage. For example, we now provide tens of thousands of clients in Kenya and Malawi with a funeral insurance product that provides a cash payout in the event of a farmer or spouse death. Ultimately, such innovations aim to support farm families in the face of unexpected volatility or crises, enabling them to continue investing in their livelihoods and steadily progressing out of poverty.

<sup>57</sup> Only a small sample of farmers actually experienced death in their family, so these findings are not statistically significant.



## **THEME 3: Measuring Impact Beyond the One Acre Fund Farmer**

One Acre Fund principally intends to achieve impact for our enrolled clients and their families. However, we are increasingly interested in understanding whether our core program impacts farmers' neighbors and their communities, and how we might boost this impact. On a higher level, One Acre Fund has recently had the opportunity to support the improvement of entire country/region-wide agricultural systems via implementation partnerships and targeted policy work. Theme 3 is composed of four learning questions which discuss our measurement approaches, and the latest findings on One Acre Fund's community and system-level impacts.

### **3.1. WHAT IMPACT DOES ONE ACRE FUND'S CORE PROGRAM HAVE ON NON-PARTICIPANT NEIGHBORS?**

We have substantial anecdotal evidence that unenrolled farmers may adopt (and benefit from) improved agricultural techniques that they observe in the fields of their One Acre Fund client neighbors. This program "spillover" has implications for how we understand and measure our impact. Specifically, the presence of spillover suggests that we may inherently undercount our impact: 1) because we fail to capture our immediate benefit to non-participating farmers, and 2) because we ground our impact measurements in neighboring farmers' harvests, so increasing their yields reduces the comparative gains that our clients experience.

We first attempted to quantify program spillover in 2015 by rigorously analyzing comparison farmers' harvest data, already collected as part of our 2014 impact assessment.<sup>58</sup> These comparison farmers were identified by One Acre Fund farmers as "interested" in our program, suggesting that they could be subject to spillover effects. We might not expect that a single year of One Acre Fund presence in an area would predict a significant increase in yield for comparison farmers; however, several years of One Acre Fund operating presence might encourage neighbors to change their planting practices, boosting their yields. Thus, we divided our comparison farmer sample between areas where One Acre Fund had operated for four or more years, and areas with less than four years of operations (the median duration of One Acre Fund presence).

---

<sup>58</sup> The study included 300+ observations from 173+ sub-locations across Kenya. More detail on the study can be found [here](#).

For added rigor, our regression models included several co-variates that might conceivably influence yields: farmer education, total livestock (as a proxy for wealth), and province location. We also controlled for fertilizer adoption, which could be subject to spillover effects separate from other planting practices.

Controlling for all these factors, comparison farmers in older One Acre Fund sites were found to experience a statistically significant yield increase of almost 145kg of maize per acre in 2014. Next, we repeated this analysis on a recently compiled 2015 dataset of 959 comparison farmers across nearly 400 One Acre Fund sites. We once again observed a statistically significant maize yield boost – this time of 90kg per acre – among comparison farmers in older One Acre Fund sites. Even this more conservative estimate means that on average, an unenrolled farmer in an older One Acre Fund site, growing an average .5 acre of maize, would increase their harvest by 45kg of maize per year. This is enough maize to feed a typical farm family for an entire month.

	SPILLOVER RESULTS – OLS REGRESSIONS FROM 2014 AND 2015	
	2014– Kg/Acre Yield	2015– Kg/Acre Yield
<b>Older sites (more than four years of One Acre Fund presence)</b>	<b>144.9<sup>***</sup></b>	<b>91.02<sup>***</sup></b>
Some secondary education	172.4 <sup>**</sup>	78.6
Total livestock value (Ksh)	.00184 <sup>*</sup>	.030
Total fertilizer	.584 <sup>**</sup>	1.6 <sup>*</sup>
Province fixed effects	287.6 <sup>*</sup>	154.2 <sup>**</sup>
Constant	973.8 <sup>***</sup>	920.7 <sup>*</sup>
Observations	302	934
***p-value < .01; ** p-value < .05; * p-value < .10		

We believe that this analysis offers a fairly strong indication that program spillover is occurring among comparison farmers in our areas of operation in Kenya. One critique of this finding might be that the study’s older sites were somehow different (naturally more productive) than newer sites. However, we do not believe that this is the case, since One Acre Fund program expansion occurs both outward (to new districts) and inward (to neighboring sites). Therefore, older sites are often adjacent to newer sites, and thus presumably share agro-ecological conditions and other factors that affect farm yields.

