

Quality of Life Baseline Summary Report: KENYA



PRINCIPLE INVESTIGATOR: Kim Siegal, M&E Director
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→ PROGRAM DESCRIPTION

Farmers make up 70 percent of the world's poor. Yet most of these farmers live in remote areas, and do not have access to basic agricultural tools and trainings. As a result, they struggle to grow enough to feed their families, and face an annual hunger season, where one in ten children do not survive past age five, with hunger and malnutrition the underlying cause in nearly half of deaths. Year after year, farmers find themselves trapped in a cycle of low yields and continued poverty.

Specifically, many rural smallholders lack the access to improved farming technology due to cash constraints, geographic isolation, and lack of training programs. Founded in Kenya in 2006, One Acre Fund provides a bundle of services to address these barriers to improved yields. The farmers are provided seed and fertilizer on credit and allowed to pay back on a flexible repayment schedule throughout the year. They form themselves into groups and are jointly responsible for repayment. They are given regular training that covers topics such as optimal planting practices, fertilizer application, pest management, and safe storage of harvest. Farmers are also provided crop insurance and given the option to purchase other products with proven income and/or quality of life impacts, such as solar lamps (our most popular add-on product) and cookstoves.

One Acre Fund's operations in Kenya are spread over the Western and Nyanza provinces and across different agro-economic conditions. The farmers enrolled in the Kenya program usually plant their crops on 1.3 acres of land out of which 0.6 acres are allotted on average to the program specific inputs. The Kenya program enrolls farmers for one season each year and includes a package of seed and fertilizer with training. Neighboring farmers have relatively low fertilizer use and access to training.

