

Digital Credit for Smallholder Farmers

Lessons Learned from the Field



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ACRONYMS

BRAC	BRAC Myanmar Microfinance Company Limited
MADB	Myanmar Agricultural Development Bank
CGAP	Consultative Group to Assist the Poor
CSA	Climate Smart Agriculture
DFA	Digital Field Application
DFS	Digital Financial Services
EU	European Union
GDP	Gross Domestic Product
HCD	Human-Centered Design
KYC	Know Your Customer
MAP	Making Access Possible
MFI	Micro-Finance Institution
MMK	Myanmar Kyat
MNO	Mobile Network Operator
QR Code	Quick Response Code
SMS	Short Message Service
SIM	Subscriber Identify Module
WBG	World Bank Group

FOREWORD

Project activities took place between early 2017 and late 2020. With the onset of the global pandemic in the early spring of 2020, in-country operations rapidly decelerated as the government implemented a series of restrictions related to social distancing, movement, and service hours of operation. Project operations effectively ceased by the end of 2020.

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Executive Summary

The ongoing digital revolution could be transformative not only for the financial inclusion of smallholder farmers but also for the food and agriculture sector more broadly, supporting the creation of more efficient, equitable, and environmentally sustainable operations.

Digital technology use can help reduce costs, help farmers make more informed and precise decisions, and improve access to information, knowledge, and markets. The World Bank Group (WBG) focuses on

data-driven digital agriculture to improve food system outcomes.

This report's primary purpose is to inform and share relevant experiences with those who have a role in designing or operating digitally enabled services for smallholder farmers—principally financial services but with broader relevance for other rural-facing services. In it, we document lessons learned from an agri-credit pilot undertaken in Myanmar involving the microfinance institution BRAC Myanmar Microfinance Co., Ltd (BRAC) and a small consortium of other private sector partners. The project's overarching

objective was **i)** to evaluate the ability of digitally enabled financial services to deliver appropriately designed loan products to smallholder farmers, thereby enabling them to invest in seasonal inputs to improve their productivity and **ii)** to assess the commercial sustainability of financial institutions to provide such loans to farmers.

The project was implemented in a relatively narrow time frame from 2018 to 2020 within a concentrated geographic area—two townships, Daik-U and Nyaung Lay Pin in the eastern Bago Region of southern central Myanmar. The loan product itself

was launched in three iterative cycles over a one-and-a-half-year period. Refinements were made to both the product and associated processes after each cycle based on experiences and reactions of key personnel and borrowers.

In total, 2,626 farmers were reached and 1,441 loans totaling an estimated MMK 420,000,000 (US\$300,000) were disbursed. The pilot team's approach sought to thoroughly understand the circumstances and the needs of their target customers, using a process known as human-centered design (HCD). Based on the findings from field research, which revealed passive usage of mobile phones among smallholder farmers despite the broad device penetration nationally, the project took a “high touch” approach to implement the pilot.

Key Findings

While the experiences and outcomes from this project are context specific—a single market, a single loan product, offered by a single provider over the course of only three growing seasons—this report aims to distill and present high level lessons that possess broad applicability to a range of market contexts involving digitization and rural service delivery. Myanmar varies considerably in

terms of topography, ethnicity, language, and basic public infrastructure. The project team therefore does not propose that the findings, lessons, or recommendations contained here are nationally representative. Nor is the team of the view that these experiences can be easily replicated within Myanmar or outside without careful consideration of key factors in specific localities where similar initiatives might be introduced.

Product design appropriateness: This loan product allowed a majority of borrowers to purchase some or most of their seasonal inputs, with a few exceptions in which the loan size could not cover the full seasonal investment required or the funds were not available when farmers wanted to make key purchases. It also offered terms and conditions that were flexible and responsive to cyclical agricultural growing patterns and an interest rate comparable to



or more favorable than the prevailing market rate for similar formal loan products.

Commercial Sustainability: Overall, the loan portfolio returned a profit in each of the three lending phases, resulting in a net profit for BRAC. Based on multiple commercial decisions taken by BRAC during the final month of the pilot project period, this loan product appears to represent a commercially viable offering. Namely, just prior to the cessation of in-market project activities and the onset of COVID19, BRAC decided to:

- i. geographically expand access to this product across 16 branches
- ii. invest its own funds to develop or acquire the necessary digital infrastructure and build internal staff capacity to deploy a digital field application (DFA) capability across all product lines
- iii. commit to an agri-loan portfolio (the only other BRAC market outside Bangladesh to do so), with a target customer base of 18 percent of its 450,000 total customer base by 2024
- iv. pursue an alternative credit scoring model as a near term objective and
- v. broaden its commercial relationship with the

mobile money service provider Ongo to access digital loan disbursement and collection services via its agent network.

Lessons Learned

Smallholder farmer demand for an individual agri-loan product

Rural demand among farmers for an individual seasonal loan product exists and appears strong. These are producers who operate on less than five acres or who typically rent land for crop production. While repayment rates for agricultural loans are quite high, this loan product attracted farmers who typically would not qualify for or seek loans from traditional rural lenders such as the Myanmar Agricultural Development Bank (MADB). That said, the repayment rate exceeded 97 percent in each of the three loan cycles, with the final cycle overlapping with the outbreak of a global pandemic. Additionally, the project team observed a preference for individualized loans over group loans. Participation in the former can have the effect of limiting one's access to capital if one or more group members underperform, and that jeopardizes access for other members in good standing. The product must fit the circumstances and activity patterns that shape a rural borrower's financial health and capacity to absorb

debt. It is important to anticipate the need for financial literacy training and a tailored communication strategy.

Digitization is not a silver bullet for smallholder farmers

Capturing and properly understanding the local context is a vital first step, one where a human centered design (HCD) approach has merit. But it must also be followed by a diligent application of that understanding during the design and piloting phases. A well-designed product or service and an effective strategy for rural market segments will need to consider what degree of digitization is appropriate to pursue, at what pace, and involving which intended end users. It must also anticipate and address issues related to **i)** gender, **ii)** building confidence and capacity in a product or service and what the benefits of usage are, **iii)** the role of human interaction, as well as **iv)** trust, and **v)** the personal privacy of rural customers.

Digitization from the service provider perspective

While the potential exists for cost and risk reduction, digitization should be viewed as a gradual process rather than a quick and seamless integration of new technology and systems with existing ones. It will

require adequate investments of time and resources to align structures, processes, and staffing. It also requires articulating a strategy that identifies digitization’s potential to clearly address current pain points in the system as well as its limitations and the need to maintain certain human-based operations and interactions.

Recommendations

1. Employ an agile and iterative design approach, such as HCD, that incorporates principles and methods capable of surfacing and responding to relevant practices, perceptions, and patterns of rural customers as well as key needs and challenges they currently encounter when deploying a product.
2. Where appropriate, let rural customers interact with digitized services through credible, trusted intermediaries, thereby allowing them to set their own pace and usage of digitization.
3. A rural-facing offering does not need to be fully digitized when launched; rather, an incremental approach may be warranted that starts with digitizing “low hanging fruit” to give stakeholders an opportunity to absorb and adjust to the new product and build trust in the service.

4. Prioritize and adequately fund an internal “digital readiness” assessment to surface training needs across departments and at different staffing levels.
5. Do not exclude human-based operations (for instance any part of loan application origination and specific validation tasks) entirely where limitations of basic rural infrastructure exist and cannot power digital services reliably at scale. If digital content such as loan applications cannot be generated, transferred, or accessed consistently, it will likely slow account activation or service delivery activities and restrict a provider’s ability to expand geographically and grow its customer base.
6. Satisfying account registration requirements (e.g. Know Your Customer or KYC information) for rural customers will require creativity with the kind of information collected and direct engagement with smallholder farmers. This may include working in well-defined tiers, in which KYC requirements increase as service value increases.
7. Explore partnerships for financial and digital literacy training that leverage external networks, experience, and capacity of partners (e.g. public or development-led rural extension services), rather than building out this capacity in-house.
8. Explore potential partnerships with agritech

companies, technology firms, or academic institutions to obtain data relevant to smallholder farmer credit risk assessment. Such partnerships should also clearly articulate the purpose for data collection to ensure it is focused on augmenting credit risk analysis.

9. The public sector has a role in ensuring a healthy enabling environment for rural-facing products and services, including digital information standards, digital infrastructure, and customer redress mechanisms.
10. Digitization of certain public sector services could de-risk agri sector investment from the private sector, such as citizenship identification and data sets related to climate, weather, and agronomy.



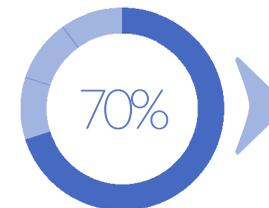
What Challenge We Set Out to Address & How We Approached It

Restricted Access to Rural/Agri-Finance Among Smallholder Farmers

Agricultural production is dominated by smallholder farmers in most developing countries. There are several reasons preventing them from adequately investing in their farms and improving production as well as income earning potential, including a lack of sufficient access to capital.¹ These farmers are also contending with the accelerating impacts of

climate change, which will dramatically impact food production globally. A failure to react appropriately will result in significant increases in food insecurity, poverty, and malnutrition. The implementation of Climate Smart Agriculture (CSA) could greatly benefit smallholder farmers.² However, this requires investment in new inputs such as drought resistant seed and in farmer capacity to comprehend and apply new farming techniques. This cannot happen without access to adequate non-financial and

financial services. With respect to the latter, loans need to be designed with affordable interest rates and according to repayment terms appropriately tailored to their farming patterns and practices.



The percentage of global demand for smallholder farmer household finance that is unmet, equivalent to around US \$170 billion.³

¹ Other factors include: insecure land rights, prejudicial land cadaster management, lack of access to quality inputs and agri-related services such as land preparation or irrigation, weak agri-extension services, poor market linkages to buyers, weak negotiation positions during harvest periods.

² Climate-smart agriculture (CSA) is an integrated approach to address the interlinked challenges of food security and climate change with the aims of increased productivity, enhanced resilience, and reduced emissions.

³ 2019 *Pathways to Prosperity* report published by the Rural & Agriculture Finance Learning Lab.



Long-term financing accounts for 98% of unmet demand, but short-term agricultural financing needs—estimated to be US \$66 billion—is under-supplied as well (equal to a 67% shortfall).⁴ Financing gaps inhibit the economic growth of smallholder farmers and further perpetuate existing cycles of poverty. There are myriad reasons behind this shortfall. Smallholder farmers often have scant collateral, few alternative sources of income, and limited credit history. They live in remote areas which are far away from financial institutions. For formal financial institutions, it is costly to promote, originate, and operate financial services in rural communities due to their remote location as well as the relatively smaller loan transaction sizes. Risk analysis is challenging due to the lack of their credit history as well as limited understanding of risks associated with agricultural production. They also have an insufficient understanding of the real needs and circumstances of smallholder farmers.