Preliminary spillover studies in Rwanda have yielded similar results. Interestingly, we have identified yield increases among comparison farmers’ maize harvests, but not among other supported crops, such as beans or potatoes; we hypothesize that this may be due to the greater visibility of One Acre Fund’s techniques on maize (e.g., row planting). Spillover remains an ongoing area of research for One Acre Fund, and we aim to more conclusively verify this effect in Rwanda in the coming years.

**M&E in Action:** While we still have more to learn about the mechanisms of program spillover, our current findings underscore the value of efforts to reach meaningful density (market penetration) in the communities we serve. Specifically, we believe that densely populated areas will create additional proliferation of improved planting techniques among unenrolled neighbors. One Acre Fund is therefore currently working to deepen our program density through a range of ‘scale innovation’ trials, including enhanced marketing efforts centered on rural radio and video-based advertising.

### 3.2. WHAT BROADER ANTI-POVERTY IMPACTS DOES ONE ACRE FUND HAVE IN THE COMMUNITIES WHERE WE WORK?

One Acre Fund is a deeply ‘field-facing’ organization. Over 98% of our staff, including our Executive Director and senior leadership, are based in our countries of operation. Thus, we are reminded on a daily basis that our program does not operate in a vacuum – we recognize that our organization’s footprint extends deep into the communities where we work.

Staffing is one of the areas where we can most directly appreciate our community-level impacts. We currently employ more than 4,000 staff, over 95% of whom are East African nationals recruited from the rural areas where we operate. Roughly half of these 4,000+ employees are entry-level ‘field officers,’ who are often recruited from among the ranks of our client farmers. Many of these field officers had never received a predictable salary prior to their role with One Acre Fund. We estimate that they can earn four times more per hour administering our program than they would as a farmer. Undeniably, One Acre Fund extends life-changing career opportunities to our frontline field staff.

We view the jobs created by our program as incremental to the community, since labor markets in the areas where we work exhibit incredibly high rates of unemployment. Therefore, we see all rural wages added as incremental to the community. As shown in the table below, we estimate that in 2015 we contributed over \$10 million in wages and benefits to our rurally based field and headquarters staff. We estimate that this figure will increase to \$13.5 million in 2016.<sup>59</sup> While we do not add these figures to our annual assessment of impact, we nonetheless believe that they create important benefits in our communities of operation.

Country	ONE ACRE FUND 2015 STAFF EXPENDITURES			ONE ACRE FUND 2016 STAFF EXPENDITURES		
	Field Staff	Rural HQ Staff	TOTAL	Field Staff	Rural HQ Staff	TOTAL
<b>Kenya</b>	2.86M	1.88M	<b>4.74M</b>	3.47M	2.25M	<b>5.72M</b>
<b>Rwanda</b>	1.95M	2.29M	<b>4.24M</b>	2.74M	3.16M	<b>5.90M</b>
<b>Burundi</b>	365K	282K	<b>647K</b>	660K	575K	<b>1.24M</b>
<b>Tanzania</b>	313K	287K	<b>600K</b>	310K	390K	<b>700K</b>
<b>Total</b>	<b>5.49M</b>	<b>4.74M</b>	<b>10.23M</b>	<b>7.18M</b>	<b>6.38M</b>	<b>13.56M</b>

Perhaps even more fundamentally, we believe that the cumulative impact we create for our clients serves as a powerful force for good in their larger communities. In a mature district of operations (10,000+ clients), One Acre Fund’s core program generates over \$1 million per year in new profits. This new income is largely invested back into businesses within that district, helping to support local enterprise, spur local spending, and build an economically vibrant rural community. This ripple effect is supported by Ligon and Sadoulet’s seminal World Bank paper, which found that increasing a country’s agricultural income by 1% results in a 6% increase in spending among the bottom tenth of the population.<sup>60</sup>

<sup>59</sup> This includes \$3-3.5 million in benefits that we extend to field staff, including transportation and mobile phone airtime.

