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ONE ACRE FUND'S DIGITAL INNOVATIONS

A Case Study of One Acre Fund's Experience in the Field

Executive Summary

Digital innovations have been an important force of our work at One Acre Fund, and especially so with COVID-19. The report, produced in partnership with the United States Agency for International Development, Development Innovations Ventures (USAID DIV), discusses our work around choosing products and partners, rolling out changes in the field, and key lessons for the future. Following are some of the report's key lessons:

Determining When and Where to Leverage Technology

- *Shift mindsets:* Focus on what will go wrong if new technology is not adopted, rather than what might go wrong while trying to implement new technology.

- *Ensure competency and environmental alignment:* Organizational competencies and environmental factors must align with technology goals.

- *More technology is not always the answer:* One Acre Fund remains a big believer that good agricultural practice requires training, reinforcement, and behavioral nudges through a hybrid approach of in-person and digital interactions.

Selecting Products and Partners

- *Simple technology can work well:* For instance, in areas where smartphone penetration is limited, USSD can be a viable solution that delivers similar value to a smartphone application.

- *Leverage detailed user stories:* It is critical to thoroughly understand user cases, product requirements, and design limitations by empathizing and collaborating with end-users.

- *Assess options with structured frameworks:* Use a risk/reward framework to assess options between licensing or contracting, building, partnering, or acquiring digital solutions.
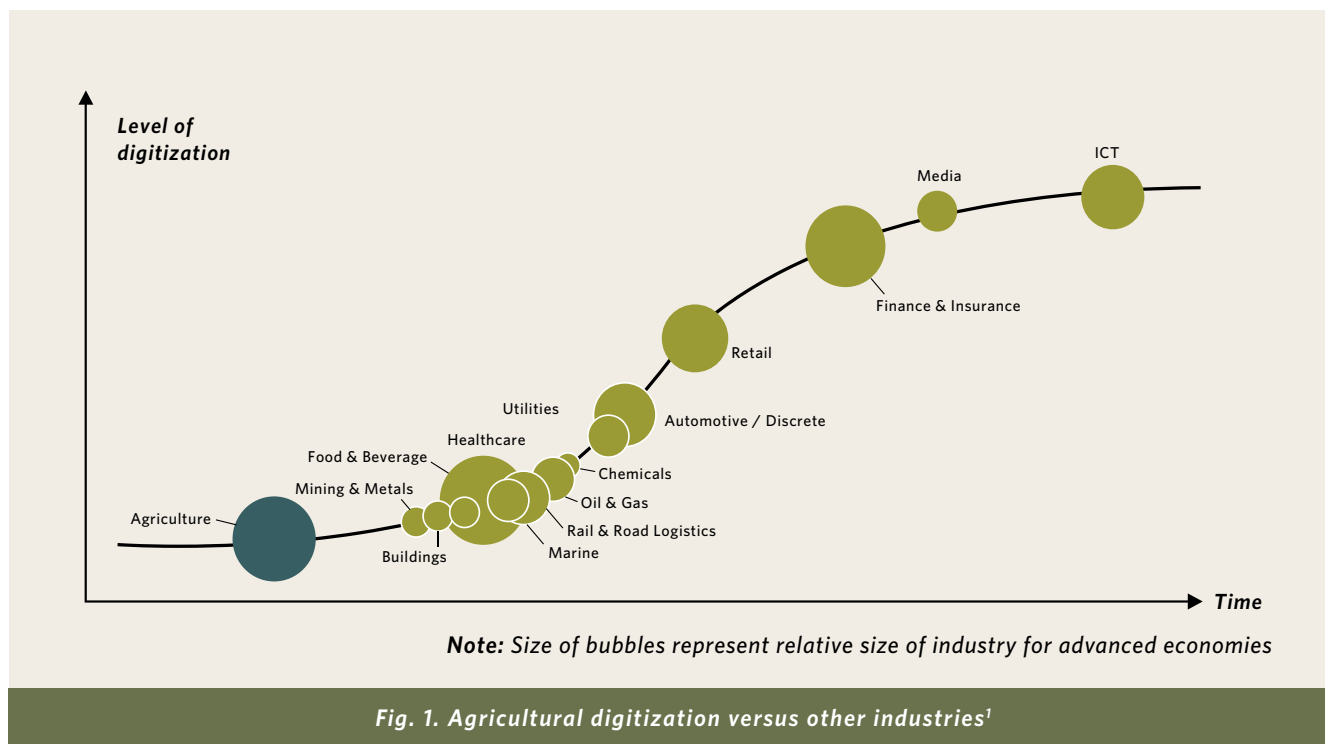
Rolling Out New Innovations

- *Changes can happen faster than anticipated:* Don't underestimate what is possible with a great team.

- *Think beyond the product:* For instance, when digital literacy is low, end users may require training or guidance from local staff.

- *Technology can create new problems:* Replacing human interaction with a digital interaction may create other risks or implications that need to be addressed.

As we look ahead to the next decade and aspire to grow the number of farmers we serve, our bottom line remains what it has always been: impact. We remain committed to increasing the scale (number of farmers we reach), depth (measurable outcomes for each farmer), and efficiency (cost of achieving outcomes) of our impact, and digital innovation is our primary means of achieving this goal.

Introduction

Technology has revolutionized nearly every aspect of life over the last several decades. We have an unimaginable amount of information accessible at our fingertips; we can easily connect with people around the world; we've optimized and automated processes from manufacturing to logistics - all of which has led to increased prosperity in countless industries and individual lives. The social sector stands to benefit from these digital innovations as well, with incredible opportunities to expand impact and disrupt traditional approaches to poverty alleviation. Smallholder agriculture has been a particularly analog economic segment in many countries, and technology has the potential to unlock significant gains for farmers and those their hard work feeds, as One Acre Fund has seen.

Note: Size of bubbles represent relative size of industry for advanced economies

Fig. 1. Agricultural digitization versus other industries[1]

Background on One Acre Fund

One Acre Fund (1AF) is a nonprofit social enterprise working to alleviate hunger and extreme poverty for small-scale subsistence farming families, the majority of whom are women in remote areas who are disconnected from value chains and largely growing staple crops for their family's consumption. 1AF delivers a complete bundle of services: financing for improved farm inputs, delivery, agricultural training, and post-harvest market support. Taken together, these interventions can help farmers significantly increase their crop yields and incomes, enabling families to begin their paths to prosperity. Farmers who join our program typically see a 40-45% increase in their incomes (bottom-line farm profits) on the crops, trees and other products we support.

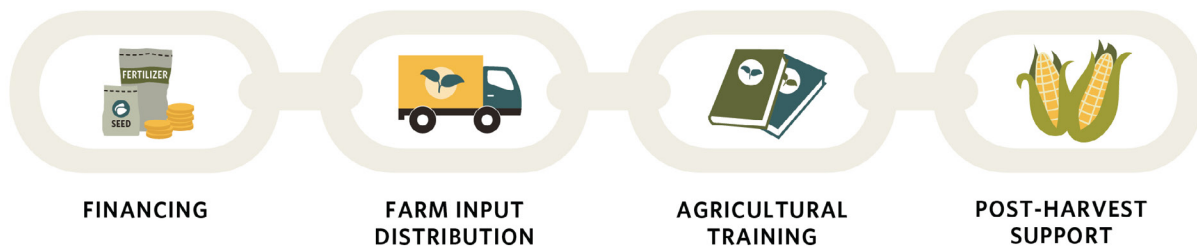[1] *Source:* https://www.arcweb.com/blog/abb-ability-strategy-explained

USAID.GOV | ONEACREFUND.ORG

Fig. 2. One Acre Fund Organisation Model

FINANCING FARM INPUT DISTRIBUTION AGRICULTURAL TRAINING POST-HARVEST SUPPORT

When One Acre Fund was founded in 2006, we started by working with just 38 farmers in Kenya. Since then, we have grown exponentially, now serving over 1.3 million farmers annually through our core program, and 1.3 million additional farm families through public and private partnerships.