Fortunately, the growing prevalence of digital

technologies globally creates new opportunities to overcome some of these chronic challenges. The growth in digital payment could increase the financial inclusion of smallholder farmers that enables pro-poor agricultural development to reduce poverty and increase food security.⁵

The ongoing digital revolution could be transformative not only for the financial inclusion of smallholder farmers but also for the food and agriculture sector more broadly, supporting the creation of more efficient, equitable, and environmentally sustainable operations. Digital technology use can help reduce costs, help farmers make more informed and precise decisions, and improve access to information, knowledge, and markets. The World Bank Group (WBG) focuses on data-driven digital agriculture to improve food system outcomes as shown in its strategy papers – “Future of Food: Harnessing Digital Technologies to Improve Food System Outcomes”⁶ and “What’s Cooking : Digital Transformation of the Agrifood System.”^{7,8}

This report documents lessons learned from a digitally enabled agri-credit product pilot undertaken in Myanmar from 2017 to 2020. Although many of the experiences and results are unique to this single market, the project has yielded observations and findings with relevance beyond that country’s borders. Many of the lessons will be useful to others seeking to address similar challenges elsewhere. This applies not only to leveraging digital technology to support agricultural credit service access and delivery but also to effectively and appropriately designing services that are responsive to the activity patterns, capabilities, and needs of smallholder farmer communities more broadly.

Market Context: Significant Change in a Short Period of Time

Agriculture accounts for approximately one third of Myanmar’s GDP, making it one of the economy’s largest sectors. Agriculture employment as a percentage of total employment is 84 percent in rural areas and among poor households.⁹ Myanmar’s agricultural productivity lags behind other countries

⁴ 2019 *Pathways to Prosperity* report published by the Rural & Agriculture Finance Learning Lab.

⁵ <https://www.cgap.org/research/publication/female-smallholders-financial-inclusion-agenda>

⁶ <https://www.worldbank.org/en/topic/agriculture/publication/future-of-food-harnessing-digital-technologies-to-improve-food-system-outcomes>

⁷ <http://hdl.handle.net/10986/35216>

⁸ See the following also for WBG’s approach in this agenda: <http://hdl.handle.net/10986/33961>

⁹ <http://documents1.worldbank.org/curated/en/806001593183687694/pdf/Myanmar-Economic-Monitor-Myanmar-in-the-Time-of-COVID-19.pdf>

in the region.¹⁰ Multiple factors contribute to this underperformance, including inadequate supply of public goods, limited supply and low application of quality inputs, low levels of on-farm mechanization, and lack of access to financing for farm investments.

With respect to financial services, Myanmar has made great strides in expanding financial inclusion in recent years. The proportion of adults with accounts at formal financial institutions increased from 23 to 48 percent between 2013 and 2018.¹¹ Surprisingly though, financial inclusion amongst farmers is relatively high. The UNCDF-led Making Access Possible (MAP) Diagnostic from 2018 found that 52 percent of farmers have access to formal financial services mainly thanks to the Myanmar Agricultural Development Bank (MADB). 62 percent of farmers have some form of access to formal or informal credit.¹²

Access to finance alone, however, is not sufficient if the financial products are not designed to meet the needs of smallholder farmers. Smallholder farmers,

FIGURE 1: Sector Overview



particularly those without land titles, often have limited options when it comes to accessing credit. Sources of informal lending such as lead farmers, input dealers (in-kind credits) or commodity off-takers (pre-harvest cash advances to secure access to crops) frequently involve higher interest rates. Public banks, such as MADB, offer attractive interest rates but lending is concentrated on rice production. Moreover, the timing and structure of MADB loans have not historically been well-designed to meet the requirements of farmers. Funds are typically released after planting, capped lending amounts tied to plot size do not always cover the total costs of

production. Loans are commonly structured as group loans with joint liabilities, and full repayment required immediately after harvest.¹³

Structural challenges are also associated with expanding appropriate financial products to smallholder farmers in Myanmar and other developing countries. These include legal, regulatory, and infrastructural roadblocks. The Ministry of Agriculture, Livestock and Irrigation itself identified many of these factors in its Myanmar Agriculture Development Strategy and Investment Plan 2018-2022.^{14,15}

¹⁰ <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/509581468181132091/myanmar-analysis-of-farm-production-economics>

¹¹ <https://www.uncdf.org/article/4500/map-myanmar-diagnostic-2018>

¹² *Ibid*

¹³ https://www.marketlinks.org/sites/marketlinks.org/files/resource/files/MyanmarDFSAssessment_Report_Long.pdf

¹⁴ <https://www.uncdf.org/article/5612/myanmar-financial-inclusion-roadmap-20192023>

¹⁵ <http://extwprlegs1.fao.org/docs/pdf/mya180003.pdf>

Yet, there are also opportunities to expand access to formal financial products, such as a credit, to smallholder farmers in ways that are now more cost effective than traditional strategies and systems in part thanks to the rapid expansion of the country's mobile infrastructure. Before 2013, a SIM card in Myanmar cost nearly US\$3,000, leaving mobile phones well out of reach for average citizens. However, with privatization of the country's mobile telecom sector, competitive pressures drove the price down precipitously, to just over one dollar in 2017.¹⁶ Recent data estimates unique SIM subscriber penetration at 108 percent as many people subscribe on a pre-paid basis and will swap SIMs to take advantage of lower voice/data rates when calling on the same carrier network. Of that 108 percent of total unique SIM subscribers, 80 percent own smartphone devices.¹⁷

The state of digital financial services in Myanmar has also expanded rapidly since the Central Bank of Myanmar first released its Regulations on

Mobile Financial Services in 2016. Mobile network operators, banks, and fintechs have taken steps to digitize financial services and leverage the rapid expansion of mobile technology in particular. These factors bode well for the advancement of financial services and are particularly relevant to smallholder farmers in a country where it takes on average more than an hour for a rural inhabitant to reach a bank, ATM, or mobile money agent from their home, and 43 minutes to reach an MFI branch.¹⁸ By comparison, farmers reported traveling shorter distances to reach other relevant service locations, such as grocery stores (11 minutes), and public transport (29 minutes).

Gender Disparities in Service Access: Persistent Gaps, Especially Within Rural Communities

Female-headed households account for 24.1 percent of urban households and 16.2 percent in rural areas. Women in Myanmar are significantly more likely than men to earn less than the poverty level (51% vs. 28%) and nearly half of women (49%) are dependent on



someone else for income, such as from remittances (compared to just 17 percent of men).¹⁹

- Though the situation varies by crop and by region, male-headed households in general achieve higher incomes and profits than female-headed households.²⁰
- Women's ownership of land title is more limited than that of men. 98 percent of male-headed households have access to agricultural land, while 61 percent of female-headed households had access to land.²¹

¹⁶ <https://www.telenor.com/wp-content/uploads/2018/02/Telenor-Realising-Digital-Myanmar-Report-06-February.pdf>

¹⁷ https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/02/Digital_credit_scoring_for_farmers_Opportunities_for_agritech_companies_in_Myanmar.pdf

¹⁸ https://finmark.org.za/system/documents/files/000/000/187/original/Myanmar_Diagnostic_2018_CB3_repro.pdf?1601968844

¹⁹ <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/509581468181132091/myanmar-analysis-of-farm-production-economics>

²⁰ <https://www.uncdf.org/article/5596/finscope-myanmar-gender-note>

²¹ <https://www.adb.org/sites/default/files/institutional-document/209596/gender-equality-womens-rights-myanmar.pdf>



borrow at all, and of those who do, only a quarter (25%) do so from a formal financial institution.^{23,24}

Moreover, while Myanmar has a relatively literate population, noticeable disparities persist between women and men. The literacy rate among women is 72 percent, compared with 80 percent among men.²⁵ Similar disparities are seen in terms of digital literacy and access. Women are less likely to own a phone than men, whether smartphone (60% vs. 65%) or basic phone (15% vs. 21%), and the number of women reportedly using a phone trails that of men as well (76% vs. 80%).²⁶ These gender dynamics were particularly relevant for the project team when designing its approach which resulted in 68 percent of loan recipients being women.

Approach & Implementation Partners

This project intended to make appropriately designed individualized loans more accessible to smallholder farmers, thereby enabling them to improve their productivity by investing in seasonal inputs. This entailed supporting a financial institution

Women are also less likely than men to have formal forms of identification, such as a national registration card, title deed, or house registration. This puts them at a severe disadvantage in terms of access to finance where such documents are required for know your customer (KYC) verification.²² All of these

are contributing factors to why a third of rural women in Myanmar (31%) were financially excluded as of 2018 and another quarter (24%) only have access to informal financial services, which tend to be more costly than formal financial services. When it comes to credit, more than half of women (54%) do not

²² <https://www.uncdf.org/article/5596/finscope-myanmar-gender-note>

²³ *Ibid*

²⁴ According to Making Access Possible (MAP) Diagnostic, gender disaggregated data (men vs women) for those points are: financially excluded (30% vs 31%), access to informal service only (20% vs 23%).

²⁵ <https://en.unesco.org/countries/myanmar>

²⁶ <https://www.uncdf.org/article/5596/finscope-myanmar-gender-note>

each played important roles to bring this product to market (see Figure 3).

Context & Impact of COVID-19

The country confirmed its first official case of COVID-19 on March 23, 2020, which coincided with the repayment period of the third and final lending cycle during this pilot project. The Government of Myanmar implemented nationwide restrictions on physical movement, leading to broad disruptions throughout the economy, including the agriculture and microfinance sectors. The lockdowns in neighboring countries caused Myanmar immigrants in those countries to lose jobs and prevented them from making remittances to their family in rural Myanmar.

BRAC suspended financing activities in late March and implemented response plans that included suspending group meetings, adhering to social distancing protocols, and disseminating public health information. BRAC's country leadership decided to leverage and pivot its marketing and sales capacity to support public awareness and information dissemination. It also decided to issue waivers to those farmers borrowing during the third cycle because the timing of the two repayments came during a period of heightened market volatility.

FIGURE 3: Implementation Partners

The implementation of this pilot relied upon a multi-stakeholder partnership to bring together all of the pieces necessary to effectively deliver this unique loan product to farmers.



L-IFT

The Rural Promoter

Supported go-to-market activities and provide hands-on client support during the loan application process in the rural communities selected for this pilot.



The World Bank

The Facilitator

Coordinated with project partners, supporting research and product/process design, and capturing learnings from the pilot experience.



BRAC MFI

The Lender

Responsible for all aspects of the loan origination and servicing process, as well as contributing anonymized data on customer loans and repayment.



Telenor

The Phone Data

One of the leading mobile network operators in Myanmar; provided the phone data, which was used to help calculate one aspect of the credit scoring.



Ongo

The Mobile Money Provider

Provided mobile money agent support in the pilot area to help with loan disbursement and repayment and ensure adequate levels of physical liquidity were present.



aWhere

The Ag Data

A weather-based agricultural intelligence company; provided the models and agricultural data that drove the agricultural risk part of the credit score.



Experian

The Platform Provider

Provided access to a digital lending platform and a credit scoring model that drew on non-financial data sourced from Telenor and aWhere.



What We Did

Key Project Components & Pilot Overview

The project was implemented from 2018 to 2020 in two townships, Daik-U and Nyaung Lay Pin, in the eastern Bago Region of southern central Myanmar.