<sup>60</sup> Ligon, Ethan, and Elisabeth Sadoulet. (2007). Estimating the Effects of Aggregate Agricultural Growth on the Distribution of Expenditures. Background paper for the WDR 2008.

### 3.3. HOW DOES ONE ACRE FUND MEASURE THE IMPACT OF OUR SYSTEMS CHANGework, AND WHAT IMPACT HAS BEEN ACHIEVED TO DATE?

Although One Acre Fund has rapidly grown to serve over 400,000 farm families, we still reach just a fraction of the estimated 50 million African families that stand to benefit from our work.<sup>61</sup> The vast majority of these families participate in government-run or regulated agriculture systems. One Acre Fund's systems change unit, launched in 2014, is designed to enhance these systems through implementation partnerships that leverage the competencies and credibility developed through our core program. To date, these partnerships have fallen into three broad categories: training (improving the impact of government extension systems), input distribution and retail (ensuring the availability of farm inputs at rural retail shops), and market stimulation (particularly focused on improving demand for hybrid seed, which offers a higher benefit to cost for farmers than alternatives).

One Acre Fund is committed to generating measurable impact in our systems change work. As such, we have invested in designing and implementing custom evaluation plans for every fully operational systems change partnership. As in our core program, we primarily define the success of these partnerships in terms of scale (number of farm families reached), impact (defined as additional farm profits generated), and cost (donor subsidy required). Also, as in our core program, we identify counterfactuals for each study, statistically adjust for pre-existing differences between treatment and comparison farmers,<sup>62</sup> physically measure yields for both groups, and use cost and price data to calculate incremental profits attributable to our intervention.

Unlike our core program, systems change projects typically deliver only one to two services within the 'bundle' that we believe every smallholder needs to prosper. As such, we recognize that these projects will generate less impact per farmer than our core program. On the other hand, by focusing on existing systems – operating at scale, supported by investments from existing actors – the scale potential and cost per farmer in these projects is more favorable than in our core program. In steady state, we currently believe our systems change unit can achieve three times the scale of our core program, at roughly one-third the impact and cost per farmer.

We have considered how a smaller impact per farmer achieved over a greater number of farmers compares to a larger impact per farmer achieved over a smaller number of farmers. On the one hand, extensive research<sup>63</sup> demonstrates that, at low income levels, the first incremental dollar brings higher marginal utility than the second incremental dollar, and so on; these diminishing returns would seem to favor systems change work. On the other hand, larger impact may spur a 'virtuous cycle,' where more substantial income injections support profitable investments, which lead to greater income generation, enabling a farm family to escape the 'poverty trap.' This theory would favor our core program. On net, we do not believe we have learned enough to favor one type of work over the other (in terms of scale, impact, and cost per farmer).

---

<sup>61</sup> We recently explored this question in detail, using geospatial data on current population figures and types of land cover to calculate average household land sizes in agricultural areas. This analysis yielded an estimate of 53 million smallholder families across Sub-Saharan Africa in 2015, a number which is expected to increase significantly in the coming years.

<sup>62</sup> It is worth noting that, even more than in our core program, it is difficult to undertake randomized control trials of our systems change work given our inability to withhold services from certain control farmers (e.g., nationwide extension programs often serve every agricultural community in the country).

<sup>63</sup> See, for instance: [OECD 2010](#), [Pew 2007](#), [Gallup 2008](#)

Beyond per farmer impact, the ultimate goal of our systems change work is to permanently improve the functioning of agricultural systems, ideally enabling their replication in new contexts. This can take the form of a government fully internalizing an improved program (as in our extension work), or commercial actors adopting norms that ensure benefits to smallholders (as in our input distribution and market stimulation work). Thus, we also consider ‘progress towards systems change’ as an important metric in all of these projects.

### Systems change results achieved

The chart below shows the 2015 results of our systems change work across all projects. Overall, we estimate an impact per farmer of \$18 and a cost per farmer of \$3.90, resulting in an SROI of 4.6. Meanwhile, our core program M&E for 2015 revealed an impact of \$137 per farmer and a cost of \$29 per farmer, yielding a roughly identical SROI of 4.7. This parallel is promising, especially when considering that our systems change unit reached roughly double the number of farmers as our core program in 2015. Still, we see much room for improvement – we are now working to boost the impact per farmer of our systems change work by infusing new innovations into our partnerships and taking a greater focus on implementation quality.

