Digital credit scoring for farmers: Opportunities for agritech companies in Myanmar

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1. Introduction

1.1 Myanmar's growing mobile sector offers opportunities in digital agriculture

Since the liberalisation of the mobile sector in 2013, Myanmar has experienced a dramatic upsurge in SIM penetration (108 per cent) and smartphone ownership (72 per cent),[1] while mobile broadband connections reached 44 million or 75 per cent of total mobile connections.[2] Mobile technology has become a vital tool for powering Myanmar's tech ecosystem. The growth of the mobile sector has given rise to mobile money as an alternative digital payments system, and networks of mobile money agents are expanding rapidly, including in rural areas where banks have had a weak presence. However, mobile money use in rural areas has not yet reached critical mass and is currently limited to a narrow range of use cases.

Agriculture dominates Myanmar's rural economy and makes a significant contribution to the national economy. It is the country's largest employer and accounts for over a quarter of gross domestic product (GDP). Crop procurement remains highly informal and depends largely on the intermediation of informal traders. The sector faces a variety of long-standing challenges that affect farmer livelihoods and limit opportunities for growth. The use of digital technologies in agriculture has allowed sector stakeholders to mitigate some of these challenges, including poor access to timely agronomic advice and underdeveloped value chain structures. Other pain points, like farmers' limited access to credit and associated low levels of financial inclusion, have been more persistent.

Agricultural credit (e.g. for inputs and assets) and non-agricultural credit (e.g. for medical and education expenses) are both critical to meeting farmers' financing needs. Recently, innovative agritech companies, in collaboration with financial services providers (FSPs), have been testing the use of digital agriculture data for farmer credit scoring. If successful, agritech companies in Myanmar could play a key role in promoting financial inclusion for farmers. This report provides a snapshot of the agriculture sector and status of financial inclusion in Myanmar, and examines ways in which recent agritech innovation is supporting rural communities to improve financial inclusion. The report also highlights emerging monetisation models and the roles of agritech companies in the country.

1 - GSMA Intelligence, end of 2018 figures. Available at: https://www.gsmaintelligence.com/markets/2274/dashboard/; **2 -** Ibid.

1.2 This report is aimed primarily at agritech companies seeking to integrate digital financial services for farmers

THE REPORT ADDRESSES THREE KEY QUESTIONS:

1 WHAT TYPE OF DATA CAN SUPPORT CREDIT SCORING FOR FARMERS?

2 HOW CAN DIGITAL AGRICULTURE SOLUTIONS PROMOTE FINANCIAL INCLUSION AND ACCESS TO CREDIT?

3 WHAT MODELS ARE EMERGING TO SUPPORT THE MONETISATION OF DIGITAL AGRICULTURE DATA?

WHAT IS THE INTENDED AUDIENCE FOR THIS REPORT?

This report is aimed primarily at agritech companies seeking to develop a rural growth strategy by assessing farmers' credit risk using digital farm and farmer data. The report will also be of interest to mobile money providers, fintech companies[3] and FSPs seeking to launch and scale digital financial services for farmers.

3 - The term "fintech" refers to companies or representatives of companies that combine financial services with modern, innovative technologies. Fintechs generally aim to attract customers with products and services that are more user friendly, efficient, transparent and automated than those currently available.

1.3 Digital agriculture solutions: six main use cases

The spectrum of digital applications in agriculture ranges from low-tech solutions that disseminate agronomic advisory to farmers to high-tech holistic tools involving satellites, sensors and big data analytics. The GSMA has grouped **digital agriculture solutions into three categories** based on the problem they solve for farmers (Figure 1).

Access to markets improves linkages to formal crop buyers, allowing farmers to bypass multiple intermediaries and making procurement more equitable. **Access to assets**, particularly farm assets and equipment, increases productivity and farmers' incomes. **Access to services** strengthens farmers' resilience and improves access to financial services.

FIGURE 1 | SIX USE CASES FOR DIGITAL AGRICULTURE SOLUTIONS

ACCESS TO MARKETS

DIGITAL PROCUREMENT
Roll out of digital technologies in the agricultural last mile that enable a range of systems and processes to transition from paper to digital.

E-COMMERCE
Online buying and selling of agricultural produce that allows farmers to reach new markets, including international buyers.

ACCESS TO ASSETS

SMART FARMING
Use of digital channels, such as the Internet of Things (IoT), to automatically and remotely access essential farm equipment and farming assets and track key parameters.