The pilot centered around six key activities:

i) primary market research, **ii)** product strategy and roadmap development, **iii)** digital platform development, **iv)** personnel training, **v)** smallholder farmer outreach, and **vi)** pilot implementation.

The loan product itself was launched in three

iterative cycles over a one-and-a-half-year period. Refinements were made to both the product and associated processes after each cycle based on experiences and reactions of both key personnel and borrowers. In total, 2,626 farmers were provided information about the loan by L-IFT and BRAC across all three cycles, of which, 2,051 applied for loans, 1,491 were approved for loans, and 1,441 loans totaling an estimated MMK 420,000,000 (US\$300,000) were disbursed in total.²⁸

These farmers were identified based on their

location in rural townships where BRAC had an existing branch presence. Some may have already been aware of BRAC and may have been former group loan clients—BRAC’s flagship rural product. They may also have taken out agri-loans from formal service providers. But there were no requirements that borrowers during this pilot project be existing or past BRAC clients or have successfully repaid a similar loan in the past. In the region where the pilot was conducted, there are two distinct cropping seasons—monsoon and dry. Farmers who received loans (typically between US\$100-330) cultivated on

²⁸ The number of loan applications, approvals and disbursements includes repeat borrowers who participated in more than one loan cycle.

average plot sizes of five acres. Few had access to irrigation during the dry season. The dominant selling crop was rice—grown during the monsoon season—followed by bean varieties, seasonal vegetables, and maize in the dry season, which they often used for household consumption. These

farmers could access multiple buyers (nearby millers, middlemen, further markets, etc.) and many farmers would decide to sell based on the prevailing spot price. Loans funds were spent on a variety of inputs, predominantly seeds and fertilizer. In terms of input supply, many farmers prefer to shop around in

search of lower prices and to collect information. They rarely rely on a single shop for input supplies. They also keep livestock as an additional revenue stream. When cash needs spike, many farmers would work as daily laborers at other farms or in some other wage-earning capacity.

FIGURE 4: Project Components & Pilot Overview

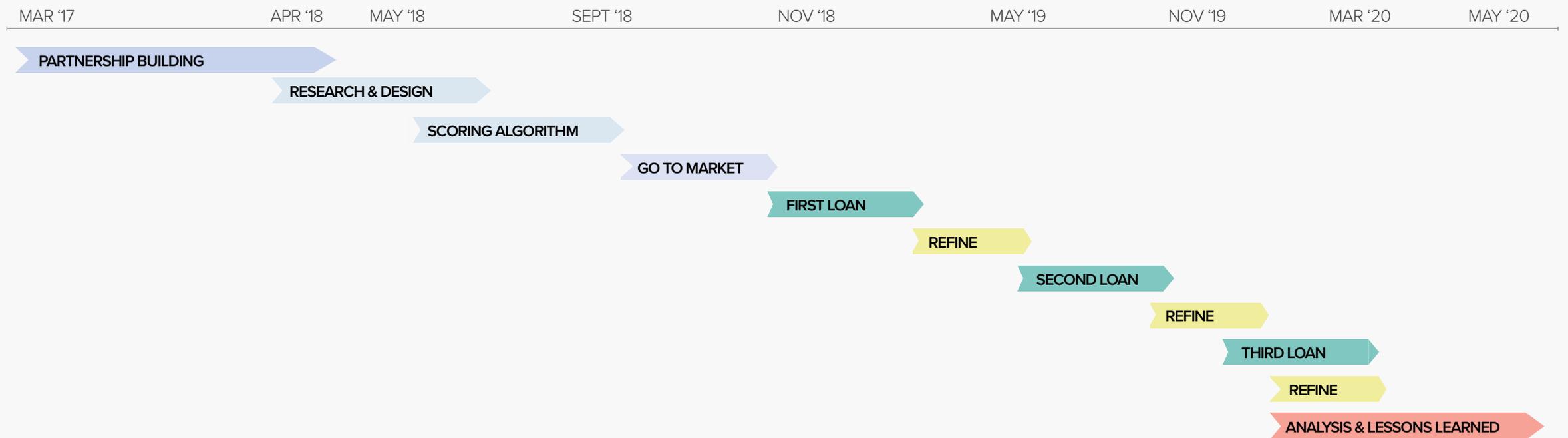
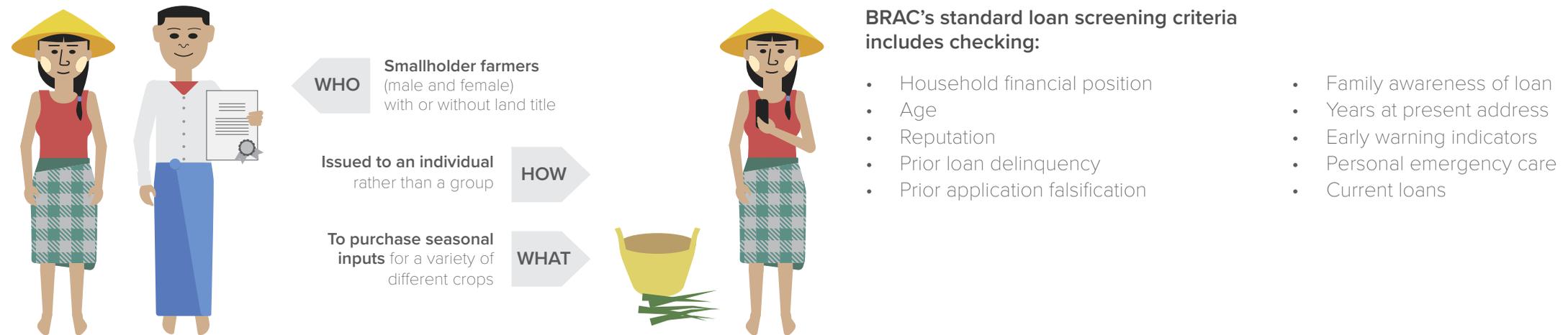


FIGURE 5: Overview of Initial Agri-Loan Concept



Rural customer engagement with a human-centered design (HCD) approach

The pilot team used a process known as human-centered design (HCD) to develop an understanding of the needs and circumstances of target customers.²⁹

The iterative process that is built into HCD is a distinguishing factor from traditional approaches to design and implementation used by some public

or development sector actors. These approaches may use a baseline study, followed by a midline 1-2 years later, and then an endline study at project closing. Such approaches may yield lessons when the window to strategize and implement adjustments or improvements has passed. The continual iteration used during HCD allows for tweaks and refinement on an ongoing basis. By design, this allows for greater responsiveness to experiences testing a service or product with actual users in a market. This in turn can

lead to stronger uptake and improved outcomes.

This project followed an HCD product design process that included two rounds of field research in the pilot location that engaged not only smallholder farmers but also other rural market actors. These included input suppliers, local millers, mobile money agents, and BRAC's local credit officers—actors that might have a role in the new product or help the team better understand certain needs, attitudes, challenges, or

²⁹ The HCD approach evolved from earlier versions of design thinking dating back to the 1960's, where it began as "participatory design" employed by anthropologists and development practitioners. See authors such as Herbert Simon and Horst Rittel. It then progressed into "user-centered design" and "meta design", where it was primarily employed by industrial engineers and technologists developing new products and services. See authors Brian Dawson and Donald Norman. In the late 1990's early 2000's, "service design" and "HCD" emerged as more of a mindset that emphasized collaboration, multidisciplinary approaches, holistic community development, and a focus on empathy. See authors William Rouse and Lucy Kimbell. Applying an HCD approach to develop programming is becoming more common these days. For example: <https://www.unicef.org/innovation/media/5456/file>

opportunities of smallholder farmers that would be relevant to design thinking and product development.

The initial round of research sought to document relevant practices of smallholder farmers, specifically agricultural and farming practices as well as mobile technology and borrowing. Of 23 interviews conducted, 13 (57%) were with women. A loan product prototype was co-designed with BRAC and other consortium stakeholders. It was then tested with potential female and male rural borrowers to gauge receptivity to how the product would be structured, priced, distributed, and accessed, as well as to determine whether any pre-pilot launch modifications were warranted.

FIGURE 7: Round 1 Interviewees



FIGURE 6: Illustration of HCD Process

Human-Centered Design is a set of methods and guiding principles that help organizations discover and address the needs of their end users.



GROUNDED IN KNOWLEDGE ABOUT USERS

Before we create solutions, we talk to users to understand goals, needs, and attitudes.



COLLABORATIVE

Complex problems require broad and deep expertise and cannot be solved by one person or organization.



VISUAL

Visualizing helps us to see problems, communicate complex ideas, and identify new opportunities.



ITERATIVE

Prototyping ideas early and often, and testing them with users ensures that our concepts meet our objectives before spending time and money creating high-fidelity designs.

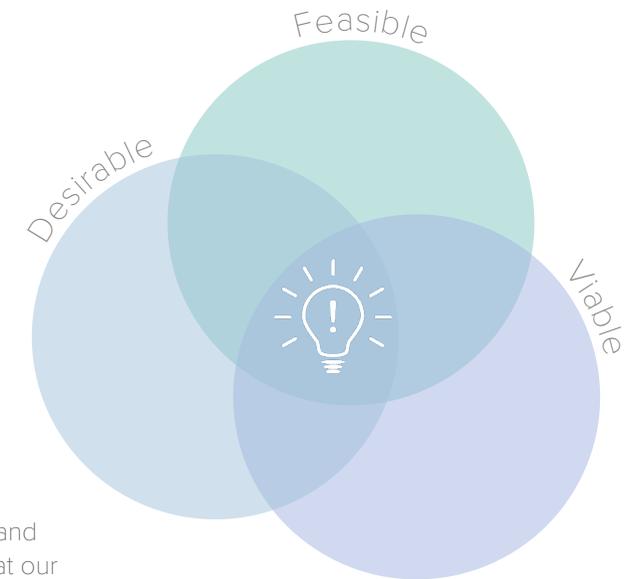


FIGURE 8: Agricultural Practices

There is not much flexibility in terms of what farmers can grow. Soil quality, land ownership, and availability of labor often drive farming decisions.

“In the growing season, [farmers] need money to invest ... like for land preparation or that sort of thing. Some people keep seeds from last year... but due to climate change, sometimes they need to buy seed again. So they need money and then borrow it at a high interest rate in the community. Now that this kind of loan is available... offering low interest rate loans to local farmers it is very supportive.”

— BRAC Branch Manager, Daik-U

SOIL QUALITY



The only thing that grows here is paddy.



My land is uneven, so I can only grow summer paddy on half of my land.

LAND OWNERSHIP



Most farmers here don't own their land, so they cannot do fish farming even though it is very profitable.

AVAILABILITY OF LABOR



When labor is not available, I don't grow summer paddy.



FIGURE 9: Mobile Phone Practices

Many smart phone owners don't use any 'smart' features.

Smart phones are attractive to farmers because the bigger dialer makes calling easier. Few buy them to use features beyond calling.

- There is a low correlation between the kind of phone someone owns and the complexity of the tasks they are able to perform.
- Few people use SMS.
- We didn't see significant gender differences.