Over the past 15 years, One Acre Fund has experienced immense change; leveraging digital solutions has been among the most influential in our growth and impact. We started before tech was widespread in Africa; mobile phone penetration in rural areas was virtually nil, and affordable, durable tablets were still many years off. This left us with a legacy customer database and systems that were built for a paper-based model.

Historically, One Acre Fund has focused on digitizing our program, to drive efficiencies in our existing model. We've introduced tools such as mobile repayment for the credit that 1AF offers at the beginning of the farm season and accepts repayment in typically very small increments throughout the season until shortly after harvest, when the farmer completes her

Fig. 3. One Acre Fund Countries of Operation

repayment; and tablets that full-time 1AF field staff use to enroll farmers, as covered in the 2017 USAID/1AF case study.

ONE ACRE FUND TECH TIMELINE

| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |

Mobile Money Repayment
+ Kenya _(2014)_

Tablet Enrolment
+ Kenya _(2016)_

Tablet Enrolment
+ Uganda _(2017)_

Mobile Money Repayment
+ Rwanda
+ Uganda
+ Malawi _(2019)_

Mobile Money Repayment
+ Burundi
+ Tanzania _(2020)_

Mobile Money Repayment
+ Zambia _(2021)_

Field Support Tablet Application
+ Kenya _(2016)_

Back Office Systems Improvements
+ All Countries _(2017)_

Tablet Enrolment
+ Malawi _(2019)_

Tablet Enrolment
+ Tanzania
+ Zambia _(2020)_

USSD Menu
+ Burundi _(2021)_

Field Support Tablet Application
+ Malawi _(2019)_

USSD Menu
+ Kenya
+ Rwanda
+ Tanzania _(2020)_

Field Support Tablet Application
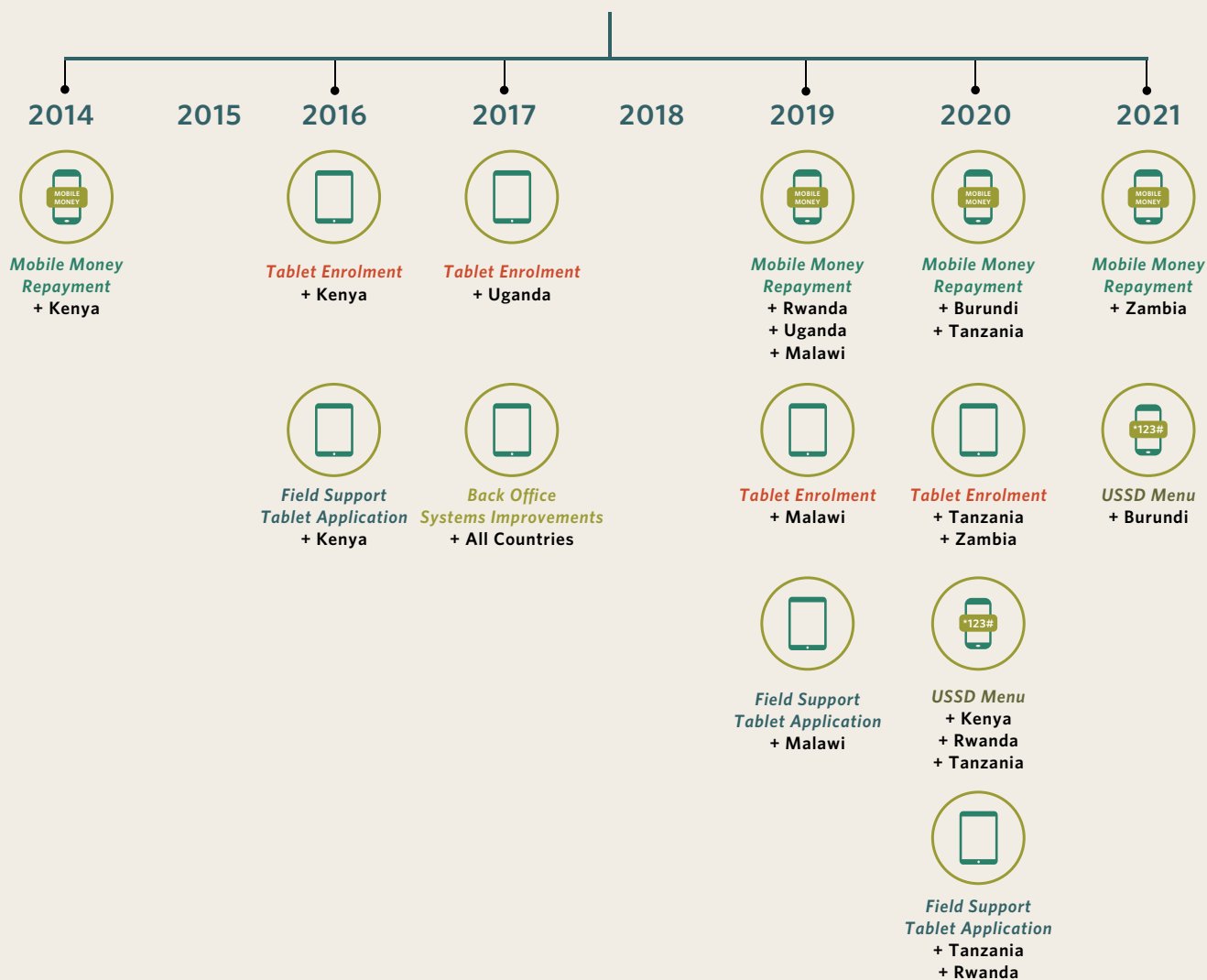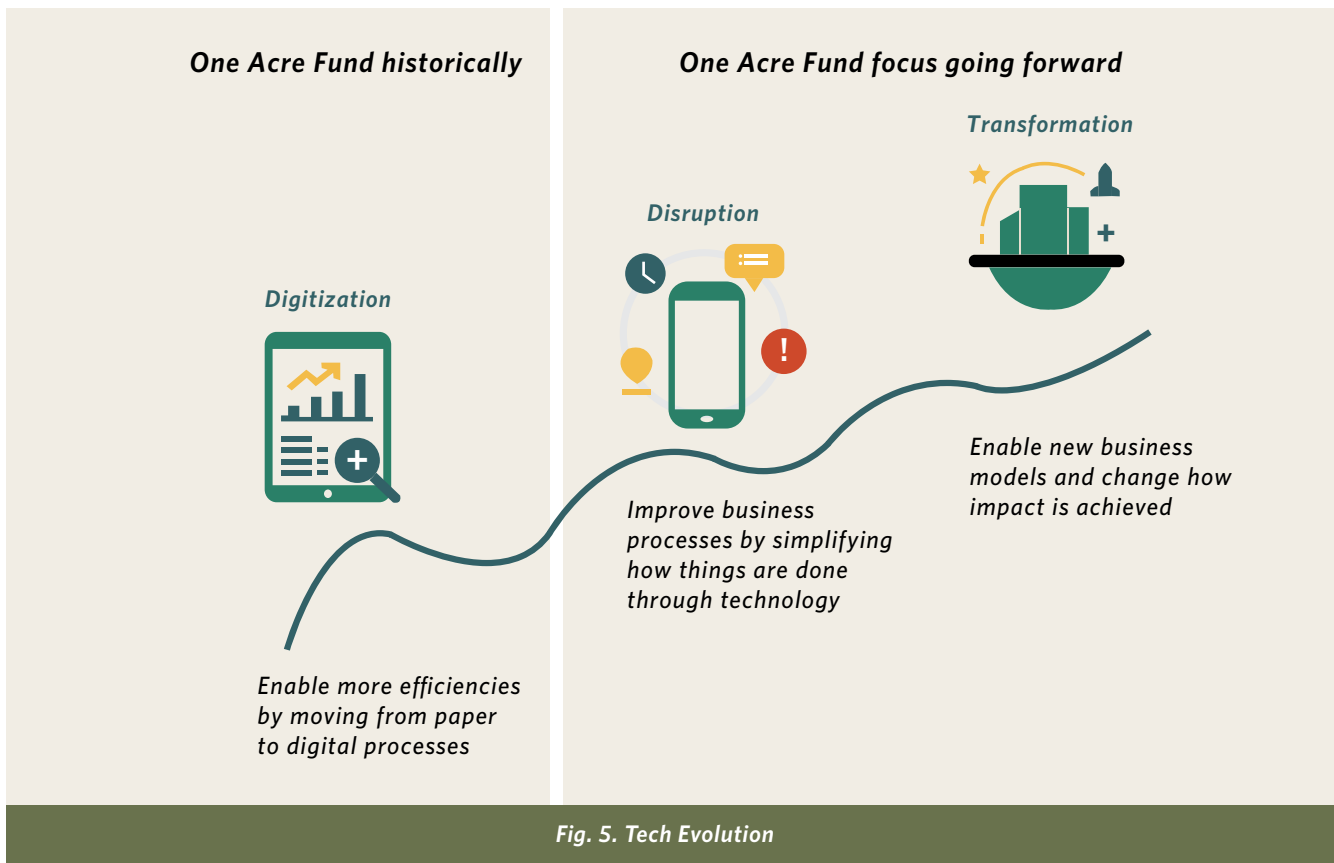**+ Tanzania**
+ Rwanda _(2020)_