Partnership category	Scale (# farm families reached)	Impact per farm family	Cost per farm family	SROI (impact per cost)
Extension partnerships	404,000	\$19.10	\$6.10	3.1
Input distribution & retail partnerships <sup>64</sup>	191,000	\$16.30	~\$0	N/A
Demand stimulation partnerships <sup>65</sup>	2,000	Not measured	Not measured	N/A
<b>OVERALL</b>	<b>597,000</b>	<b>\$18.0</b>	<b>\$3.9</b>	<b>4.6</b>

As these programs begin to affect the underlying systems in which they reside, we will begin to consider new measurement methods to gauge levels of whole-system change, and One Acre Fund’s respective role (some relevant lessons are emerging from our burgeoning field-building M&E efforts, discussed in the following subsection). However, we believe that it remains too early to rigorously measure or report on this question.

Finally, it should be noted that, as we approach ‘systems change,’ we anticipate a decline in One Acre Fund’s impact per farmer (as currently measured). For instance, as private sector alternatives develop in input distribution and retail, comparison farm families that are not served by One Acre Fund (or One Acre Fund-supplied agrodealers) will improve their yields. Similarly, the yields of comparison farmers will increase as knowledge organically diffuses to the neighbors of participants in nationwide extension programs. This presents a complex measurement challenge, since One Acre Fund’s involvement in systems change may warrant an ongoing impact ‘credit’ to our efforts. We are now working to design new measurement approaches that take such factors into account, and we look forward to sharing our learnings in a future impact report.

<sup>64</sup> Impact per farmer expressed as a ‘returns to fertilizer’ analysis, which assumes that, in the absence of One Acre Fund, farmers would be unable to access quality inputs from alternative agrodealers. We are revisiting this assumption as the private sector begins to successfully enter this system, which is the long-term system change being sought in this work. Also – cost per farmer is around zero as this is a roughly breakeven business for One Acre Fund (i.e., revenues from rural retailers known as agrodealers roughly cover program costs)

<sup>65</sup> Tanzania demand stimulation work was just underway at the end of 2015; impact and cost have not yet been measured.

M&E in Action: As with our core program M&E, our systems change M&E is intended to both prove and improve the impact of our related work on the ground. For instance, systems change M&E recently revealed findings that influenced our strategy around a demand stimulation partnership in Rwanda. In 2014, given the known benefits of fertilizer application, One Acre Fund partnered with the government of Rwanda to distribute 400,000 fliers promoting fertilizer use among smallholders. Specifically, these fliers were distributed through the government's Farmer Promoter program, which works with nearly 14,000 volunteer trainings (farmers) throughout the country reaching each village.

We collected data on fertilizer use, yields, and profits from 1,200 smallholder farmers countrywide and found that the fertilizer fliers were effective in increasing farmers' use of fertilizer. However, deeper analysis revealed that the fliers were only effective in improving profits when combined with the Farmer Promoter program. Farmers who saw the flier from someone other than a Farmer Promoter did increase their fertilizer use, but did not see an increase in farm profits. We believe it is likely that farmers' increased fertilizer use did not translate into increased profits because they lacked additional training on the most effective and efficient application of fertilizer. This finding allowed us to proceed with a more informed approach toward fertilizer promotion, and we now only deploy fliers in conjunction with other efforts, improving the impact and cost-effectiveness of the partnership.

### 3.4. HOW DOES ONE ACRE FUND MEASURE THE IMPACT OF OUR FIELD-BUILDING WORK, AND WHAT IMPACT HAS BEEN ACHIEVED TO DATE?

One Acre Fund’s field-building work represents our broadest conception of impact. We define field building as any effort that seeks to influence key ecosystem actors (at a national, regional, or global level) to shape policies or practice to benefit smallholders.