Key findings include:

- **Instances of informal and formal borrowing on a seasonally recurring basis** for farming were reported by participants, with more men than women engaging in this type of activity.
- **Some participants were averse to taking on loans** because of a feeling of embarrassment or a fear that they would be unable to repay the debt.
- **The majority of farmers interviewed own smartphones.** However, some of the smartphones were low-end models with factory settings pre-set to a foreign language the users could not understand.³⁰
- **Few knew how to use smartphones for more than just making phone calls.** Most farmers were not comfortable buying airtime on their own and only a few were familiar with receiving, opening, or replying to SMS text messages.³¹ Older children often play the role of device purchaser and instructor. Without their support, many farmers are unlikely to perform more complicated tasks.

FIGURE 10: Selection of Farmers' Phones



³⁰ So-called “fake smartphones,” which falsely carry a major manufacturer’s brand, were observed. They can be used for basic functions, such as making phone calls, but their ability to properly run certain apps can be unreliable and is difficult to predict in advance.

³¹ This is due to a number of factors, including but not limited to, competing font encoding formats and messages often sent in English.

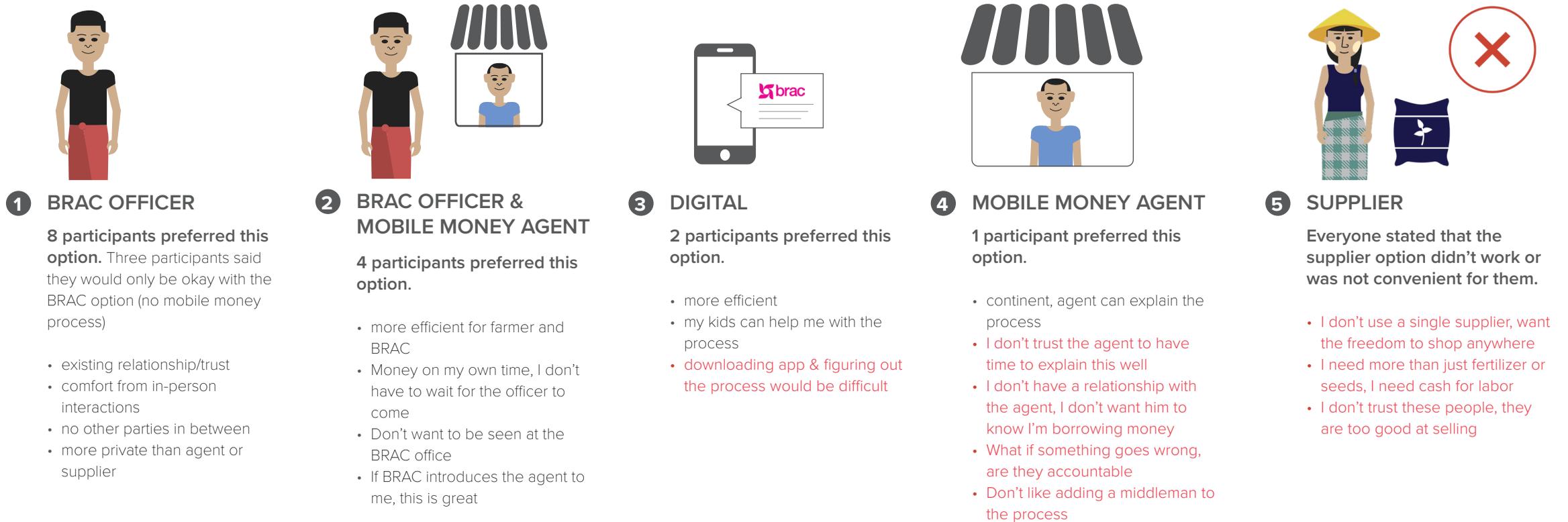
Developing Engagement Model Options

Equipped with a better understanding of farmer practices, the project team then presented five engagement models to the farmers. These models were designed to record reactions and preferences about different ways a farmer might first hear about the service (marketing/advertising), learn more about

specific products (product education), apply for, access, and use a given product (sales and distribution). The models varied by the **i)** degree of direct engagement a farmer would have with digital technology and **ii)** by the type of person the smallholder farmer would interact with to learn about, enroll, and use the product (Figure 11).

A series of visual storyboards were developed to depict basic elements of the product according to each model. Smallholder farmers were then asked to provide feedback so the project team could better gauge which model was perceived to be more comfortable and convenient.

FIGURE 11: Rural Customer Feedback Regarding Engagement Models



Following this first round of HCD research, the project team convened a co-creation workshop with key implementation partners to discuss research findings and design the customer journey and product prototype. It was agreed that any product prototype would need to bundle the following elements:

- **“High touch” approach** – Given the limited comfort levels most farmers interviewed had with using their phones, it would be necessary to provide a high touch approach with farmers receiving support from specially trained rural promoters, BRAC credit officers, and mobile money agents.
- **Reduced verification procedures and expedited approval timeline** – It normally takes BRAC around 1-2 weeks to make a credit decision including several site visits. With the streamlined verification process, BRAC sought to reduce the number of site visits and decrease the turnaround time from application to approval to just 3-5 days. It also dedicated a credit officer at each branch to help facilitate digital loan applications.
- **Mobile money optional** – Recognizing that not all farmers were comfortable with mobile money, its use for disbursement and repayment would be optional.

- **Bullet payment at the end in lieu of recurring payments at the start** – BRAC had not previously offered an agri-loan product in the country and its repayment model for its group and SME loans included a recurring bi-weekly payment over the maturation of the loan. Based on farmer reactions from the HCD research round, it was evident that these rural households had limited non-farm related income streams. Therefore, they were likely not able to begin loan repayments until after they harvested their crops. BRAC leadership agreed to amend its standard policy to accommodate this seasonal cash flow pattern.

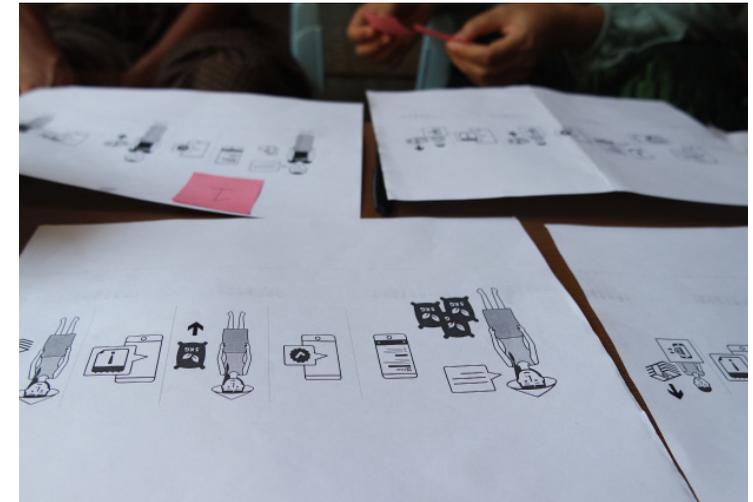
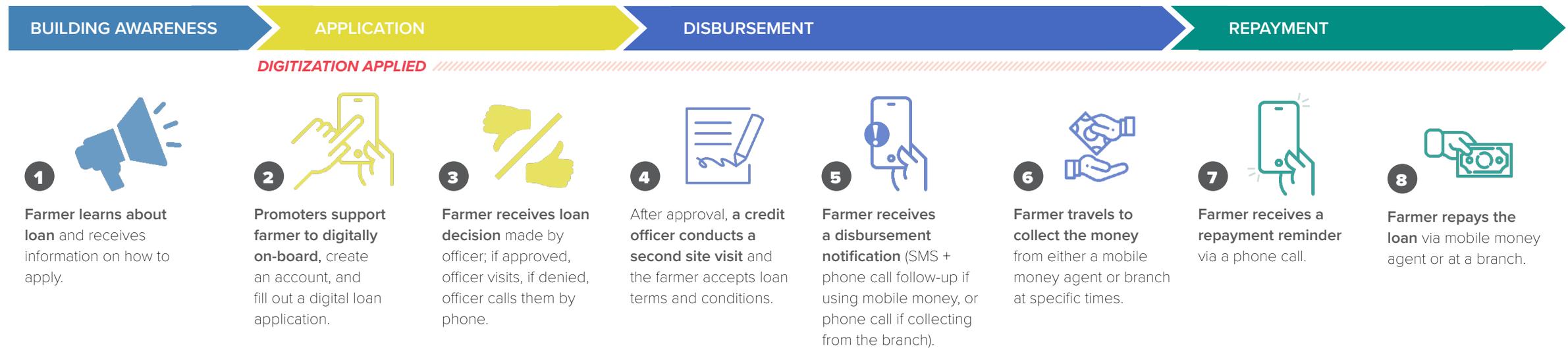


FIGURE 12: User Journey



Pilot Launch and Iteration

The pilot was divided into three loan cycles, with refinements made to each subsequent cycle based on feedback from the prior cycle, instead of retaining the same processes and features throughout. These refinements did not dramatically alter the customer experience or the basic product features; instead, they had more to do with adjustments to internal policies and processes based on how staff managed their roles and responsibilities and adjusted to new digital components during the pilot. Figure 13 summarizes

results and key attributes from each of the three lending cycles. A total of 2,626 farmers were reached during the pilot. 1,441 loans were disbursed, of which 992 (or ~69%) were made to women. In addition to BRAC’s gender inclusive mandate, which informed the project’s gender sensitive approach, the sizable representation of women borrowers may also be the result of male labor migration flows out of rural townships.³² This trend is having the related effect of increasing the percentage of smallholder farming households led by women.

KEY FEATURES OF THE AGRI-LOAN PRODUCT

Since this product targeted smallholder farmers to support seasonal input investments, loan amounts were relatively small—between MMK 150,000 and 500,000 (~US\$100 to US\$300). The loan duration was five months, with no repayments for the first three months, and two installments covering 50 percent of the principal plus interest at the end of the fourth and fifth months.

In order to apply for a loan, farmers were required to meet existing BRAC qualification criteria, be between the ages of 18-65, and have had an active Telenor SIM card for at least six months.

³² The Myanmar Government estimates that there are 4.25 million Myanmar nationals living abroad. Regionally, drivers of migration can include higher wages in neighboring countries, conflict, and environmental migration due to natural disasters among other factors. See IOM report on Myanmar: <https://www.iom.int/countries/myanmar>

Because this was BRAC's first experience with an individualized agri-loan product, during the first cycle the project team initially focused on ensuring a smooth roll-out of core, non-digital components of the offering. This included product marketing, promotion, education, staffing and training as well as ensuring loan application and disbursement operations were operationally feasible and aligned with institutional policies and national laws and regulations. With respect to digital components, a digital survey tool was used by field personnel to collect know your customer (KYC) details and other client information during the application phase. Alternative data scores (mobile and agri) were not yet available and so were not incorporated into the decision-making process.