Fig. 4. Timeline with historical One Acre Fund Tech rollouts

Before the COVID-19 pandemic, we began embracing a gradual need for transformation and disruption, where tech fundamentally improves every aspect of our existing model and enables entirely new channels altogether for serving farmers, respectively. COVID was the great accelerant for this work.

In this report, we will explain One Acre Fund's approach to digital solutions, specifically around choosing products and partners, rolling out changes in the field, and the learnings to be carried forward. We have also found the Principles for Digital Development to be a solid representation of the approach One Acre Fund has taken; and throughout the text, we will point out these alignments.

One Acre Fund historically

Digitization

One Acre Fund focus going forward

Transformation

Disruption

Enable new business
models and change how
impact is achieved

Improve business
processes by simplifying
how things are done
through technology

Enable more efficiencies
by moving from paper
to digital processes

Fig. 5. Tech Evolution

Determining when and where to leverage digital technology

As a nonprofit, One Acre Fund's guiding north star is always impact. Hence, technology for us is a means to the end of impact: our breadth (number of farmers we reach), depth (measurable outcomes for each farmer), and efficiency (cost to achieve outcomes). Every aspect of our model - extending credit and insurance, enabling input ordering and delivery, providing training, providing post-harvest support and market access - lends itself to digitization. Our job is to figure out what degree and form of digitization most drives these three key measures of impact.
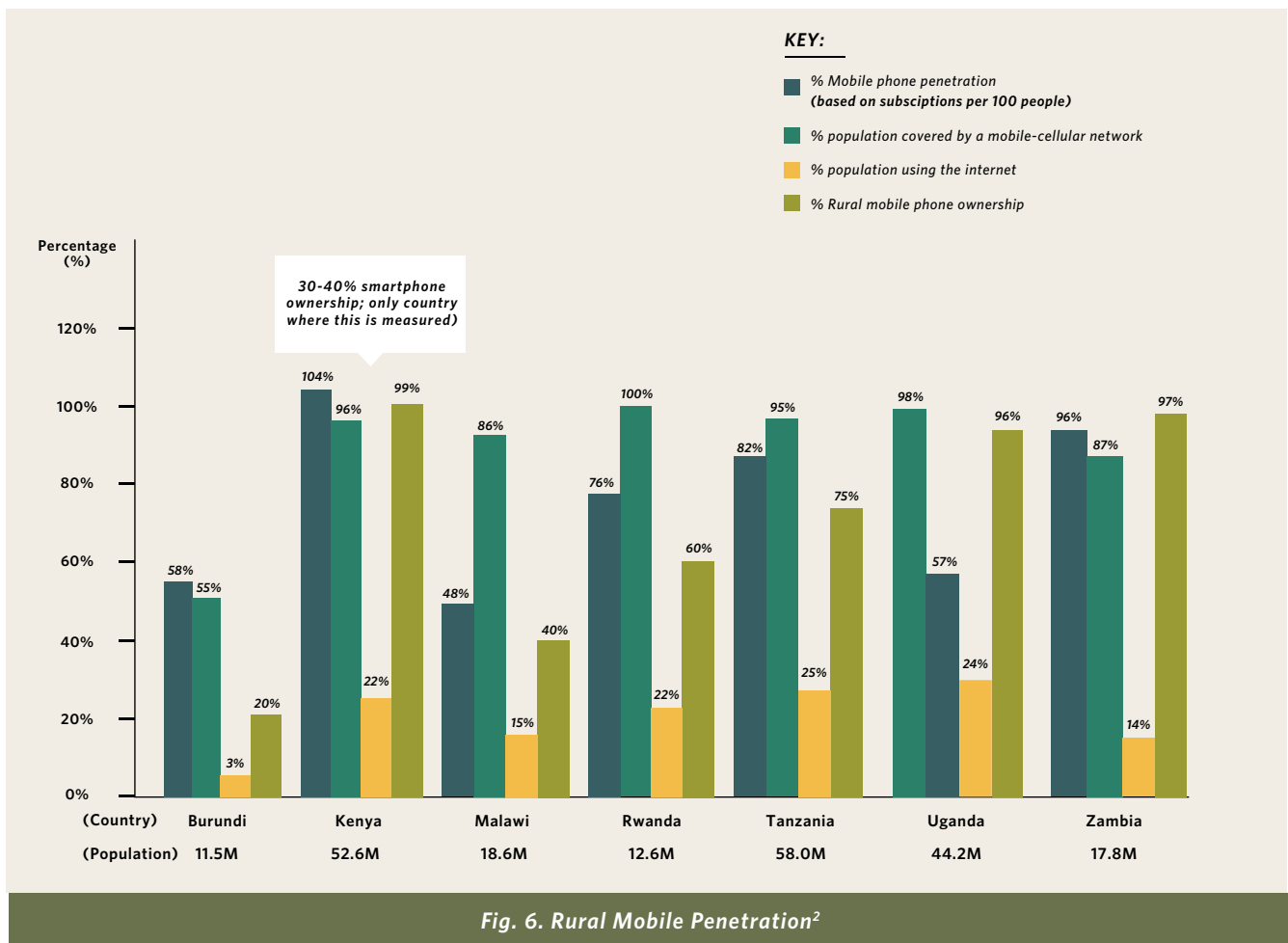
Context-dependent solutions

Technology needs to be the right fit for the specific environment, which varies by country that One Acre Fund operates in. Aspects we consider are local digital and telecom infrastructure, the capacity and buy-in of our tech and field teams, farmer trust, and public/private sector alignment. For example:

- Kenya is much further along in a digitized economy. For One Acre Fund, Kenya was the first country to go fully cashless in repayments, to roll out tablets for our field force, and to sell smartphones on credit.
- Rwanda has a less sophisticated digital economy; mobile phone ownership and connectivity is far lower, and the use of mobile money is not widespread.