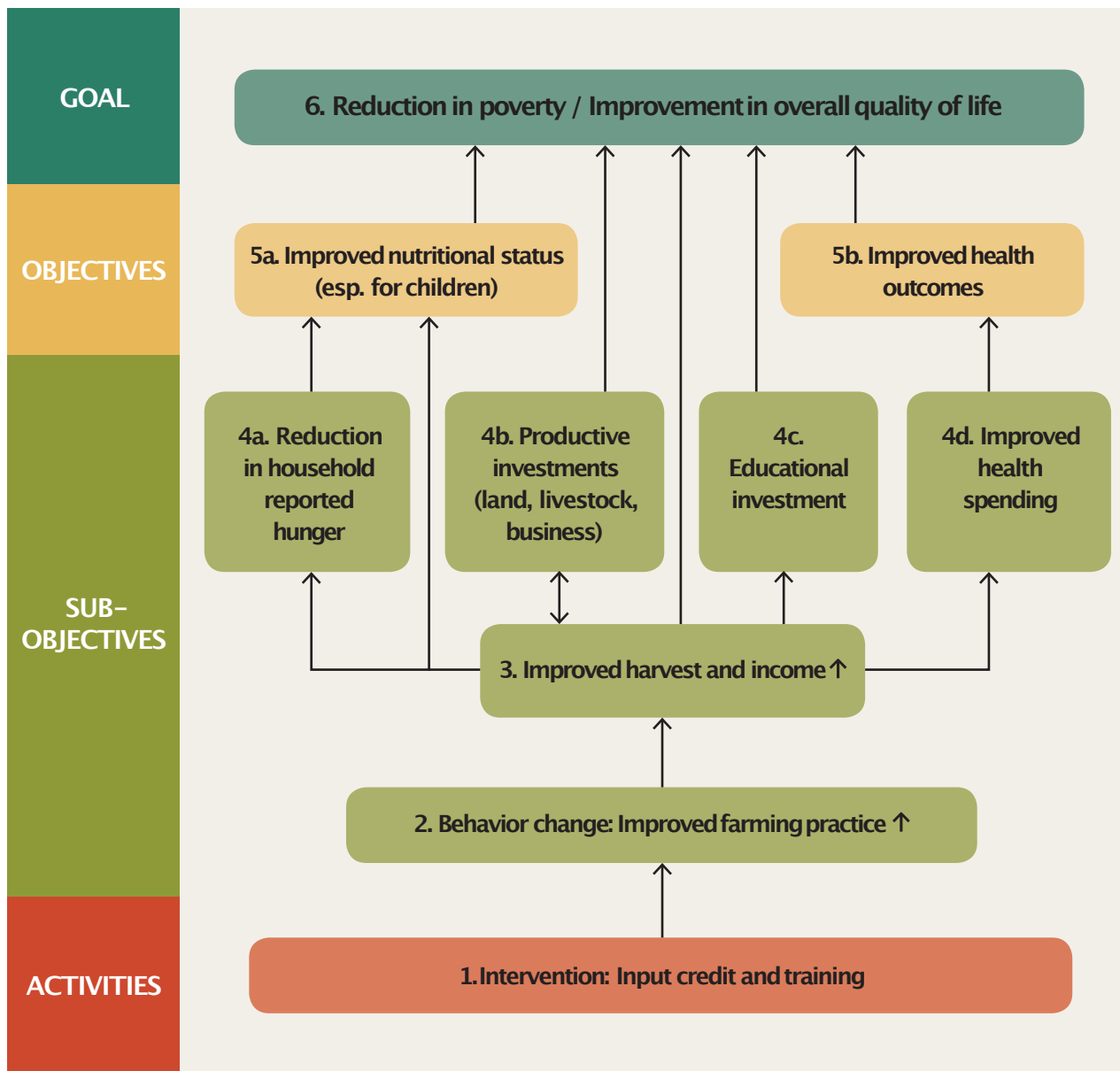
→ THEORY OF CHANGE

One Acre Fund's ultimate goal is to reduce poverty and improve quality of life for our clients. Below is our theory of change, focused on our core target population of farmers and their families. It moves from our direct program components to → behavior change to → increases in harvests and incomes. We have measured our impact on all of these fronts (represented as steps 1, 2, and 3 in the below graphic), keeping careful track of our program components through key performance indicators. These indicators track farmers' behavior change, through methods such as planting compliance surveys. We also track direct outcomes through our annual impact assessments.

In addition to the impact we generate through our direct program, which helps farmers improve harvest productivity, One Acre Fund is also interested in the impact we can have on other aspects of farmers' lives. This "quality of life" impact is often related to increased harvests, as demonstrated by the arrows below (and numbered as steps 4, 5, and 6). We hope that overall, our impact ultimately leads to a reduction in poverty and improved quality of life.

Below is a theory of change for how the program might work to improve a farmer's overall quality of life.

Figure 1. Theory of Change



→ OBJECTIVES/GOALS

The central purpose of our Quality of Life Study is to understand and assess our impact on farmers' lives more holistically. We have a growing body of evidence showing that One Acre Fund contributes to an increase in both yield and farm profit. However, we have not studied how this translates into meaningful change in farmers' lives. We intend to investigate secondary program impacts, such as spending on education, health and hunger outcomes, and purchase of productive assets, through this longitudinal multi-country study.

The goals of this effort are two-fold:

1. **More fully understand our impact.** The direction and magnitude of certain program outcomes are uncertain, and this evaluation will explore whether removing barriers to farming technology can increase, for instance, secondary outcomes like childhood nutrition and educational outcomes.
2. **Inform future action.** Through a longitudinal study focusing on secondary outcomes, we can better understand how we impact farmers' lives in multiple spheres and better target our interventions (e.g. trainings, products we make available) to make an even more profound impact on their lives.

We hypothesize that we will have some impact on agricultural productivity, education expenditures, and hunger based on our prior data collection efforts and analyses. We would like to better understand how we can do more in other areas, such as dietary diversity, assets accumulation, financial education, gender dynamics, and nutrition. We don't necessarily hypothesize an impact in these areas but would like to learn more about them, and consider program adaptations or enhancements, through this study.

→ METHODOLOGY

The study is being conducted in the district of Busia.¹ This site was chosen as it fulfilled a set of predetermined criteria, such as being a relatively new program site, being representative in terms of agro-ecological conditions of typical program areas, not being a location in which we are running other trials, and having a cluster of sites around the area without any program intervention to serve as the controls which are separated with an arbitrary border.