Currently One Acre Fund’s field-building work falls into three broad buckets:

1. Farm microfinance: Microfinance institutions (MFIs) largely focus their lending in urban and peri-urban areas, leading to a massive unmet need for rural finance, particularly among smallholder farmers. To address this gap, One Acre Fund has organized a coalition called [Propagate](#), currently composed of six-leading MFIs with a rural agricultural finance presence. Propagate works to disseminate knowledge and facilitate operational partnerships that increase farm finance activity and overall effectiveness.
2. Agriculture research: Most agriculture research is conducted far from smallholders’ fields; as a result, only a small proportion ends up being further developed and delivered to smallholders. We disseminate our R&D approach, results and learnings with the hope of positively influencing researchers and practitioners of sustainable agricultural intensification.
3. Agriculture policy (regulations, aid, etc.): We advance high-level advocacy efforts and/or technical support that aim to influence decision-makers’ strategy and administration of systems that impact smallholder farmers. We focus these efforts at the national, regional, and global levels, leveraging our deep field presence to pursue a uniquely comprehensive scope.

Since the vast majority of our field-building work is about influence (through knowledge dissemination, advocacy, etc.)<sup>66</sup>, we will focus our discussion here, using policy change as an example.

#### Field-building measurement challenges

Measuring the impact of policy change is fraught with four key challenges:

- Challenge #1: Defining what to measure in a dynamic environment: Policy environments are unpredictable. There are no clear, pre-defined inputs that lead to policy change and real-world impact; the impact of this work is not as straightforward as applying fertilizer and reliably boosting harvest yields. Even defining specific visions for change can be difficult, as this involves isolating a practical indicator that can be measured in order to assess improvement (e.g., increased access to seed).
- Challenge #2: Long time horizon: Policy change tends to occur over long time horizons. The variety of actors and processes that give policy environments their non-linear nature, and the tendency to defend the status quo, means that change will occur incrementally – M&E must be tailored accordingly.
- Challenge #3: Attribution to our efforts: Even after a policy goal is achieved, it might be very difficult to attribute the outcome to One Acre Fund’s specific efforts, given that there are almost always a broad range of other actors involved in the push for change.

---

<sup>66</sup> However, not all of our field-building work – or M&E – focuses on policy change. For example, when field building leads to operational partnerships (e.g., within farm microfinance), we can simply measure impact as we do in our core program and systems change work (e.g., measuring the increase in harvest and farm profits that result from adding a training component to an MFI’s work with clients).



- Challenge #4: Attribution of policy change to impact: After a policy change (or series of changes) is finalized, there is no counterfactual against which to measure impact. For example, we cannot randomly assign the policy change to part of a country in order to establish a comparison group. This lack of counterfactual presents a particular limitation because there are a range of reasons why successful policy change might not actually lead to “real-world” impact, namely implementation (i.e., system inefficiency may have more to do with process failure than policy gaps).

### Our field-building measurement approach

We work to address these challenges through a multi-phased measurement framework. Specifically, our field-building M&E encompasses three time periods: *ex ante*(before projects are underway), *in mediare*(while a given project is underway), and *ex post*(looking back at the success of projects over a time period).

#### Ex ante considerations:

- Focus on farmer welfare (profit): The goal behind all of our policy work remains firmly fixed on the smallholder farmer. Most policy actors measure their success simply through an assessment of whether a policy change is achieved, and might be attributed to their advocacy work. Our policy projects aim to go beyond this, developing hypotheses regarding the actual impact of changes in the real world, and assessing whether projects are ultimately worth the effort. Before devoting resources to any new project, we must have a compelling reason to assume that success will result in a tangible welfare improvement for smallholder farmers. We define this as a financial “dollar impact.”
- Choose measurable indicators that tie to profit: Our impact hypothesis is based on shifting some measurable metric in the real world for a large population. We pursue projects when we see the opportunity to create change, and when our competencies (knowledge, relationships, etc.) position us as the right actor to get involved. After selecting a relevant indicator, we then develop a total dollar estimate of the value of the anticipated change<sup>67</sup> – we do not see policy change as a goal in and of itself.
- Make two key attribution estimations: Before entering a project, we assess 1) the degree to which we expect the intended policy change to precipitate a shift in the indicator of interest, and 2) the degree to which any policy change is likely to be attributed to One Acre Fund’s efforts. For example, there are many systems changes that could lead to an increase in seed access in Burundi, but we might estimate (based on data review, stakeholder interviews, etc.) that 10% of a change could be linked back to improving the ease of registering new varieties (our policy goal). We might then assume that we can attribute 20% of this change to our efforts, given our key role. We then multiply a preliminary dollar estimate by these two numbers to gauge the value of our efforts. We always create low, medium and high estimates based on different assumptions.
- Check for cost-effectiveness at a portfolio level: We sum the net present value of all probability-weighted (medium-scenario) project impacts over a period of time (typically five years) and compare this figure to our proposed field-building expenditure. We pursue projects that allow us to meet the ‘minimum SROI hurdle rate’ our leadership sets for resource allocation, typically \$4 of farmer profit for every \$1 invested. We also run the process in reverse, assessing how many proposed projects would