Principles for Digital Development #2 "Understand the existing ecosystem"

KEY:
- ■ % Mobile phone penetration *(based on subsciptions per 100 people)*
- ■ % population covered by a mobile-cellular network
- ■ % population using the internet
- ■ % Rural mobile phone ownership

30-40% smartphone ownership; only country where this is measured)

(Country)	Burundi	Kenya	Malawi	Rwanda	Tanzania	Uganda	Zambia
(Population)	11.5M	52.6M	18.6M	12.6M	58.0M	44.2M	17.8M

Fig. 6. Rural Mobile Penetration[2]

In Rwanda, where there are challenges around low phone ownership, solutions were developed to enable mobile money to flourish through a strategy of phone borrowership. One Acre Fund made two key technical innovations that allowed farmers without phones to navigate the process of making repayments through the phone of a friend, neighbor, field officer, or agent easier and gave them more confidence while also reducing the risk of fraud:

- **Unique client IDs:** We switched from using a phone number as the customer ID to creating a unique One Acre Fund client ID, which allowed farmers to manage their account regardless of phone ownership
- **Automated confirmations:** We developed a feature that sends a confirmation message to clients to confirm receipt of payment (which is not available as part of the mobile money platform).

Mobile money payments were slowly scaled up in Rwanda over the course of 5 years, from 2014 to 2019, before becoming the mandatory form of repayment. Now, 100% of clients in Rwanda use mobile money. In addition to the technical innovations noted above, this transition was made possible by partnering with Mobile Network Operators in Rwanda, selecting and training new mobile money agents, offering incentives to field staff, and pushing client education training. We emphasized the convenience factor to clients (they could pay from anywhere, anytime, and didn't have to walk to give their field officer cash) as well as the security of the payment and the other ways they could use mobile money (paying for electricity, airtime, government services, etc) to create buy-in.

Investing in the ecosystem

In parallel, and especially in nascent markets like Rwanda, One Acre Fund plays an important role in strengthening the digital ecosystems in the countries in which we operate. Some ways we have approached this are by increasing mobile money agent density and making devices more accessible and affordable.

Mobile money agent density

While mobile coverage areas are mostly strong, fundamentally, there is a weak business case for Mobile Network Operators (MNOs) to invest in rural communities, where acquiring customers is both difficult and expensive. MNOs are less motivated to serve markets with lower population density, lower income levels, lower literacy levels, and lower perceived mobile adoption. Since 2012, One Acre Fund has been scaling and optimizing a mobile repayment platform to bring our now 1.3 million farmer network under digital repayment. It was a strategic imperative given that handling millions of small cash payments was a time-consuming and burdensome activity for our field staff that created opportunity for fraud, loss and recording errors.

CECILE NAYIRABONA, BUSINESS WOMAN - RWANDA

We therefore decided to make upstream investments to build out the mobile money agent workforce in our areas of operation. Mobile money agents density is a key determinant of whether transitioning to mobile money is possible. In Tanzania, One Acre Fund started an agent cultivation program in close coordination with two of the three MNOs operating mobile money platforms in Tanzania: TIGO and Vodacom. We identify and recruit agents, generally established business-people who already have a kiosk or a complimentary business, from villages in our districts. We pay for the licensing fees and also support them in other ways, like referring these agents to One Acre Fund contacts at the MNOs so they can get around lengthy registration lines and generally make the licensing process more streamlined. One Acre Fund's investment in local business-people also provides them with an additional source of income.

Affordable and accessible devices

Five years ago, industry experts were predicting that the increasing availability of low-cost smartphones would mean even more access for all segments of the market. However, the opposite seems to be true; the poorest populations still cannot afford even the cheapest smartphones and the simple, affordable phones are being phased out of the market, widening the ownership gap[3].

With a goal of increasing phone ownership among clients in Rwanda from 60% to 80% over the next 3 years, we launched a trial during the last season where farmers in two districts were offered Tecno feature phones for ~$12 on credit, and 14% of farmers ordered the product. Based on One Acre Fund's experience, for new products, a 10% adoption rate is a strong indicator of interest, and is a general threshold to consider for scaling.

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[3] *Interview with Amol Jadhav, Director of Market Engagement, GSMA*

This is not the first time that the Rwanda program has trialed phone sales; previously there was a high cannibalization rate with other products as well as additional problems related to phone quality. Given Tecno's popular and trustworthy brand name in the field, and an attractive opportunity to build a strong warranty process (where customers can return and replace damaged or malfunctioning phones), the trial fared much better last year. The Rwanda program will move to offering the phones in ten districts in the next season before fully scaling up.

Additional guiding principles

Whatever technology One Acre Fund leverages also needs to be aligned with these additional guiding principles, which help us prioritize where and how to invest:

- **Iterate and fail fast:** Get teams to learn faster, in iterative cycles of days rather than weeks or months, by keeping the innovation efforts close to the clients to ensure ideas can be tested quickly. For example, we rolled out new USSD enrollment tools faster than schedule to management enrollment during COVID-19, and adjusted quickly when there were issues.
- **Focus on enabling efficient and effective user journeys:** Each product provides the targeted user with a user experience that helps them perform their work efficiently and effectively. For example, we shifted tablet flows such as the enrollment process to USSD flows.
- **Build for tomorrow:** Build for the tech clients will have in the future, rather than only what they use today. For example, we are moving from a monolithic to a microservices architecture which will allow us to deploy changes faster.

 [Principles for Digital Development #4 "Build for Sustainability"](#)

- **Building last** Where possible, through effective research of available products, leverage off-the-shelf products rather than building our own custom solutions. For example, we are currently rolling out a third party Warehouse Management System and we rolled out a third party point-of-sale solution instead of building our own.

 [Principles for Digital Development #7 "Reuse and Improve"](#)

- **Cross-organizational solutions:** Development of applications used across the organization is preferred over the development of similar or duplicative applications, which are only provided to a single country/ division. For example, our omni-channel farmer communications tool works for every department including business operations, recruiting, and training.

 [Principles for Digital Development #9 "Be Collaborative"](#)

Selecting solutions and partners

Historically, we built a lot of our technology solutions in-house because 10-15 years ago, it was difficult to find tools that were the right fit for the East African subsistence farmer context at the time. For example, we internally developed our client management system because the available off-the-shelf software was developed for microfinance institutions, and not applicable to our unique circumstances (e.g., hundreds of combinations of what farmers could order). In parallel, there was very limited internet connectivity at the time; our initial database was built in Microsoft Access and transported by thumbdrive in order to collect field data.