Our goals for selecting a study design were to identify a control group which: (1) looks similar to One Acre Fund farmers in terms of difficult-to-observe characteristics like motivation and risk (i.e. to avoid the "selection bias" problem when choosing a control group which did not self-select into the program), and (2) operates in a similar environment to control farmers. This is important for tracking groups over time. For example, if a non-governmental organization providing nutrient supplements moved into one area, it would be more difficult to attribute any changes in health outcomes to the One Acre Fund program.

In addition, it is important to consider the likelihood of program attrition (both of control farmers into the program and farmers out of the program) over the four-year study duration.

¹ A companion study is being conducted in Rwanda –our second largest country program. However, the study location is a new district, so baseline results do not include any veteran One Acre Fund farmers and therefore do not give any preliminary indication of impact.

Given all of the above considerations, we are pursuing a difference-in-difference approach, and restricted the study farmers to a small geographic area in which control farmers were selected from just beyond a program boundary. We will also use propensity score matching to compare farmers with similar characteristics. This will help us mitigate selection bias while ensuring a similar agro-ecological and social service environment.

All program farmers in the Busia district served as the treatment group for this study. The controls were selected on the basis of random cluster sampling around the Busia district where the program was not extended.

In Kenya, about 300 veteran farmers were in our sample. This enabled us to get an early indication of our program impact. To do this we compared newly enrolled farmers who had yet to harvest with veteran farmers (who had already participated in the program for one to two years). While there may be some preexisting differences between these two populations, we feel that they are overall highly comparable and could provide a directional indication of impact.

To be clear, this study is intended as a multi-year study, since many of the outcomes being measured are expected to unfold over multiple years. We believe that the longitudinal design will get us the most rigorous estimate of impact. However, because the baseline round of data collected included several hundred veteran farmers, this allows us to get a preliminary glimpse at what impact One Acre Fund could be having in the outcomes studied. Of course the fully completed longitudinal study will have more rigorous results, but we can consider the analysis comparing newly enrolled to veteran farmers to be highly suggestive.

We can think of the analysis as occurring over 2 groups:

	Control Farmers	One Acre Fund Farmers	
Group 1 → To check balance for longitudinal study/establish baseline	Control (n≈1200)	Treatment/new One Acre Fund (n≈900)	
Group 2 → To have early indication of impact		New One Acre Fund (n≈900)	Veteran One Acre Fund (n≈300)

→ RESULTS

Comparison of One Acre Fund and Control Farmers

DEMOGRAPHICS. There were some differences between One Acre Fund and control farmers, where One Acre Fund farmers were more educated, more likely to be married, had a slightly older spouse, and had larger families. We did expect differences in these populations, and can control for these differences through propensity score matching. Part of the goal of doing baseline analysis is to understand the nature of these differences and to devise a strategy for how to control for them in subsequent analyses. New and veteran One Acre Fund farmers were highly similar on demographic characteristics (i.e. no statistically significant differences), which gives us confidence in comparing the two populations to obtain an early indication of program impact.

Baseline Data²

Basic Demographics: Control vs. One Acre Fund Farmers			
	Control Farmers	New One Acre Fund Farmers	P-value
Sample size	1221	962	pi
% with a secondary education	15%	21%	0.000
% married	73%	79%	0.001
Ave. respondent age	45.0	45.9	0.131
Ave. spouse age	43.8	46.7	0.000
% women respondents	72%	73%	0.481
Ave. household members	5.6	6.4	0.000
Average hh members under 18	3.1	3.7	0.000

Preliminary Impact Data

Demographic Characteristics: Veteran vs. New One Acre Fund Farmers			
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	P-value
Sample size	962	238	
% with a secondary education	21%	21%	0.988
% married	79%	79%	0.960
Ave. respondent age	45.9	47.3	0.150
Ave. spouse age	46.7	48.0	0.259
% women respondents	73%	71%	0.355
Ave. household members	6.4	6.4	0.960
Average hh members under 18	3.7	3.5	0.320