During the second cycle, based on experiences from the first cycle, BRAC leadership reduced from three to two the number of required in-person site visits before submitting a completed application for review. The project team's focus centered on the deployment of a new software tool to remotely initiate loan applications in the field and manage customer accounts at the local and central offices on a digital lending platform via internet connection. BRAC then relied on a hybrid paper and digital process to consolidate and

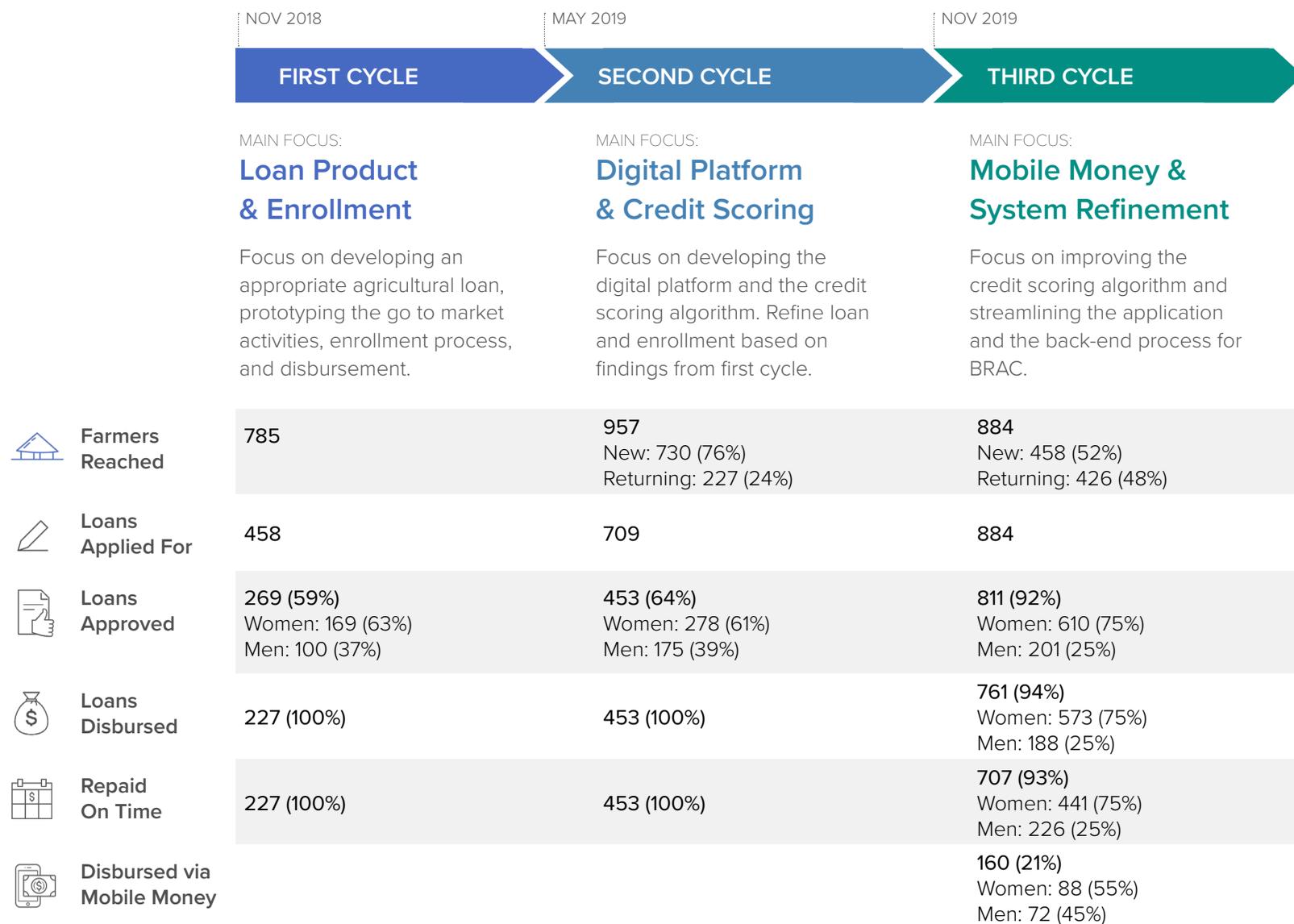
review admissible applications. This hybrid process was developed to overcome unreliable internet connectivity in the villages where farmers live and frequent power outages in the township centers where offices were located. As a result, BRAC branch and HQ staff printed hard copies of the applications so they could amend or complete as needed to avoid further delays to the review and approval process. Mobile and agri scores were available during the second cycle. However, BRAC could not always access these scores within a timeframe that aligned with the need to approve and disburse loans according to seasonal farming cycles. This experience was not strong enough to build staff confidence in these scores.

During the third and final cycle, based on the experience with the software tool in the second cycle, BRAC equipped their branch and central staff with tablets to optimize the digitally collected application data. Another digital component, mobile money service, was also added in this cycle. Mobile money was first tested with a small group of borrowers at the disbursement of the third cycle. Ongo (mobile money operator) deployed its staff to initiate bulk disbursements that reduced BRAC's physical cash handling requirements. Based on the successful



experience with this trial disbursement, BRAC decided to allow all borrowers the option to use mobile money for repayment. Farmers could opt in to repaying their loan installments via Ongo's agent network. BRAC also pursued a dual track approach for application processing and approval. The first track adhered to the same process employed in the second cycle, which required the collection and verification of established criteria for lending activities and supplemental criteria specific to this agri-loan product pilot. To understand the effectiveness of the verification process, randomly selected applications were given loans without credit screening.

FIGURE 13: Summary of Key Pilot Indicators – An Iterative Approach that Allowed for Refinement with Each Cycle



Note: the percentages after each number (except for gender breakdowns) shows the conversion rate between stages.

Loan Cycle #1 (Dry season)



The first cycle of loans was disbursed in November 2018, reaching a total of 785 farmers. Out of that total, 458 loan applications were originated, and 269 loans were approved. Just under two-thirds of approved loan applicants (63%) were women. The repayment rate was 100 percent. This cycle revealed several insights that were used to inform refinements made prior to the second cycle in May 2019.

- **Need for product training refinement.** Given the non-traditional nature of the repayment terms, there were initial challenges explaining to farmers how interest was calculated as it differed considerably from other loans they had taken where amounts were uniform and distributed uniformly along the period of the loan, often using a simple straight line rate calculation.
- **Need for improved data collection standards and training for credit officers.** There was a lack of consistency in the data inputs as well as in the quality of photos taken for digital loan applications. Improved standards and instruction were required to ensure that credit officers could receive proper information through the system.

- **Need for printed materials because many farmers will not or cannot decide on the spot.** Having clear, printed materials that farmers, especially women farmers, could take away with them before making a decision was critical in helping them to determine on their own or with family members whether they wanted to apply for a loan.³³
- **Group meetings reigned supreme as the best channel for promoting and mobilizing rural communities.** As identified in the HCD research phase, group meetings remained the best way to promote the product in a community, particularly when supported by local leaders.
- **Ensuring customer privacy in a rural group setting can be problematic.** Helping farmers complete their applications at the group meeting meant that others could overhear their personal information. At the same time, this was seen as a potential positive since it meant farmers would be less likely to provide false information. Also, finding applicants' houses for home visits was sometimes challenging as there are no standard addresses and farmers do not always answer their phones.



- **Applying traditional vetting methods for individual rural applicants can be complicated and costly given the difficulty in locating residences or farms and the distances between the two.** The process of conducting in-person site visits to verify elements of a loan application for each individual farmer was complicated because some farms were often remote and not close to the farmer's home, requiring a significant amount of time to reach.³⁴
- **Despite encouraging topline indicators regarding mobile telecom coverage and smartphone penetration, deploying a mobile app proved much less viable.** Encouraging topline indicators regarding mobile telecom network coverage and rural smartphone ownership suggested opportunities to deploy a mobile app that would allow farmers to participate in the digitization process by applying for loans from their smartphones. However, there was a much weaker digital/mobile comprehension and usage.

³³ In a country like Myanmar, where literacy is relatively high, printed materials were useful. In countries with lower levels of literacy, other methods of disseminating information, such as using audio or visuals, might be necessary to consider.

³⁴ This was further complicated by the fact that most BRAC and L-IFT field staff are female, so they preferred to travel in pairs for safety, which reduced the number of farms that could be visited in a day.

Loan Cycle #2 (Monsoon season)



The team found that the first cycle was helpful at generating demand for the product. Digital platform and scoring models were launched in the second cycle. During this cycle, 957 farmers were reached, 709 applied for loans, out of which 453 were approved and received loans. 187 of them were returning borrowers from the first cycle. As with the first cycle, the repayment rate was 100 percent. The second cycle revealed some additional insights that were useful as the team prepared for the final round of iteration with the third cycle. Those included the following:

- **Loan structure and three-month grace period was well received, but room for improvement remained as many farmers requested a longer repayment period.** The loan grace period was attractive to farmers, although there was interest in having a longer repayment period to better match the harvest cycle and a larger loan to cover all seasonal input investments.

- **Telenor SIM requirement led some farmers to mistakenly assume the loan was from Telenor instead of BRAC.** The mobile scoring required that farmers have a Telenor SIM. This led to some farmers mistakenly assuming that the loan was from Telenor.
- **Given the relatively small loan sizes and no land title requirement for applicants, technology access and skills of actual borrowers were much**

lower than expected. Relative to the farmers that were interviewed during the HCD research phase, the pilot phase attracted poorer clients.³⁵ This resulted in smallholder farmers with lower access to functional smartphones and less experience using those phones than had been anticipated.

- **Digital systems have dependencies and requirements that often cannot be met or found in rural operating environments, which**

UNIQUE CHALLENGES POSED BY THE MYANMAR LANGUAGE SYMBOLS & FONTS

Two competing and incompatible encoding standards are currently in use Myanmar: Unicode, the international standard, and Zawgyi, only used in Myanmar. The government has tried to stimulate greater adoption of Unicode but its efforts have not yielded broad results to date in rural area. This complicates a number of digitization activities. In addition, characters and symbols on a Latin-based script keyboard requires specific knowledge that is not widely disseminated in Myanmar. These issues can lead to delays or errors when digitally transcribing and sharing information, which impacts not only administrative processes (e.g. application validation and review) but also communications and marketing activities where text must be printed or shared electronically across commonly used platforms and software (e.g. Google docs). Continued expansion of quality brand smartphones, however, increases the access to the emergence of user-friendly text conversion software plug-ins that can be utilized by a large segment of the population, regardless of technical skill level.

³⁵ Loan amounts from MADB are proportional to the borrower's land size. As a pilot, we introduced a loan amount cap of ~US\$350 irrespective of the size of the borrower's land. This cap was viewed as too small for covering the inputs needs for large farms (such as 10 acres). Farmers with relatively large land who can access larger loan amounts from MADB loan did not find the loan product attractive. Conversely, farmers with small plots of less than 2 acres found this product attractive. Farmers with large land plots tended to be more well off than farmers with small land.

complicated system access and hindered administrative operations. The presence and reliability of basic infrastructure (i.e. power, mobile telecom signal) remains a considerable challenge in the pilot area. Rural promoters and BRAC credit officers encountered power outages and intermittent internet connectivity either at their branch office locations or during visits to farming communities. This complicated system access as well as hindered basic administrative operations.