As we've scaled over the years, we found that these bespoke solutions were difficult to configure to new situations (e.g., more flexible ordering). Luckily, there is a much wider range of options available on the market now that have capabilities meeting the needs of organizations like One Acre Fund; thus, we've shifted to a very high bar to build solutions internally given the growth of the ag-tech product space.

We have a robust process from identifying needs for potential solutions to assessing options and implementation.

1. **Identify a need:** This usually happens when a staff member submits a "new engagement request" ticket through our technology service desk platform. A member of the tech team reviews the engagement request and determines if the need can be addressed through an existing digital solution, or a simple modification or addition to an existing solution. These requests are ticketed several times a week by staff.

2. **If a new solution is required, pitch a business case:** A member of the tech team works with the department requesting the new tool to put together a cost-benefit analysis and present it to the Technology Working Group (TWG). The TWG is a group of cross-organizational leaders representing the tech team, each major business unit (e.g., supply chain), and our country programs.
   a. For example, when conducting the cost-benefit analysis for a third-party retail point-of-sale system, we considered benefits such as increased revenue and cost savings from reduced manual data entry. On the cost side, we incorporated recurring software, training and maintenance costs as well as set-up costs. Using these inputs, we calculated the net present value of the investment and the SROI (social return on investment, or the new farmer income generated for every dollar of donor funds spent). These metrics were rigorously compared with other tech investments in the pipeline to ensure that the highest impact projects were prioritized.
   b. We previously looked into a single sign-on provider and deemed its cost of $100,000+ a year to outweigh the benefits, and ultimately did not move forward with that solution.

3. **If TWG approves, conduct user empathy sessions and collect user stories:** Product managers understand design constraints and write detailed User Stories in partnership with relevant stakeholders and users to deeply understand use cases, and modify requirements as needed.
   a. User empathy sessions are a higher level exercise to first understand different personas and what to take into consideration when designing solutions.

      i.   For instance, a Field Officer persona may include that they do not have access to the internet, or have 3 children they are trying to put through school, and cannot afford a smartphone. In this case, we would not want to develop a smartphone solution and rather focus on more feature phone applications.

      ii.   This exercise helps us be mindful of designing for different populations with different needs and constraints

  b.   User stories are more specific to the product requirements and how they will be used, and are written in the format of "As a… I want to…So that…"

      i.   For example, a user story for our new Warehouse Management System was "As a warehouse manager, I want to see the list of open Purchase Orders for my warehouse and select the one which I want to register as received, so that I can accurately document goods received"

Principles for Digital Development #1 "Design with the User"

4. **Outline and prioritize requirements:** With the user stories they collected, Product Managers create a list of product requirements based on priority (must have, should have, could have) and verify these with users and other stakeholders.

5. **Determine if the solutions should be bought or built:** Based on the additional user context and deeper understanding of system requirements, Product Managers conduct another cost benefit analysis and risk / reward assessment of building versus procuring a product.

	Build		License/Contract		Acquire		Partner	
	Risk	Reward	Risk	Reward	Risk	Reward	Risk	Reward
Platform	Time (**)	Cost and fit with specs (**)	Fit with specs (*)	Speed (***)	Diligence and cost (***)	Validated product / data, developers, remove competitor, asset value (***)	Inability to control data (**)	Leveraging partner reach (**)
Service	Time (**)	Cost and fit with specs (**)	Low farmer adoption (*)	Speed (***)	Diligence and cost (***)	Validated product / data, developers, asset value (***)	Low farmer adoption, partner demands (**)	Speed, reputation, insights (**)

Definitions

Build – we develop the technology ourselves
License/Contract – license a tech product off-the-shelf, or contract a technology service provider
Acquire – we acquire a tech company
Partner – partner with a tech company (with limited/no resources exchanged) to benefit both parties
Risk/Reward Level: (highest priority given to speed to market – presuming quality and acceptable price point)
     *low   **** medium**   ***** high**

Fig. 7. Matrix showing risk / reward of various options; build, license, partner, acquire

6. **If buying solution, research and shortlist vendors:** Product Managers identify and engage in extensive conversations with potential vendors before creating a shortlist that meet the prioritized product requirements, as well as broader organizational criteria, such as:

   a.   Does the product have a wide customer base, so its usability and quality have been tested and improved, and it is likely to stay on the market?

   b.   Does the vendor provide useful documentation and a help desk, and respond quickly to problems?

   c.   How easy it will be for our other products to interface or integrate with it?

   d.   What is the method for performing customization, and how easily can the customization process be learned?

7. **Test shortlisted vendors:** For most cloud-based softwares, Product Managers use a 90 day trial to thoroughly test systems in their sandbox environments. For the leading contender, Product Managers also conduct a production trial where One Acre Fund data is loaded into the system.

   a.   Where applicable, new solutions are tested in the field as well. For instance, our new point-of-sale system for rural retail stores in Kenya was first used in one location during the trial period before being procured and rolled out across all stores.

   b.   Our R&D teams use a four-phase process to shepherd any new innovation from initial research to full-scale rollout, featuring successively larger trials under actual field conditions with impact and demand thresholds at each stage.

   c.   The Risk Committee with representatives from our security, legal, and government relations teams reviews shortlisted products to ensure that they meet our client data protection standards. We store customer data in a scrambled format that is not readable in our database, and only a few people have access to read it.

   Principles for Digital Development #8 "Address Privacy and Security"

8. **Select and roll out the product:** Provided that testing went well, negotiations proceed with the vendor and One Acre Fund acquires the product. From there, the tech team works closely with the department using the product to execute all set up and integrations, training, and data migration.

In a situation where One Acre Fund determines that a partnership is the best path forward rather than building or licensing a product, we clearly establish the gaps in our core competencies that need to be complemented by a partner and in parallel understand the value that we would be providing to a partner. In these cases, we determine a short list of partners meeting the above criteria and have ongoing discussions to ensure that both parties are well-aligned.

Case study: Selecting and rolling out our new Warehouse Management System

In early 2020, One Acre Fund identified a need for a new digitized Warehouse Management System to streamline and consolidate our previously heavily paper-based distribution and logistics model. The cost-benefit analysis included improvements such as higher inventory and shipment accuracy, increased order-fill rates, better utilization of floor space and reduced inventory loss due to shrinkage. It was also determined that the solution should be licensed given the prevalence of existing sophisticated warehouse management products.

Once approved, the tech team kicked off the search for vendors and began to collect dozens of detailed user stories from stakeholders across logistics, business operations, supply chain and field operations teams. Using this information, they assessed a number of vendors and shortlisted four for more in-depth review. A production trial was not done since it would require an infeasible amount of configurations with existing One Acre Fund systems; instead, intensive testing in demo systems was done. After nearly a 10 month process, the tech team made a final recommendation.

For the initial pilot, a demo warehouse was selected and the new system was configured with existing One Acre Fund systems, and new processes were developed. Go/no-go criteria across data accuracy, inventory tracking and staff time were defined to continue scaling the system in a phased approach by country over the course of 2021.

SEARCH OF VENDORS
The ES team identified and contacted potential vendors.

VENDORS ASSESSMENT
The ES team assessed the vendors in detail compared to the User Stories.

IMPLEMENTATION
Pilot, Go-Live and roll-out are planned for next year.

| JAN 2020 | FEB 2020 | JUN 2020 | AUG 2020 | OCT 2020 | 2021 |

REQUIREMENTS DESCRIPTION
We identified a need and defined the outlined requirement description.

DETAILED USER STORIES
We wrote 85 User Stories with the participation of all the logistics teams, and we described the future processes.