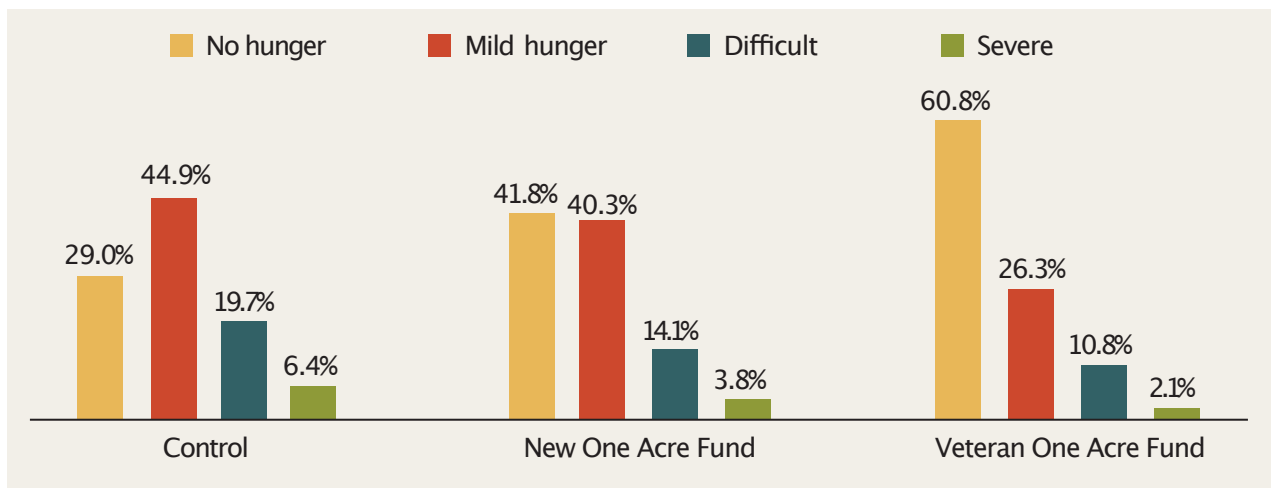
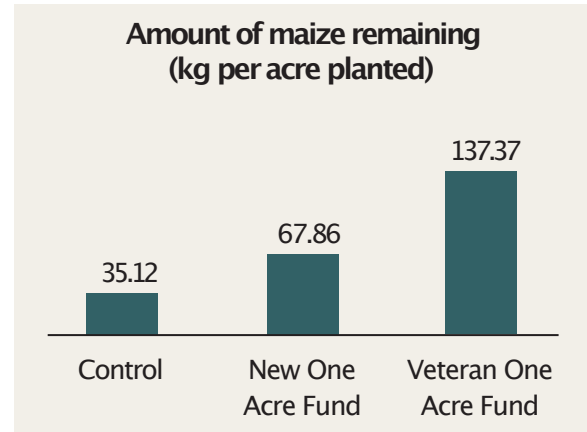
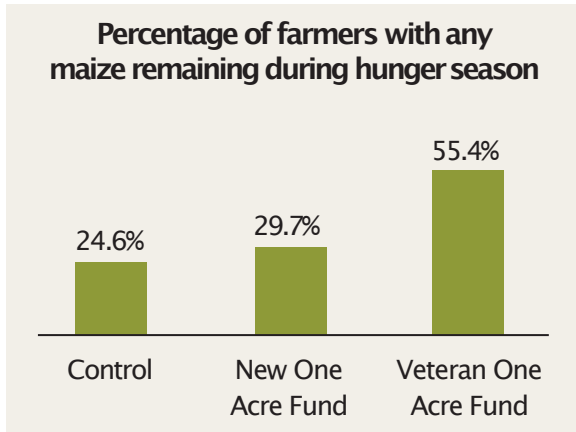
Reaching the most vulnerable farmers who are at the bottom of the pyramid is a priority for One Acre Fund. A recently conducted enrollment study in Kenya also highlighted some entry barriers (both perceived and actual) that may keep the neediest farmers out of the One Acre Fund programs. In response to this, starting from the 2016 season in Kenya, the prepayment has been lowered from Ksh 1000³ (\$10) to Ksh 500 (\$5) and loan packages which are smaller in size have been introduced to lower some of the barriers that farmers face.