ACCESS TO SERVICES

INFORMATION SERVICES
Mobile-enabled dissemination of information to farmers, such as agronomic advice, market prices and certification standards.

WEATHER AND CLIMATE SERVICES
Provision of localised forecasts enabled by improved weather modelling techniques, and weather-adaptive and climate-smart agronomic advice.

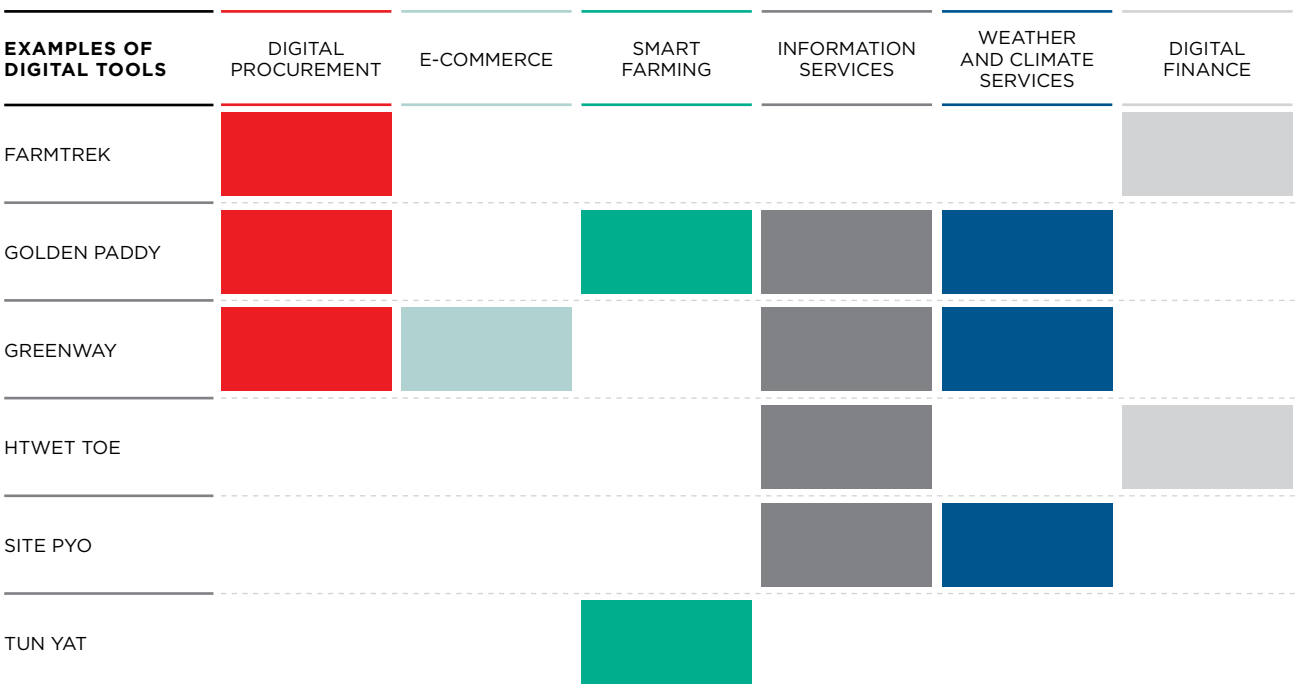
DIGITAL FINANCE
Access to financial products and services via digital channels.

1.4 Agricultural data can support farmers in Myanmar to establish economic identities

Digital agriculture tools generate digital footprints, including farm and farmer data (e.g. farmer identification data, geolocation data), that can help farmers forge an economic identity. An economic identity is a form of functional identity that enables financial institutions to assess the credit risk of previously unbanked farmers. Digital agriculture tools can therefore offer farmers a pathway to financial inclusion.

In Myanmar, the digital agriculture ecosystem has steadily expanded over the past few years. Digital agriculture solutions are predominantly smartphone apps marketed directly to farmers. Figure 2 shows the use cases supported by Myanmar's most established digital agriculture services.

FIGURE 2 | DIGITAL AGRICULTURE USE CASES



2.1 Food crops dominate agricultural production in Myanmar

Despite rapid urbanisation in recent years, Myanmar's population remains overwhelmingly rural. Agriculture is the main employer for 50 per cent of the country's working age population,[4] yet agriculture, livestock and fishery represented just 24.6 per cent of GDP in 2018, indicating low agricultural productivity.[5]

Food crops account for most of Myanmar's agricultural production, including cereals (e.g. paddy and maize), oilseeds (e.g. groundnut and sesame), pulses (e.g. green gram and chickpea) and vegetables and fruits (e.g. potato and plantain). Paddy (e.g. rice) is the main crop grown in the country, with over 40 per cent of net area sown to paddy in 2017.[6] Most farms produce paddy during the monsoon season and other food crops during the cool and dry seasons, such as pulses, oilseeds and maize. Cash crops, such as rubber, cotton, coffee and tea (typical in other regional markets like Indonesia and Vietnam) are nascent and occupy a small cultivation area.