RECOMMENDATION AND SELECTION
The ES team made their final recommendation and we need to make a final decision.

Now that we have covered our guiding principles and selection processes for digital investments, we would like to share some context on the products One Acre Fund is prioritizing to bring technology to small holder farmers.

Key One Acre Fund Products

Key product #1: Farmer-facing technologies

Among the most important set of digital solutions in the One Acre Fund arsenal are our farmer-facing technologies. In our years of working closely with farmers, we've identified key needs to be addressed through digital tools and functionalities:

Easier and more secure way to make payments: In order to avoid cash transactions that are exposed to fraud and inflexible in collections timing, One Acre Fund transitioned to using mobile money in all of our countries. As shared in more detail earlier in the report, One Acre Fund needed to strengthen the digital ecosystem in order to make this possible; by increasing mobile money agent density and negotiating with mobile network operators minimize the burden of fees. Our transition timeline also varied depending on country readiness; Kenya was first in 2014; Rwanda, Malawi, and Uganda in 2019, and Tanzania in 2020.

Access to affordable devices: Digital solutions are hardly viable if farmers do not have the devices to access them on. One Acre Fund is scaling up the sales of feature phones on credit (for ~$12) in Rwanda and smartphones on credit (for ~$60-70) in Kenya, while also partnering with the phone manufacturer Techno to take on warranty liability.

Easier and more efficient ways for farmers to access their client information:
Historically, farmers had to interact in person with their field officer or reach out to the call center in order to check their balances, inquire about payments, or generally have their questions answered. In order to increase efficiency and more options for self-service, One Acre Fund developed a USSD (menu driven interface for feature phones) tool for farmers to see their current balances, healthy repayment path, and recent transactions. To create these USSD menus,

FARMER JOSELYNE UMUTONI AND CONSOLEE MUKANDIMUKURI SENDING FARM INPUT ORDER USING CELL PHONE - RWANDA

we used a combination of lower code development tools such as Telerivet along with custom coding to connect these data to our back end systems. This platform was recently expanded to allow farmers to directly enroll in the program as well. The content is translated into several languages to be accessible to farmers; Swahili in Kenya, Kinyarwanda in Rwanda, French and Kirundi in Burundi. Our field staff has been instrumental in training farmers on these new features.
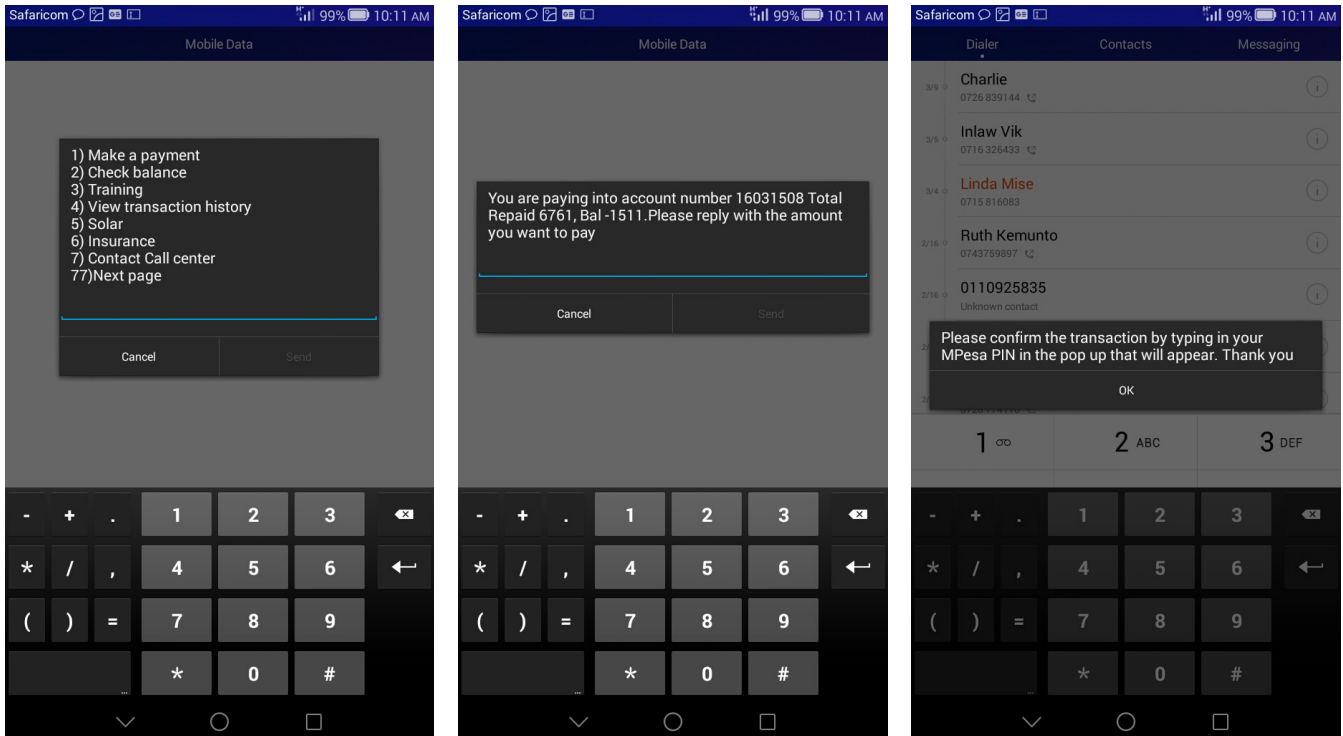
Fig. 8. Screenshots of USSD menus