² For all tables, we have bolded results which showed a statistically significant difference at $p < .05$, which means that there is a less than 5% likelihood that these differences would have occurred by chance.

³ We are assuming an exchange rate of 100 Ksh to 1 USD, which was the average exchange rate at the time of the study.

Preliminary Impact

HUNGER. One Acre Fund farmers self-report significantly less hunger and have much more grain saved from the prior harvest (both in terms of percentage of farmers who have grain saved and overall amount saved). Even when controlling for other factors the estimates are still statistically significant. In addition, the overall distribution of reported hunger season (severe to none) is much more favorable for veteran farmers.



As a more rigorous test for the program impact comparing new and veteran One Acre Fund farmers, we have run regression models controlling for age, household size, education, gender, and physical assets for any of the significant results above to see if they hold. Even when controlling for these other factors the estimates are still statistically significant, at least at the $p < .1$ level of the self-reported (severe or difficult) hunger season, which is just below the .1 significance level.

	Simple t-test				OLS Regression	
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	Diff	P-value	Diff	P-value
Percent report "severe or difficult" Hunger season	17.9%	12.9%	5%	0.065	4.2%	0.099
Percentage who have maize remaining	29.7%	55.4%	26%	0.000	25.1%	0.000
Total amount harvest remaining (kg/acre)	67.86	137.37	69.51	0.010	59.6	0.048

NUTRITION. Childhood nutritional status (e.g. wasting, stunting, and malnourishment) does not appear to be affected by program participation at baseline. This is unsurprising, as it would be difficult to affect child nutritional status after just one season of improved harvest. In addition, dietary diversity does not appear affected by program participation. With these results, we are now more carefully and strategically considering how our program might make more of an impact in these important spheres, through training, a greater encouragement of crop diversification, providing nutrient enriched seeds, and possibly nutritional supplements such as micro-nutrient powder (see “Interpretations and Recommendations” for more information).

Preliminary Impact Data

Child Nutrition: Veteran vs. New One Acre Fund Farmers			
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	P-value
% malnourished (weight for age at <-2 sd of WHO median)	7.4%	7.5%	0.967
% mildly malnourished (weight for age at between 1-2sd of WHO median)	18.5%	14.5%	0.196
% of children stunted (height for age at <-2 sd of WHO median)	18.7%	17.1%	0.618
% of children wasted (weight for height at <-2 sd of WHO median)	5.5%	3.6%	0.313
% malnourished (according to MUAC)	5.1%	3.4%	0.318
% moderately malnourished (according to MUAC)	7.8%	5.4%	0.227

EDUCATION. While there is no statistically significant impact in terms of school attendance (which is already quite high) between new and veteran One Acre Fund farmers, there are some differences in terms of the percent of children attending private school, with 33 percent more children of veteran farmers attending private school. We do know anecdotally that parents tend to move children frequently to better schools when they have the opportunity. Because attendance is starting so high, we might be more likely to see impacts in type of school and amount paid for school. When we remove extreme outliers (which we do for almost all self-reported expenditure data), we do see statistically significant increases in spending of 15 percent. We do not see any effects in the expected direction in terms of school absences, even when only looking at school absences for missed school fees.

Preliminary Impact Data

Education Outcomes: Veteran vs. New One Acre Fund Farmers			
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	P-value
School attendance			
% of children attending school	92.9%	91.3%	0.112
% of children attending private school	16.0%	22.6%	0.000
% of children 3–6 attending school	74%	70%	0.333
% of school-going children who are girls	50.1%	50.8%	0.711
% of school-going children over 13 who are girls	49.4%	51.8%	0.446
% of those under 18 who are attending school	92.8%	91.1%	0.252
% of those between 5 and 18 who are attending school	97.4%	96.1%	0.067
% of those over 13 who are attending secondary school	37.2%	33.7%	0.190
School fees paid (Ksh)			
Ave. school costs January –May	5,127.4	5,250.5	0.789
Ave. costs with outliers removed	3,501.4	4,000.9	0.047
Fees paid for those under 6	1,508.9	2,141.9	0.019