- **Digitization such as digital intake forms may increase certain process efficiencies and help increase collection consistency and quality, but it also introduces greater operational rigidity relative to analog systems.** Analog processes offer users greater flexibility and can be more easily amended. Requiring certain fields in a digital form can help to increase consistency and quality control. At the same time, if not designed with proper flexibility in mind, those systems can be less user-friendly than paper-based forms.³⁶ In addition, the inherent flexibility of analog systems used for managing operations in a rural environment can often be attractive to staff to revert to in areas where digital infrastructure is non-existent or volatile.



Loan Cycle #3 (Dry season)



The third cycle, which launched in November 2019, focused on refining digital systems and processes, as well as on launching the use of mobile money for loan disbursement and repayment. During this cycle, farmer outreach had become much more refined. Of the 884 farmers reached, all of them submitted an application, with 811 approvals and 761 disbursements. The primary

reason for the difference in approval and disbursement numbers was the migration of mostly male farmers, often to Thailand or Malaysia, between when they applied and when disbursements were ready. As a result, more loans were approved than were actually disbursed. In total, 160 farmers successfully participated in all three lending cycles.

Just over one in five farmers received disbursements via mobile money. This was the first cycle that the option was made available. All farmers were expected to repay their loans via mobile money, with most doing so through an over the counter (OTC) payment made at an agent point. Like the previous cycles, the third cycle yielded some worthwhile insights.

- **Dedicated mobile money agents may offer greater service and support for farmers because customer engagement is built directly into the model and full-time agents are incentivized to support customers in ways non-exclusive, commission-based agent are not.** The mobile money model used during this pilot was particularly interesting. The project partner, Ongo, uses full-time staff rather than shopkeepers or other entrepreneurs who agree to provide agent services

³⁶ For example, by not allowing a user to easily correct data.

in addition to their core business activities. This is often the case with primarily person-to-person (P2P) mobile money models.³⁷

- **Customer interface with mobile money—or any digital service—can be kept analog such as issuing printed cards with a QR code to farmers, which removed any requirement to interface directly with technology and reduced an initial barrier to entry.** Ongo provided farmers with business cards with a QR code that agents could quickly scan to process the disbursement or repayment. This method did not require farmers to have to interface with the technology at all, thereby reducing an initial barrier to entry that may have otherwise existed.
- **Frequent changing of SIM cards made use of mobile money for repayment more challenging, which led BRAC to implement periodic update of its customers' mobile phone numbers to minimize errors.** Farmers tend to change their SIM cards

frequently, often to receive better promotional deals. SIM card sharing is also common. This made it more difficult for farmers to repay their loans via mobile money agents since a matching phone number is required. BRAC recognized this pattern and implemented a periodic updating of its customer's mobile phone numbers to ensure minimal complications with the digital disbursement and repayment process. It also became increasingly relevant with the outbreak of COVID-19, as the dominant communication channel link BRAC to its customers.

- **COVID-19 likely impacted the ability of some farmers to repay on time.** As it turned out, this cycle overlapped with the outbreak of the COVID-19 pandemic.³⁸ This had a noticeable economic impact on many participating farmers. Out of 761 total loans disbursed, delayed repayment occurred in only 54 cases. And of these 54 cases, only 9 loans remain outstanding as of the drafting of this report in September 2020.



³⁷ In addition, Ongo primary works with business customers to help digitize supply chains. As a result, their agents travel to local businesses to collect cash. During those visits, they were also able to schedule times to meet farmers close to their homes and to hand deliver them cash. This type of cash delivery model, rather than one that puts the onus on farmers to travel to an agent to cash out reduces the burden on farmers to access their loans. This aspect of the model may not work in all geographies, particularly in areas where crime is more prevalent and/or where a male agent meeting a female borrower would not be considered culturally appropriate.

³⁸ The government extended its nation-wide curfew until May 15, 2020. BRAC required that all staff, including field staff, work from home. The government also place travel restrictions on movements during the day and group meetings, which further inhibited BRAC's ability to physically meet with customers.



What We Learned

1. Smallholder farmer demand for an individual agri-loan product

Rural demand for this type of loan product exists and appears strong. The product must fit the circumstances and activity patterns that shape a rural borrower's financial health and capacity to absorb debt. It is important to anticipate the need for appropriate financial literacy training and a tailored communication strategy.

High demand and strong ability to repay was observed among participating smallholder farmers. The demand and repayment rates also led to a willingness by BRAC to scale up beyond the pilot and expand the geographic availability of this individualized agri-loan product from 2 to 55 townships targeting ~2,600 to ~20,000 farmers. BRAC also adapted its newly launched agri-loan program to include greater repayment flexibility, including an option to receive and repay loan funds with mobile money. Demand was particularly strong

among smallholder farmers who owned plots of less than two acres.³⁹ Further, a 100 percent repayment rate was recorded during the first and second lending cycles. In general, BRAC and other MFI's in Myanmar have very low delinquency rates in their traditional, non-agricultural operations.⁴⁰ While the precise reasons behind the high repayment rates of this product for stallholder farmers were not fully captured during the pilot, two potential reasons were posited anecdotally from interactions between rural borrowers and field staff. One was BRAC's careful

³⁹ They tend to have limited alternatives for borrowing money than farmers who own large plots. Farmers with larger plots expressed a desire to borrow larger amounts, to cover their entire production costs.

⁴⁰ <http://hdl.handle.net/10986/27557>

and perhaps more cautious screening process given that this was a new loan product, and therefore warranted extra scrutiny. Another possible factor behind high repayment rates was peer pressure from fellow borrowers in the community who did not want to jeopardize future access to this type of loan.

To accommodate this level of demand for financing, providers require commercially viable models with acceptable operating costs and lending risks. In general, microfinance loans without collateral have a more frequent repayment schedule, while agricultural production demands seasonal loans with a flexible repayment scheme. Diversifying into lending products with greater repayment flexibility are often assumed to impose additional risks among already risk-sensitive MFIs, making them more reluctant to make larger loans available.⁴¹ It may therefore be necessary to introduce screening protocols and de-risking mechanisms properly tailored to the realities of operating in remote areas involving the acquisition of individual rural customers, particularly when a provider is launching a product or seeking to expand into a new market segment.

While demand was strong, many smallholder farmers struggled to comprehend how interest for this new type of loan was calculated. Based on prior borrowing experience or understanding, farmers were more accustomed to a scenario whereby they are told how much they owe as a single lump sum. In this pilot, communication was less direct as staff attempted to explain how the three-month grace period impacted the calculations for the two payments that would have to come in month four and five. Rural residents may simply fear borrowing that leads to over-indebtedness or have an aversion to it because it could lead to negative perceptions from community members. These dynamics indicate a need for dedicated financial literacy training that is designed and delivered for smallholder farmers so that individuals and households are better equipped with the knowledge and skills to manage a healthy level of finance and what types of products best suit their needs and capabilities.

The ability to adapt loan tenure, grace period, and repayment schedule to seasonal cash flow cycles of dominant crops also played a key role in strong repayment rates among smallholder

farmers. BRAC was initially hesitant to introduce such a long grace period given that it primarily lends to rural groups with a two-week repayment cycle, in which repayment is linked to multiple sources of income. Despite the more flexible design of this product, the loan disbursement was late due to technical reasons with the digital loan application process. In addition, although the length of growing periods differs between monsoon and dry seasons, the schedules and terms of the loans remained the same. The loans were therefore not well aligned to the actual planting cycle for many farmers, which resulted in many farmers having to repay the loan before harvest. In some cases, they had to borrow money from elsewhere or sell livestock to do so. Farmers expressed interest in extending the loan period by another month for paddy to avoid this premature repayment due date. The generally positive feedback from farmers and 100 percent repayment rate prior to COVID-19 has made BRAC receptive to offering more user-friendly terms and flexible products to farmers. The pilot demonstrated that viable market opportunities exist for commercial lenders that can balance capital and operational risks associated with deploying rural lending operations against farmer needs for unsecured

⁴¹ <https://openknowledge.worldbank.org/handle/10986/27557>

lower value, longer duration loans, in which recovery is concentrated at the end of the lending period.

2. Digitizing operations from the smallholder farmer perspective

Digitization is not a silver bullet. Capturing and properly understanding the local context is a vital first step in which an HCD approach has considerable merit. But it must also be followed by a diligent application of that understanding during the design and piloting phases. A well-designed product or service and an effective delivery strategy for rural market segments will need to consider what degree of digitization is appropriate to pursue, at what pace, and involving which intended end users. It must also anticipate and address issues related to i) gender, ii) building confidence and capacity in a product or service and what the benefits of usage are, iii) the role of human interaction, as well as iv) trust, and v) privacy.

Digital solutions need to be calibrated to the realities of the rural operating environment and target customer segment. Service providers will want to counter-balance topline figures and trends from secondary sources about the potential to

PRELIMINARY FINDINGS FROM IMPACT EVALUATION OF THE AGRICULTURAL MICROCREDIT PRODUCT IN MYANMAR

To better understand the impact of the loan product, BRAC commissioned a study to compare the impact on farmers who received the loan to a control group who did not receive the loan. The study looks to examine the impact of the loan on farmer input use and income for a sample of farmers who received the loan in the November 2019-April 2020 season (Loan cycle #3). The sample used in the study consists of three different types of groups; those randomly selected to receive a loan (188), those selected to receive a loan by BRAC loan officers, (168) and a control group of farmers who did not receive the loan (97 farmers).

In the first set of analyses, the team compared both treatment groups to the control group in two separate sets of regressions. Since the control group was not selected randomly, the team used a statistical matching technique called Propensity Score Matching, which uses baseline data to improve the comparison between the treatment and the control group.

Evidence of the impact of the loan on aggregate outcomes such as total input expenditure and income is noisy and not statistically significant for either treatment group. However, looking at disaggregated expenditure outcomes the team finds that those who were randomly selected to receive loans, spent MMK 108,000 (~US\$77) more on fertilizer expenditure, while the treatment group selected by BRAC officers spent MMK 101,559 (US\$73) more on pesticides, on average in the November 2019-April 2020 season when compared to the control group. These impacts are against an average loan size of MMK 290,000 (~US\$186). The team therefore finds limited evidence that receiving the loan is correlated with higher input expenditures.

The team also compared outcomes between the two treatment groups, providing insights into whether BRAC officers did a “better” job of selecting farmers who would benefit from the loan, compared to those who were randomly selected. “Better” in the context here would be if farmers selected by BRAC had higher levels on the key outcomes studied. The team finds that those who were selected by BRAC, spent MMK 318,866 (US\$228) more on agricultural inputs and had higher levels of agriculture profits.

In a second set of analyses the team studied the impact of the credit score on the treatment effect of the loan product. However, the team did not find clear evidence in this preliminary evidence of the impact of credit score on the loan outcomes, and the results appear to be in the opposite directions for the two treatment groups. Further analysis is needed here to draw any conclusions.

leverage digital technology by undertaking primary market research to achieve a more granular level of detail. A firm grasp of local market conditions lends itself to the ability to effectively communicate with customers, and to increase their willingness to engage by improving their understanding of how digital technology can benefit them. In the case of Myanmar, recent trends and developments regarding mobile telecom service coverage and mobile device penetration suggested that digital solutions may be deployed in a farmer-led engagement model. However, the realities of unreliable power supply and mobile connectivity, the prevalence of “fake” smartphones, the challenges to accessing mobile devices, the frequent loss or sharing of SIM cards, and poor mobile literacy each played a role in shaping the digitization process from a rural smallholder farmer’s perspective.