HOW COVID ACCELERATED OUR WORK

The pandemic significantly challenged our way of working and operating model. Our heavily in-person- interaction reliant field model was no longer feasible for farmer training, marketing or enrollment. Collecting loan repayments was also challenging and further exacerbated by farmers' cash constraints due to COVID. In response, we made changes to each part of our model.
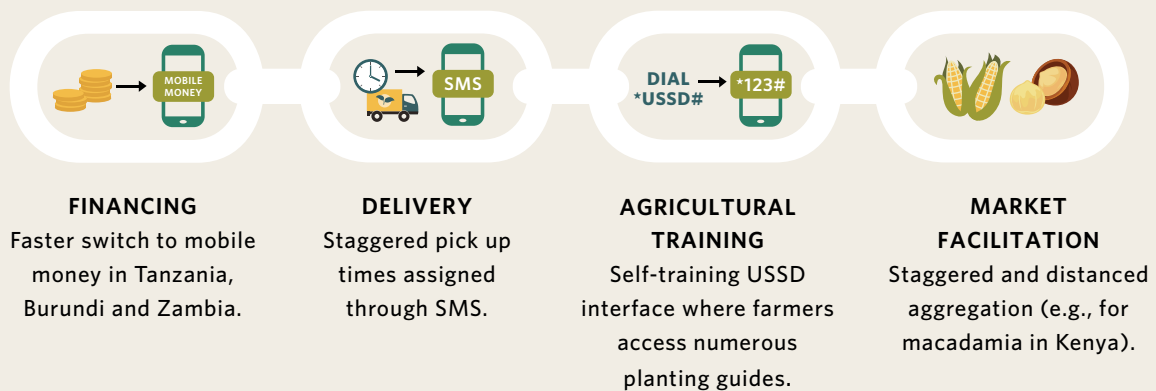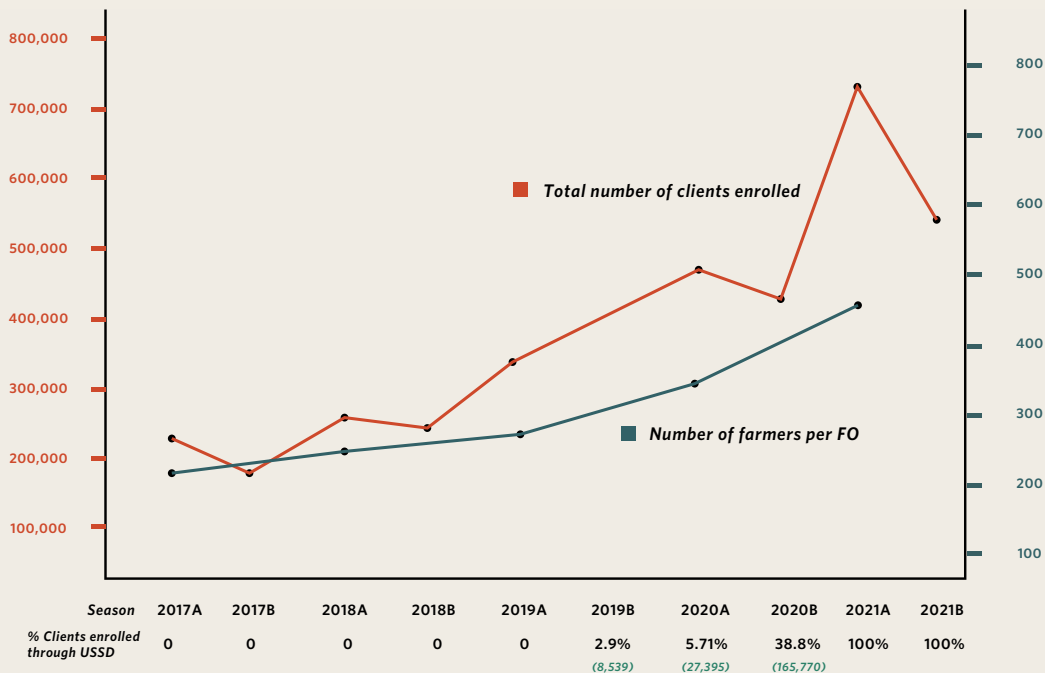

FINANCING
Faster switch to mobile money in Tanzania, Burundi and Zambia.

DELIVERY
Staggered pick up times assigned through SMS.

AGRICULTURAL TRAINING
Self-training USSD interface where farmers access numerous planting guides.

MARKET FACILITATION
Staggered and distanced aggregation (e.g., for macadamia in Kenya).

Fig. 9. Key changes in each of our four-part program model: financing, delivery, training, and market facilitation.

One particular success was the significant expansion of USSD for enrollment; more than 700,000 farmers signed up by USSD in Rwanda. While we had previously started trialing this innovation, the scale-up to the entire program took place two seasons earlier than planned.

Season	2017A	2017B	2018A	2018B	2019A	2019B	2020A	2020B	2021A	2021B
% Clients enrolled through USSD	0	0	0	0	0	2.9% *(8,539)*	5.71% *(27,395)*	38.8% *(165,770)*	100%	100%

NOTE: The A season in Rwanda is from September to November, with the enrollment ending in July. The B season, which is a smaller planting season, is from February to May, with enrollment ending the preceding December. The drops in B season enrollment are because of seasonality, rather than demand for our program.

Fig. 10. Rwanda USSD enrollment

Key product #2: Field-force-facing technologies

One Acre Fund has a network of more than 6,000 rurally-based full-time field extension agents. They are our direct line to the farmers we serve, our most powerful asset, and further enabling their work through technology is key to our digital transformation. We focused on a few key opportunities for efficiency to prioritize the functionalities we have built for our field team.
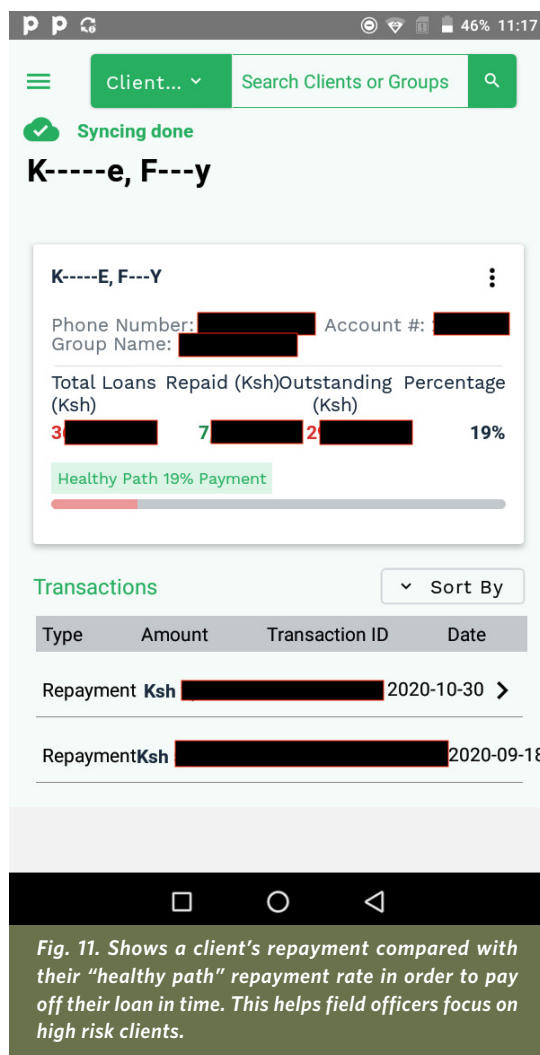
Streamline the heavily paper-based enrollment model: Previously, field officers collected all farmer information on paper, and manual data entry was used to aggregate into our client database. This posed challenges for data accuracy, and was a time consuming process. Over the past several years, we have rolled out tablets, and an enrollment survey application which maps paper-based approaches for our field staff to conduct client enrollment. We found that field officers could enroll 8% more clients with this method.

Improve data collection accuracy and efficiency: The tablet survey software allows for pre-population of returning client data; the spelling of sites, groups, and client names can be pulled from the previous year's records and do not require manual entry, which greatly reduces the possibility of human error in the entry process. The survey software also allows data validation.

Better manage a growing client portfolio: As One Acre Fund continues to grow, one of our key levers for sustainability is increasing the number of farmers each field officer can manage, and tech solutions to help manage the portfolio are crucial. A tablet application links to our client database to visualize group and client repayment data and enables field staff to intuitively manage their clients. We have also introduced predictive modeling tools to help field staff determine which clients are behind the repayment curve and may require additional attention.

The next frontier

Digital enrollment is the tip of the iceberg to the role that our digital field force can play. Over the next 3-5 years, we envision many more eventual applications such as diagnosing crop health and diseases, and delivering precision agriculture services. There are also opportunities for automated and gamified field staff performance management, as well as use of sophisticated customer segmentation to target our client interactions for enrollment, marketing, and repayment for efficiency gains and better customer experience.

Fig. 11. Shows a client's repayment compared with their "healthy path" repayment rate in order to pay off their loan in time. This helps field officers focus on high risk clients.

HOW COVID ACCELERATED OUR WORK

Lockdowns and group gathering restrictions as a result of the pandemic meant that our regular in-person field staff training and meetings were no longer possible. In response, we quickly ramped up the ability for field staff to work and communicate remotely.