As a more rigorous test for the program impact comparing new and veteran One Acre Fund farmers, we have run regression models controlling for age, household size, education, gender, and physical assets for any of the significant results above to see if they hold. When controlling for these other factors education spending is no longer significant, but the percent of children in private school is still highly significant, where veteran farmers are 6.5 percent more likely to have children in private school. Because private schools are generally more expensive, we are not sure why there does not seem to be a robust impact on school spending. It is possible that expenditure reporting is simply very imprecise and hence more difficult to detect an impact at this sample size.

	Simple t-test (reported above)				OLS Regression	
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	Diff	P-value	Diff	P-value
% in private school	16%	22.6%	7%	0.000	6.47%	0.000
Education spending (Ksh)	3501	4001	499.0	0.047	395.4	0.153
Education spending for those under 6	1509	2142	633.0	0.019	564.8	0.215

HEALTH. There were very few differences in health outcomes in our impact sample, which is what we might expect considering the nature of One Acre Fund program and the fact that one year of improved harvest is unlikely to affect disease burden. However, after removing extreme outliers from the data, we do see a statistically significant difference in health spending with veteran farmers paying 35 percent more for each sick person.

Preliminary Impact Data

Health Outcomes: Veteran vs. New One Acre Fund Farmers			
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	P-value
% of households reporting an illness in last 2 weeks	73.9%	75.8%	0.543
% of all family members who were sick in past 2 weeks	23.0%	22.3%	0.639
% of those sick who sought treatment	94.3%	95.0%	0.603
% of those who sought treatment for those under 6	95.5%	97.6%	0.399
Ave. health costs (Ksh)	515.40	613.18	0.403
Ave. health costs (outliers removed)(Ksh)	325.92	413.02	0.022
% who saw a doctor or nurse	63.6%	65.5%	0.541

CONSUMPTION AND ASSETS. We examine household consumption and assets to get an indication of income and wealth. However, these are notoriously difficult estimates to get from household surveys, as recall of spending is difficult and respondents might have an incentive to either inflate (due to shame) or deflate (due to belief they will qualify for a program) their responses. Therefore, we have removed outliers from much of these data and we also look at number of assets in addition to total self-reported value of assets (e.g. number of bicycles as well as total value of bicycles).

ASSETS. We do see some important differences in assets between new and veteran One Acre Fund farmers, particularly in livestock assets, which are 33 percent higher for veteran farmers. These differences are still statistically significant when we control for other factors. For more permanent assets, like land and home values, this is more likely a preexisting difference between the two groups, however for assets that are easier to purchase quickly, this could easily be a program impact.

Preliminary Impact Data

Asset: Veteran vs. New One Acre Fund Farmers (Ksh)			
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	P-value
Total assets (Ksh)	637,011	805,990	0.003
Total physical assets (Ksh)	620,147	792,971	0.002
Total livestock assets (Ksh)	33,136	46,671	0.000
Total financial assets (Ksh)	6,747	7,431	0.368

Prior program participation appears to have an impact on some assets in particular, such as livestock (cows in particular), motorbikes and bicycles. This is largely in line with what we hear from farmer clients about how they spent extra income from harvests. Even when controlling for other factors (age, household size, education, gender, and physical assets) in regression models the impact on these key assets remains significant.

	Simple t-test				OLS Regression	
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	Diff	P-value	Diff	P-value
Total livestock assets (Ksh)	33,136	46,671	13,535	0.000	12,282	0.000
% who own a cow	55%	69%	14%	0.000	11.3%	0.001
Ave. # of cows	1.53	2.21	0.68	0.000	0.540	0.000
Ave. # of chicks	5.99	9.55	3.56	0.004	3.53	0.075
% who own a motorcycle	8%	13%	5.0%	0.029	4.3%	0.065
% who own a bicycle	63%	72%	9%	0.009	7%	0.030

CONSUMPTION. We also find significant difference in overall consumption (both recent and over the past year) between new and veteran One Acre Fund farmers. When controlling for other factors (age, household size, education, gender, and physical assets) we see an impact of around \$1.50USD in consumption in the past two weeks and around \$100 USD in the past year. However, we did not detect statistically significant differences in the consumption of food in the past two days between these groups. The largest differences in purchases over the last year are for livestock, motorbikes, and some home improvements, which do correspond with our anecdotal evidence of what One Acre Fund farmers do with their extra income.