Careful consideration should be given to existing mobile usage patterns and preferences of smallholder farmers. Smallholders may exhibit a very narrow pattern and so lack familiarity with important actions they are expected to perform to access and use the service. For example, the team discovered that even though smartphone

penetration appeared strong within the target communities, many farmers used their smartphone passively. They were unfamiliar with how to use SMS, never download apps, or upload any information through their phones. Having to use their phones to initiate an application, approve terms and conditions, or receive and repay loans was therefore new to most farmers, and outside of the comfort zone of many. This suggests that in addition to financial literacy, digital literacy training and capacity building may be required when introducing digital financial services to smallholder farmers. It also underscores the importance of undertaking primary market research that employs an HCD approach so that these deeper insights into customer needs are identified and properly addressed.

In some areas, residents may own multiple SIM cards and SIM “swapping” is common, driven by promotional campaigns, and may impact the ability to develop individual scoring models based on a single mobile network operator’s billing and data records system. For service providers seeking to leverage a single SIM number as a primary means to authenticate a customer’s identity, this practice may create a number of operational challenges that

will be costly to administer and oversee at scale (e.g. maintaining an accurate database of active customer SIM numbers). This gives challenges to operations which use mobile phone number as one of key customer ID, as well as mobile big data-based scoring model, which requires behavior data attached with a given SIM card over a certain time period. In addition, Mobile devices are frequently used in a communal manner, with some smallholder farmers having only SIM cards and relying on someone else’s mobile device to make or receive calls. This impacts the ability of smallholder farmers to independently access the service.

Understanding gender differences is critical to proper product design and deployment. Local gender dynamics will likely have implications for how technology and financing is accessed differently by women and men. Gender should also inform product design and delivery.

In many rural cultures and societies, women and men congregate in different places, and follow daily routines that afford males considerably more mobility and freedom. Expectations about appropriate forms of behavior and comportment



three lending cycles. For example, BRAC’s senior leadership maintains a high percentage of female loan officers to make outreach activities with rural women more comfortable. The project team also distributed paper brochures during information meetings with prospective borrowers because they recognized that women may not be able to unilaterally decide at the meeting whether to apply for a loan. They could refer to the paper brochure later in conversations with their husband or other male family members and apply once they had time to make a decision.

Building a human bridge for rural last-mile service delivery is often necessary to stimulate acceptance and usage – though it may be costly.

It is critical to identify the role of key local intermediaries in the design process as they can provide smallholder farmers with exposure to digitally enabled products or services in a rural context. Rural last mile delivery will often require the use of individuals, micro- or small enterprises, or larger businesses to act as authorized agents or representatives. If findings during the design and prototyping phases indicate that digitization would exceed the current readiness, capacity, or interest of smallholder farmers, key

also distinguish gender roles and norms, and these too tend to inhibit women’s options – including what is considered acceptable in how they engage in financial markets. Crop production differs leading to different farm-based cash flow patterns, and levels of technology access and digital literacy may vary considerably.⁴²

Products and services that fail to adequately account for and address these differences may, in practice, exclude women. An HCD process can be particularly helpful in drawing out some of these different needs and expectations. During this project, the project team actively solicited the thoughts and preferences of women at multiple stages of the design process as well as their experience during each of the

⁴² See the following links to CGAP publications on the role of social norms and how women access and use financial services: <https://www.cgap.org/blog/how-social-norms-men-restrict-womens-financial-inclusion>

intermediaries could play a constructive role and facilitate access to the product or service without requiring the smallholder farmer's direct involvement. While this may increase operating costs in the short term, once adequate volumes of customers and transactions are reached, this cost structure would shift (ideally decline) making it commercially viable for rural-facing service providers to sustain.

Developing trust among rural populations in any new service, digitally enabled or otherwise, requires the ability to connect with customers and communicate its value proposition. A thoughtful, user-centric design process and a sound launch strategy are necessary, but rural customers will likely not confer their trust simply because the service exists on the market. They need to be properly introduced to the service and have sufficient time using it to understand how it practically functions and experience its benefits. In this project, local elders provided valuable entry points into rural communities. But these sources of rural trust also require a certain degree of cultivation and outreach to ensure that whatever message or request is

passed through them are properly delivered. For example, some initial conversations with local elders lacked specificity in terms which farmers were likely most appropriate for this product. This led to a number of community mobilizations that drew older, more affluent, or larger scale farmers instead of younger farmers with smaller plots or who rented land.

Digitization may help alleviate mental barriers to borrowing within certain rural communities by addressing a specific aspect of privacy, but it also raises new concerns about how to treat, manage, and protect information about smallholder farmers that previously was not digitized. The ability to remotely access formal lending services affords rural borrowers a certain degree of privacy. A smallholder farmer may not want to be seen walking into an MFI or bank branch out of fear that others will speculate it was to borrow money because she or he is desperate or a poor manager of household finances.⁴³ However, when visiting an authorized agent that provides a range of digital financial services—such as money transfer, cash-in, cash-out, bill payment and loan disbursement or

collection—a smallholder farmer may have several reasons for such a visit. These services also open up new avenues for fraud that rural low-income customers are unfamiliar with and ill-equipped to mitigate or avoid.⁴⁴ When considering broader issues of data privacy and protection, the use of non-financial data sets to produce alternative credit scores often requires accessing or generating information about household activity patterns and farming practices. And while service providers may be able to leverage this information to provide digital products that are more affordable, more accessible, and better tailored to the needs of smallholder farmers, it raises important questions about how this information should be treated. Particularly with respect to digitized agricultural information attributable to a specific farming household or plot, there is considerable regulatory and legal ambiguity at present regarding who owns this information, who can access it and how it should be stored and shared. Some governments, including the United States, EU, and New Zealand, recently published working guidelines and proposed best practices to provide structure to ongoing conversations about this nascent and rapidly evolving topic.⁴⁵

⁴³ In some cultural norms, borrowing money is a source of shame.

⁴⁴ See CGAP publication for details: <https://www.cgap.org/research/publication/fraud-mobile-financial-services>

⁴⁵ The EU has released a *Code of Conduct on Agriculture Data Sharing by Contractual Agreement*, The US American Farm Bureau Federations have released a *Privacy and Security Principles for Farm Data*, and New Zealand has released a *Farm Data Code*.

3. Digitizing operations from the service provider perspective

While the potential exists for cost and risk reduction, digitization should be viewed as a gradual process rather than a quick and seamless integration of new technology or systems with existing ones. It will require a broadly established and well-understood internal rationale, adjustments to organizational culture, and adequate investments of time and resources to align structures, processes, and staffing. It also requires a strategy that identifies digitization's potential to address current pain points in the system as well as its limitations and the need to maintain certain human-based operations and interactions.



Not all processes and systems are equal when it comes to digitization. Digitizing selectively in a context in which a small number of inefficient, analog elements are replaced may be more attractive and feasible than a wholesale digitization effort that replaces entire systems—cutting across multiple processes, departments, and personnel. For example, BRAC found it relatively easy to digitize its loan disbursement and collections operations since

doing so allowed them to outsource a less efficient process of branch-based cash disbursements to a mobile money service provider with a rural agent network. However, digitizing other elements of the envisioned product design—such as the credit score, customer account creation, and loan application, review, and approval—progressed at different speeds and to varying degrees of

success. Digitization of those elements required significant reforms to existing systems and familiar processes as well as work internally to build staff capacity and comfort levels to trust and use these new digital tools. Attempts to fully carry out the proposed digitization effort would have resulted in further time and investment within the current consortium configuration. Ultimately, BRAC elected

a more targeted approach that alleviated a near term operational challenge—funds disbursements and collections. This brought about gains in terms of both efficiency and cost in its loan disbursement and collection activities. BRAC leadership also observed during an exit interview that digitizing information associated with rural customer application origination and onboarding contributed to staff productivity increases in the range of 40-60 percent. This effect on productivity was realized in the field and in the office among personnel tasked with different loan origination and approval duties.

Digital technology reduces—but does not eliminate—the need for an on-the-ground presence.

It is important to keep in mind that digital solutions need to be calibrated to the realities of the local, rural environment. Often, connectivity in these areas is at best a recurring challenge and at times non-existent. If the service requires a stable internet connection and does not support certain offline features such as account origination and data entry, this will impact the ability of smallholder farmers to register for or access products and services. Without an existing service presence in rural areas, providers should not overlook the strategic, financial,

and operational implications of last-mile delivery into smallholder farming communities. Even though a service offering leverages digital technology, the provider will likely require a rural network of personnel or agent affiliates in the short to medium term to support marketing and customer acquisition as well as post-acquisition customer education and support. These networks also play an important role in establishing trust with farmers. They also generate digital information on smallholder farmers needed to onboard new clients and validate credit models that do not yet exist in the service providers' or other systems.

Mobile money can offer attractive benefits for both lenders and borrowers.

While only around 20 percent of borrowers in the third cycle were given the option to receive their loan via mobile money, the positive experience with even this limited number of clients helped BRAC to see the benefits of this channel. Not only did it reduce the amount of staff time and cash handling risk needed to physically disburse cash, it also benefited borrowers who were able to receive their loans much faster than the previous cash-based method. As a result, BRAC decided to offer all customers of one branch

STREAMLINING APPLICATION VERIFICATION PROTOCOLS CAN MAKE SERVICING INDIVIDUAL RURAL LOANS MORE EFFICIENT AND LESS COSTLY

At the outset of the pilot, BRAC chose to retain its standard practice of three site visits during an individual loan application review. Since the prospective borrowers are often in remote places with no bank branch nearby, these visits substantially contribute to the lender's costs for facilitating these loans, reducing their attractiveness. As the pilot progressed, BRAC agreed to simplify the verification process. Following the first loan cycle, the number of house visits was reduced to two—an initial visit by the loan promoter during loan application origination, followed by a visit by the credit officer. This reduced verification process eliminated the usual branch manager approval. During the second cycle, house visits were randomly done for repeat borrowers, with only 70% receiving house visits. This was reduced to 50% for old and new borrowers alike in the third cycle.

the option of mobile money as a disbursement/collection channel for other products as well to obtain further experience.

Awareness of unique e-KYC challenges is key when entering new markets. In Myanmar, rural addresses often do not exist. Birthdays are generally documented according to the Myanmar lunar calendar and names may not have standardized English spellings. These types of local dynamics may prove problematic when procuring an international platform provider that is not set up to accommodate deviations from international standards as part of its existing software application suite or customization offering.

Alternative data sources for credit scoring models requires further research and experimentation.