We rolled out over 2,000 tablets in countries that had not previously moved from paper-based enrollment, and trained staff on using their new devices. We also launched email and Google suite tools for all field staff so that information could easily flow from HQ to our field teams without needing to send physical documents. Our call center was decentralized by moving the technology into the cloud and enabling our customer service agents to work from home.

Throughout, we had to manage constraints such as the lack of internet connectivity and challenges for call center staff to find a quiet place at home to work by providing headphones and stipends for airtime and data so that staff could hotspot where there is no internet connectivity. Meetings were also set in advance so that staff could plan to go to internet cafes in their villages to participate in meetings. There were also difficulties around virtually training staff on unfamiliar digital tools, but we planned our training materials and schedule early and took advantage of opportunities before lockdowns to safely conduct as much new training in person as possible.

Deep dive: USAID-supported markets of Malawi and Uganda

Uganda and Malawi are One Acre Fund's newest full-scale program countries – after two years as pilots, both countries fully launched in 2016, with generous scale-up support from USAID's Development Innovation Ventures program. In this partnership, improving digital offerings has been one of the most pivotal levers to reduce net cost per farmer and drive the scalability of our program.

Case study: *Uganda*

Before COVID-19

One Acre Fund's program in Uganda was historically extremely analog; even as late as 2018, there were no tablets, mobile money, or a toll free customer engagement line. Our Uganda team had been working on digitizing operations in general from late 2019 to early 2020, which was able to carry over very well into the pandemic environment.

At the onset of COVID-19

These changes included rolling out tablets to be used for enrollment, and introducing emails and Google suite tools to the field team. One particularly crucial tool was the "Closed User Group" through a Ugandan mobile network operator, which allowed One Acre Fund staff to call other staff for free, minimizing the cost of airtime. Getting these basics right worked well for the Uganda team.

A key learning that served the program well was the champions, or train-the-trainer, approach for both field staff and farmers. A champions approach entails focusing on a few well-performing team members, and relying on them to support their peers. For instance, field officers who were quicker to pick up digital literacy skills supported their peers in tablet fluency. Similarly, farmer group leaders who better understood local nuances trained other farmers on mobile money payments rather than HQ-led farmer trainings. These group leaders were more aware of issues such as farmers sharing their phones with other family members, and were able to garner more trust in their communities for new systems.

(Continued) Case study: *Uganda*

Today

Looking ahead, the Uganda team is focusing on professionalizing the management of farmer data in order to make clients' digital interactions with One Acre Fund smoother, and reduce the need for a farmer to call their field officer or group leader with questions or concerns. For instance, the team is working on immediate SMS payment confirmations so that farmers are not worried that their hard-earned money has not reached One Acre Fund.

Case study: *Malawi*

At the onset of COVID-19

Recent technology priorities in the Malawi program were focused on supporting the field team so that they could support their farmers. The field team had already been using tablets, but all of Google suite was rolled out during COVID. The team set virtual meetings for the whole season in advance, so that field officers could plan to go to internet hotspots -- and they were able to reach 100% meeting participation.

In parallel, there has also been important work done to enable farmers to have access to tech services. Mobile phones were added to One Acre Fund bundles available on credit, and the program has trained farmers over the last two years on using mobile money. 2020 was the first year with entirely cashless repayment, but it also achieved the highest repayment rates; the Malawi program had 92% repayment while serving around 15k farmers in 2019, and 97% repayment while serving more than 25k farmers in 2020. One Acre Fund Malawi also integrated with a second telecom provider (Airtel) to make mobile payments easier.

Today

Looking ahead, the Malawi program plans to leverage their key learning that sometimes changing traditional methods, like having in person meetings, result in great outcomes even if originally thought to be too hard. For instance, the team had not thought that there could be such high participation in virtual meetings. Virtual meetings also had the added benefit of savings on transport and food costs. This has inspired the team to mostly continue virtual meetings even when the pandemic ends.

M&E TABLET CROP MIX SURVEYING, KENYA

Future plans for technology at One Acre Fund

One Acre Fund's ambitious 2030 vision of serving 10 million farmers will require us to operate differently, and be able to make each dollar go further to create more impact for more farmers. We believe this is possible since we have seen our programs adapt rapidly in 2020, and we will need to continue leveraging digital innovations and build on the learnings from COVID.

We have seen the initial rewards of digitizing our core program; now it is time to reap the full benefits of a digital transformation of our business operations. The next frontier of the One Acre Fund model is an omnichannel program that farmers can access in a personalized and flexible manner, which will rely heavily on technology innovations. We envision this including:

- **Direct-to-farmer digital services platform:** A tool where farmers can access real-time, localized information across market prices, weather, planting recommendations, and more.

- **New tablet-based functionalities:** Features for our field staff to deliver support such as precision agriculture (personalized field-level recommendations on planting time, fertilizer application etc) and targeted repayment follow-ups.

- **Flexible program:** Through an omni-channel platform for smallholder farmers to capture a 360° view of the farmer, and allow farmers to purchase what they want, when they want, and with multiple payment options.

- **Leverage partnerships to move faster:** In the past 5 years esp, there has been a blossoming of tech solutions for farmers (e.g., precision agriculture, PAYGO financing), particularly in more mature markets like Kenya, and we are able to plug these partner solutions into our technology backbone.

Summary of key learnings

☑ **Determining when and where to leverage technology**

- **Shift mindsets:** Rather than focusing what might go wrong while trying to implement new technology, shift to a mindset of what will go wrong if new technology is not adopted. This will make things move much faster.

- **Ensure competency and environmental alignment:** Organizational competencies and environmental factors must all be aligned with technology goals; such as local infrastructure, tech team, client trust, public/private sector alignment, and client facing innovations.

- **More technology is not always the answer:** One Acre Fund remains a big believer that good agricultural practice requires training and reinforcement and behavioral nudges. Before COVID we did all of these components in-person, during COVID both shifted to virtual platforms, and post-COVID, we anticipate adopting a hybrid approach.

☑ **Selecting products and partners**

- **Simple technology can work well:** For instance, in areas where smartphone penetration is limited, USSD can be a viable solution for customer engagement that sidesteps the need for extensive local infrastructure and delivers much of the same value as a smartphone application.

- **Leverage detailed user stories:** Ensure that you deeply understand use cases, product requirements, and design limitations by empathizing and collaborating with end users

- **Assess options with structured frameworks:** Use a risk/reward framework to assess options between licensing or contracting, building, partnering or acquiring digital solutions

☑ **Rolling out new innovations**

- **Changes can happen faster than you think:** Don't underestimate what is possible with a great team. For instance, One Acre Fund's program in Rwanda scaled up USSD enrollment from 40% to 100% two seasons ahead of schedule due to COVID.

- **Think beyond the product:** It's necessary to think through the support beyond the product itself that users need. For instance, when digital literacy is low, end users may require training or guidance from local staff. Our Rwanda program saw improved user experience and fewer drops (i.e. clients enrolling but not ultimately taking out a loan) when they trained farmers and farmer volunteer leaders on how to use the USSD tool.

- **Technology can create new problems:** Replacing human interaction with a digital interaction may create other risks or implications that need to be addressed. For instance, eliminating the field officer from the transaction removes a way to minimize credit risk (i.e. a client taking a larger loan than they are likely able to repay). This can be partly replicated by imposing a limit on the maximum loan size for mobile-based product purchasing.