	Simple t-test				OLS Regression	
	New One Acre Fund Farmers	Veteran One Acre Fund Farmers	Diff	P-value	Diff	P-value
Value (Ksh) of all purchases in last 2 weeks (outliers removed)	1,042	1,225	183	0.007	1472	0.042
Value (Ksh) of large purchases in the last year (outliers removed)	50,005	60,693	10,688	0.010	9490.2	0.028
Value of (Ksh) livestock purchased in last year	2,285	3,496	1,211	0.014	1269	0.045

BUSINESS GENERATION. There are few effects on self-reported cash income and business generated from one season in One Acre Fund. However, we asked about income from various sources over the past two weeks (as this is a better recall period), and the harvest happened about 7 months prior. So, it is possible that any cash impact effects may have dissipated. We do find statistically significant effects on income on selling milk and eggs, which is in line with our findings on livestock purchases from veteran One Acre Fund farmers.

WELL-BEING. We find moderately statistically significant effects on overall stress, with veteran farmers reporting less stress. One theory could be that veteran farmers had less stress because they benefited from a larger harvest. We do not see many differences on happiness/satisfaction. However, this might be because both groups have a similar program impact which affects happiness (hope, optimism from credit and camaraderie from group participation). Qualitative work might shed more light on farmer stress and life satisfaction.

WOMEN'S ECONOMIC EMPOWERMENT. We see no statistically significant impact on women's decision-making power between new and veteran One Acre Fund farmers in this baseline study round. This is to be expected as the program serves households and not exclusively women. However, about 60 percent of contract signers are women, the majority of training attendees are women, about half of our field staff are women, and the pictorial trainings are geared toward lower literacy levels of women in our area. So, we do hope to find some impact in future years on women's economic empowerment, even though gender norms are notoriously difficult to affect.

FINANCIAL LITERACY. There are few differences between new and veteran One Acre Fund farmers in terms of how they report budgeting and planning. Again, both groups theoretically have a program effect having each gone through at least six months of working with One Acre Fund to pay back their loans and have some financial education training. Veteran farmers are more likely to have a bank account, however, and this difference holds when we control for other factors (age, household size, gender, education, and physical assets), where veteran farmers are 7 percent more likely to have a bank account ($p=.044$).

➔ INTERPRETATIONS AND RECOMMENDATIONS

There are three primary purposes to this baseline data: (1) to understand the differences between the two sample populations (One Acre Fund and control) we will be following over time, (2) to obtain preliminary indication of program impact, and (3) to glean programmatic lessons on how to improve impact.

Goal 1: In terms of checking the similarity between groups, it is clear that there are some differences that will be important to control moving forward. On most income and wealth indicators, One Acre Fund farmers seem to be a bit better off. In addition, there were some small but statistically significant differences in the demographic profile of the samples. Therefore, we will match farmers by wealth index, marital status, family size, and education using propensity score matching when analyzing outcomes during the next round of data collection.

Not only is this important to control for these differences in this study, but these data can also indicate an important programmatic lesson. One Acre Fund is open to all interested farmers in an area. Other studies of income and expenditure have shown One Acre Fund farmers easily meet the definition of "extreme poor," and in certain countries like Burundi and Rwanda, "ultra poor;" however, data from this study suggests a slight difference in wealth and related variables between One Acre Fund and control farmers. In response to this, starting from the 2016 season in Kenya, the prepayment has been lowered from Ksh 1000 (\$10 USD) to Ksh 500 (\$5 USD) and loan packages which are smaller in size have been introduced to lower some of the barriers being faced by these farmers. In addition, it might be possible to more actively recruit from a poorer tier of farmers, who seem to be less inclined to join. Those farmers might have even more to gain from program participation but could be deterred by a fear of loans, group work, or other reasons. We will continue to investigate why farmers in Kenya do not join through annual surveys on non-enrollers and push our recruitment to be as inclusive as possible.