---

<sup>67</sup> We also consider externalities on farmers reached by the other operating units of One Acre Fund; i.e., we may work on policy changes that will enable or improve the impact generated by our core program. In the Burundi seed example, for instance, our policy work will make it easier to register new varieties that gives our global procurement team more seed purchase options, hence increasing the impact on our core program clients.

have to succeed (move the measurable indicator and farmer profit) in order for our expenditure to be worthwhile. This is a crucial step, as we assume that only a fraction of the total portfolio will result in clear impact in the examined timeframe.

### **In media res considerations:**

- Tracking outputs and intermediate outcomes: We focus our day-to-day field-building efforts on achieving more concrete output and outcome goals based on our theory of change, such as assessing the meetings we hold, the products we produce for government, or tracking incremental changes in government policy. These give us more immediate objectives to focus our efforts, and also help underpin our attribution assumptions. We also run qualitative assessments (e.g., stakeholder surveys) to flesh out our attribution assumptions.
- Learning and evolving as we work: Our focus on carefully defining and tracking the outputs and outcomes of our work gives us useful monitoring data on progress towards our goals. It also allows us to refine our strategy and overall learning agenda for efficiently and effectively running our work. For example, tracking the number of approved seeds in the Burundi government catalogue very tangibly tells us whether the more immediate goal of the brochure is being met, or if more needs to be done to promote the document. The actual dollar impact of this change on farmers, while important, is several steps removed from what we can more directly control.

### **Ex-post considerations**

- Refining our impact hypotheses: Unlike our core program measurement, which produces a clear, impact number at a moment in time (after harvest), we will rarely be able to clearly determine that a policy program is “complete” and at a measurable state (due to challenges #1 and #2 above). Rather, our policy impact hypotheses will be refined over time as we absorb new information to test our initial assumptions; hypotheses are thus never really final. We start with an initial ex-ante estimate to justify selecting a given project, and as output/outcome data come in, we refine our assumptions. For a given project, we may choose to exit, temporarily hold (e.g., until a better opportunity window opens), continue, or double down. Refining our impact hypotheses also enables us to confirm cost effectiveness across our policy portfolio, as One Acre Fund considers resource allocation at key points in our annual budgetary cycle and long-term planning.
- External validation: At a certain scale, we may seek external validation of our cumulative policy impacts; however, we have not pursued this path to date.

We recognize that it is impossible for our field-building unit to achieve the level of measurement precision applied to our core program and systems change units. Nonetheless, we believe that the framework described above ensures that our field-building work is a good use of organizational and donor resources, creating real, tangible change for smallholder farmers.



## CONCLUSION

One Acre Fund’s commitment to measurement underpins our commitment to impact. In our ten years of operation, we have collected a vast amount of practical information about our clients, model, and results; we are pleased to share a collection of key findings in this Comprehensive Impact Report. Ultimately, we are confident that our program meaningfully and cost-effectively improves the livelihoods and wellbeing of the farm families we serve. Nonetheless, we remain focused on those areas where we see a potential for deeper impact, such as child nutrition outcomes. Similarly, while we have steadily increased the rigor of our measurement methodologies, we view this as a constant work in progress. Our ethos of “proving and improving” continues to guide our M&E efforts as we look forward to our next ten years of serving smallholder farm families.

In closing, we would like to extend a note of thanks to our supporters. Your due diligence and sage advice have strengthened our commitment to achieving measurable results; we are particularly indebted to the MasterCard Foundation for its generous and ongoing support of our M&E work since 2013. Thank you – this document, and the impact that One Acre Fund has achieved to date, would not be possible without your partnership.