The pilot showed that it is technically possible to introduce alternative sources of digital data, such as mobile and agricultural data, to inform credit decisions. At the same time, this is a process that cannot be rushed. There is potentially significant risk to any financial institution that institutes a new model for credit decisions, particularly one that has not been tried elsewhere. While BRAC had access to these data sources in the second and third cycles, the timeliness and robustness of the data was not always aligned to their needs.⁴⁶ As a result, credit decisions were often made using more traditional data and decision-making processes.

This is an important lesson learned. The introduction of non-financial data and alternative credit scoring models must be done incrementally in a way that clearly demonstrates to credit officers and senior management the model's predictive potential. The technological feasibility of new scoring models is a necessary but not sufficient condition. This will require deploying the model long enough to achieve a certain customer base, portfolio size, and default ratio to better identify risk factors as well as to observe performance during periods of acute economic stress or downturn (e.g. major weather event).

Ultimately, financial institutions will only begin to adopt such models when they are convinced of their accuracy and benefit.

Robust credit scoring models require strong data, ideally attributable to a single individual. While the pilot's duration was not long enough to aggressively stress test the model, it did generate lessons relevant to other service providers and stakeholders considering similar designs for a rural financing product. Given the degree of phone sharing that exists in rural Myanmar, using mobile usage data as a proxy for disposable income becomes more



complicated. If multiple people are topping up and using the SIM card of an applicant, it is difficult to know what to attribute to that individual. Moreover, it is impossible to know if an individual has been sharing their SIM card unless they self-report that. In countries where SIM/phone sharing is less prevalent, such a model might be much more effective. In some contexts, where the SIM card is shared amongst family members and where agricultural income is considered household income, SIM sharing might be less of a concern as a proxy for income. However, it is still impossible for the mobile network operator to know who is using the phone, and whether it is only members of the immediate household or otherwise.

⁴⁶ The fact that farmers were not loyal users of a single SIM card introduced an additional layer of challenge.

MAKING USE OF ALTERNATIVE INFORMATION TO BUILD CREDIT PROFILES

The pilot explored incorporating two alternative, non-financial sources of data to help build credit profiles for smallholder farmers, many of whom did not have formal credit profiles: mobile phone and agricultural risk data.

The mobile phone data looked at factors such as how long the farmer had a SIM, usage and top-up history, and current airtime balance over a historical period, which required at least six months of SIM activity. This was used as a proxy for traditional financial data, such as cash flow.

The agricultural data relied on crop risk scores that were created for four crops: rice, maize, green gram, and black gram. The crop risk scores relied on historical weather data from satellite imagery and local weather stations. Scores ranged in value from 0 to 200. Higher scores indicate lower agroclimatic risk and deemed to have greater production potential, a higher likelihood of successful harvest, and more likely to be able to repay their loans.

The main practical challenge in using alternative data for credit scoring is in first pairing the data with loan repayment data for a given target population (such as farmers) so that the relationships between alternative data points and loan repayments can be quantified. While mobile network operator data has been proven to predict repayment risk well for very small, short-term (30 day) consumption or income-smoothing (nano) loans (*), the extent to which these relationships hold for smallholder farmers planting crops with a 6 or more month growing cycle can only be known by collecting the mobile network operator data at the time of loan disbursement, lending to the farmers, waiting for loans to mature, and observing the relationships between the alternative data points and loan repayment.

The less a lender screens borrowers in such a ‘knowledge building’ pilot, the more clearly the relationships between the alternative data characteristics and loan repayment can be seen. Obtaining at least 500 delinquent accounts (a notional minimum for statistical scorecard development (**)) entails a cost that most MFIs will find preclusive, but paying it could help obtain a ‘golden sample’(***) that allows it to develop a model that is scalable (through digital platforms) to clients it otherwise would never had risked lending to.

In this pilot, despite 18 months and three lending cycles, there were fewer than 60 delinquent loans and no way to know with any certainty if either the mobile or agricultural data based scores were at all effective. This suggest future pilots in similar markets might be designed to increase the risk taken already in a second cycle, once the viability of the farmer loan product itself has been proven.

* https://www.ifc.org/wps/wcm/connect/region_ext_content/ifc_external_corporate_site/sub-saharan+africa/resources/dfs-data-analytics

** CGAP “How to use advanced analytics to build credit-scoring models that increase access” page 19

*** David Hand “Dark Data” page 239

Mobile credit scoring can inadvertently exclude some potential customers, especially women.

Since the mobile credit score involved data from a single mobile network operator, eligible customers had to have active SIM cards with that provider for a minimum period of six months. This resulted in some farmers being excluded, as they may live in an area with poor network coverage, use a SIM card registered in a family member's name, or simply prefer another provider. At the same time, partnering with multiple mobile network operators may not always be feasible. In markets where a single operator is more dominant, this may be easier to overcome. Being aware of this challenge and taking steps to reduce its potential impact is advisable from the offset.

Crop risk models may require multiple data inputs to calibrate, and score interpretation across different crops needs to be properly understood.

During the pilot, not all desired data inputs could be collected. Many data sources required direct engagement with farmers or plot visits to collect, such as the specific breed of a given crop, the date of crop planting, when and how much fertilizer was

applied, soil quality, pest and disease prevalence, and eventual crop yield. These data points would have strengthened the model's predictive capabilities, linked them more explicitly to a farmer's plot, and allowed for seasonal updates for further recalibration and improvement. The team also had to address the issue of how to treat the same score assigned to two different crops and whether to map risk according to both score and crop or only according to score.⁴⁷ To link crop scores to quantitative risk of delinquency as well as compare crop scores among different crops, adequate farmer-level data need to be collected for farmers who receive loans and repay either on time or late.

Service providers will want to balance the potential efficiencies of digitization with the existing flexibility of human-based operations.

Potential efficiency gains from digitization may not be rapidly realized or broadly distributed. Within service providers, digitization's efficiencies are commonly associated with improved standardization, aggregation, processing, and management of information. This will often correspond to more streamlined, cost-effective methods for loan

decision-making, tracking, and supervision, with implications for how office-based personnel at different management levels operate. But activities and processes associated with loan origination, funds disbursement, or funds collection may not be impacted to the same degree. Digital systems, because of their reliance on other infrastructure, lack a level of flexibility relative to human-based operations. If systems are down, due to connectivity, power, device, or software issues, access is restricted and performance may suffer if non-digital work-arounds do not exist. Additionally, digital systems are typically efficient and effective where adequate digitized data exists. As a result, service providers will want to consider whether digitization offers greater value in better serving the needs of an existing client base as it matures and more digital data accrues versus acquiring new customers who will likely have a much smaller digital information footprint. This could also have implications for when, how, and for what purpose customers are exposed to digitization and encouraged to be active or passive participants.

⁴⁷ The two most common crops grown by farmers during this pilot were rice (during monsoon season) and beans (during dry season). If the crop risk score generated for both rice and beans is equal, it was not immediately clear whether the production risk was the same or not and to what extent that should impact the lending decision.



Recommendations



DESIGN

1. Employ a research and design approach such as HCD that incorporates principles and methods capable of surfacing relevant practices, perceptions, and patterns of rural customers as well as key needs and challenges they encounter. Digitization is not a silver bullet and service providers must assess the degree of readiness of smallholder farmers to understand, adopt, and actively use a product or service.



VARIOUS USERS

2. Where appropriate, let rural customers remain at the periphery of digitization but able to interact with the product or service through credible intermediaries. Rural digitization should not extend beyond what the local environment and observed practices of likely users will allow, especially at the outset. While smallholder farmers are typically the target end user, they may not be able to immediately take up new digitally enabled products.

3. A rural-facing offering does not need to be fully digitized when launched; rather, an incremental approach may be warranted that starts with digitizing “low hanging fruit” to give stakeholders an opportunity to absorb and adjust to the new product or service. While BRAC was open to a more comprehensive digitization strategy, they quickly realized that easiest aspect of individual rural lending to digitize, and the one where they saw the most likely financial and operational benefit, had to do with managing physical cash to process either loan disbursements or repayments.

- 4. Prioritize and adequately fund an internal “digital readiness” assessment to surface training needs across departments and at different staffing levels.** Since the responsibility for educating customers often falls on branch or field personnel, it is essential to understand their capacity as well and to then design accordingly. They must be able to establish a level of comprehension and confidence with the selected digital solution so they can explain what it is and how it works. Digitizing paper-based systems for use in rural areas with limited digital infrastructure is not a “quick fix” and instead requires longer term thinking, internal capacity building, and champions.
- 5. Do not exclude human-based operations entirely given the limitations of basic rural infrastructure required to power digital services reliably at scale.** Rural customers will likely require ways to access their accounts, ask questions, make comments, or seek redress for specific issues and concerns. They may expect an option to communicate with a service representative directly and have strong

preferences regarding where, when, and how this communication should occur. In the near term, human touch points, whether in-person or via call center, can provide additional service backstops that are necessary when targeting rural customers.



SERVICE PROVIDERS

- 6. Service providers may need to adjust or expand the type of information collected from smallholder farmers and rely more heavily on direct engagement to satisfying account registration requirements (e.g. Know Your Customer or KYC information).** In anticipation of information gaps and collection challenges, service providers should proactively assess and specify critical gaps, consult relevant laws and regulations—especially those related to account issuance and identity verification and validation—and determine what adjustments can be made to implement a process that is compliant,

operationally feasible, and financially viable.

- 7. Explore partnerships for financial and digital literacy training.** The need for financial and digital literacy training for rural populations will only increase as the availability and reliability of digitally enabled products broadens geographically. While highly market and context specific, partnerships among public, private, and development sector actors are likely the most effective way to deploy and scale such trainings. Service providers should not seek to build out this capacity in-house and instead leverage networks, experience and capacity of external partners (e.g. public or development-led rural extension services).
- 8. Explore potential partnerships with agritech companies, technology firms, and academic institutions to obtain data relevant to smallholder farmer credit risk.** Digital footprints of farmers captured by agritech companies have significant potential to immediately help lenders understand how smallholder farmers differ from one another and identify those most ready to take and

able to repay a formal loan.⁴⁸ The next step of turning this data into a robust statistical model with accurate quantitative estimates of the likelihood to repay a loan requires first lending to a selection of the farmers and observing repayment. In addition to credit, crop risk scores have the potential to facilitate the provision of crop and/or location-specific information to farmers. There should also be consideration given to why these data sets are being generated to avoid data collection simply to have as much information as possible on existing customers.



PUBLIC SECTOR

9. The public sector has a role in ensuring a healthy enabling environment for rural-facing products and services, including digital information standards and digital infrastructure. National governments should consider a range of initiatives—policy, regulatory, investment—that clarify rights and obligations



regarding how digital data and information is generated, owned, accessed, used, and protected. They should also prioritize digital connectivity in a way that promotes accessibility, reliability, and affordability for rural communities. Further, they may want to consider mechanisms for customers, and rural customers in particular, to complain and seek redress.

10. Digitization of certain public sector services could reduce private sector risk in agricultural investment. For instance, digitized citizenship identity could help account registration and e-KYC. Easy to access digital data sets containing climate, weather, and agronomic information would help analyze agricultural risks.

⁴⁸ https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/02/Digital_credit_scoring_for_farmers_Opportunities_for_agritech_companies_in_Myanmar.pdf