Goal 2: The second goal was to identify preliminary impact of the program across all quality of life measures. We surveyed both new farmers who had yet to experience harvest under the program with veteran farmers who had already experienced a harvest. Both groups self-selected into the program, so they are highly comparable (i.e. they share similar “unobservable” characteristics that would lead to their interest in One Acre Fund). In addition, we see from demographic data that these two groups are highly similar.

We feel that comparing new and veteran farmers is a highly valid measurement strategy with the following two caveats: (1) it is possible the veteran farmers still might have some unobservable differences which led them to be “early adopters” of the program, and (2) new farmers do have some program impact in terms of credit, even though the larger impact of a harvest difference has yet to be realized. Overall, however, comparing these two groups can give us a solid preview of what the longitudinal study should tell us in terms of program impact.

Looking at preliminary program impact, we see positive impacts of the program on hunger, some education spending, some health spending, purchases of productive assets (like livestock), and also some indication of improvements in self-reported well-being and financial literacy. This is encouraging news; however the magnitude of impact in certain areas, like financial literacy, could prompt us to do more in this area. For example, we could emphasize more financial planning training and possibly research working with local MFIs to provide information on a broader range of locally available financial services.

We do not observe any statistically significant impact on health, most education attendance, dietary diversity, childhood nutritional status, or women’s economic empowerment. For some of these areas, like childhood nutritional status and health, it might simply take more time than one season of harvest to show an impact.

We were also surprised not to see more impact on educational attendance as we know from previous work that a great proportion of additional income is spent on school fees, and this should presumably translate into more school attendance. School attendance overall is quite high in Kenya, so it might be that One Acre Fund farmers are switching their children to private schools, which are presumed to be of greater quality. School switching is quite common in Kenya, and we do see a program impact in terms of private school enrolment (33 percent more children of veteran farmers attend private school). This is in line with our school fees spending findings, which also show an increase in reported school fees paid.

Goal 3. Our preliminary impact results have prompted us to take a more strategic look at some important areas in which the data indicate a less than desired impact. These results have spurred deep discussion in the organization about how we might more actively move the needle in these important levers of anti-poverty. With respect to dietary diversity and childhood nutritional status we are doing the following:

- We will be collecting data on dietary diversity from our program countries where we have full-scale operations in 2016, as part of our regular impact assessment to understand which places we are having an impact. Burundi, for example, has done more regular training on nutrition, and if we see some positive impact there, we can roll out similar trainings to other countries.
- In future rounds of the quality of life survey, we will add on some modules to get more precise information on the pathways to improved nutrition. We will look at consumption for the smallest child in the family in addition to household consumption and ask additional questions about overall hunger level from the broader USAID FANTA scale.
- At the strategic tiers of the organization, we are considering the following program changes to support nutrition.
 - o Nutrient-enriched seeds
 - o Micro-nutrient powder distribution/purchase
 - o Dietary diversity training
 - o Increasing the crop diversity of our package

In addition, while school attendance is quite high overall, it is relatively low (about 32 percent) for secondary school. Graduation from secondary school is a significant anti-poverty lever, which we would like to address more proactively. Again, this data analysis has encouraged us to look more strategically about how our program might be best positioned to support our farmers in this area.

Our tree program is probably best positioned to help farmers with the expense of secondary school if they have small children. For a relatively small investment, a tree planted today can have a large pay-off in five to ten years, when a child is hitting secondary school. In addition, we have a school fees loan available as a trial product in Kenya. School fees are due just after harvest and farmers often sell at a disadvantageous price (when selling price is low) to pay fees. This loan allows them to have capital to pay fees and to keep their grain and sell it at a much higher profit later in the season. We are also in discussions about other ways in which we can assist farmers in both paying for school fees and accessing the highest quality education possible. 🌱