FIGURE 3 | RELEVANCE OF AGRICULTURE IN SELECTED SOUTHEAST ASIAN MARKETS, 2019

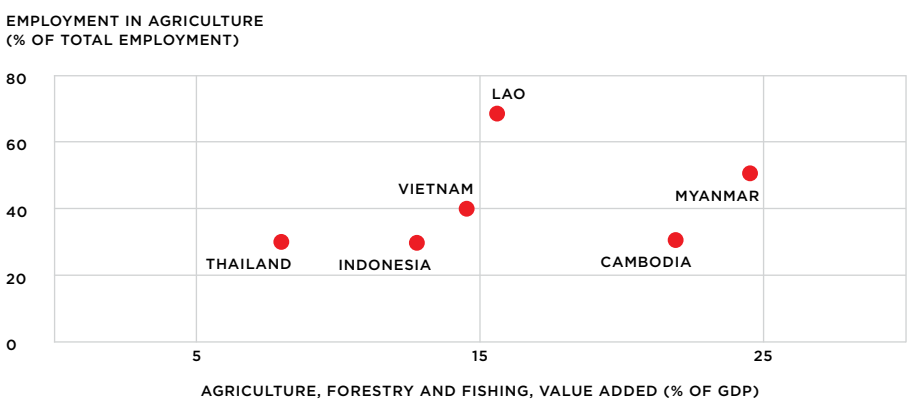
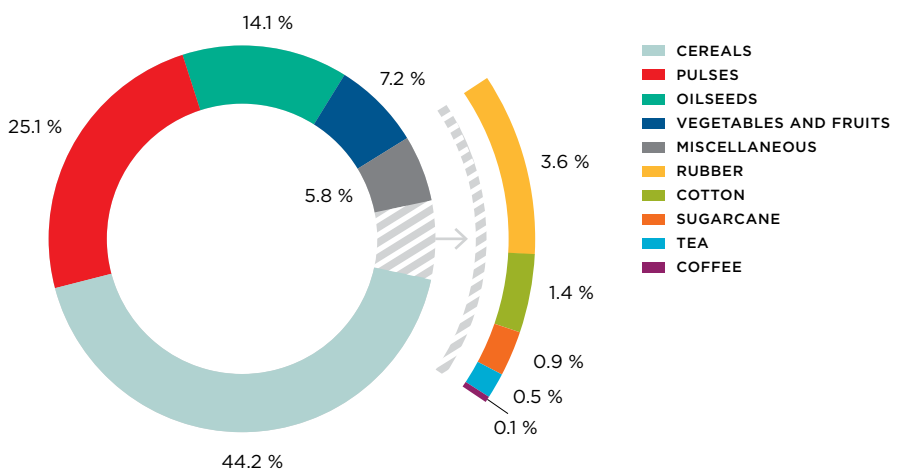


FIGURE 4 | CULTIVATION AREA OF PRINCIPAL COMMODITY CATEGORIES, IN ACRES, 2017



4 - The World Bank (2019), https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=MM; **5 -** Myanmar Statistical Yearbook 2017. Available at: https://www.mmsis.gov.mm/sub_menu/statistics/fileDb.jsp; **6 -** Ibid.

2.2 Underdeveloped value chains hold back agricultural exports

Myanmar's agricultural sector is underdeveloped, due mainly to inadequate financing that has slowed agricultural development and resulted in poor vertical integration across value chains. For farmers, inadequate access to financing undermines their ability to access agricultural inputs (e.g. seeds, fertilisers), farm machinery (e.g. planters, harvesters) and cover medical expenses and other bills. Agricultural outputs are often sourced from aggregators that must navigate through several layers of intermediaries to reach farmers. Sectoral challenges such as these have led to agricultural products representing only a small percentage of Myanmar's exports.

Among commodity exports, pulses have become the primary foreign exchange earner (74 per cent of all agricultural commodity exports in 2017) (Figure 6). Exports of industrial crops, such as coffee, tea and palm oil, are negligible. However, Myanmar's strategic location between the large markets of India and China offers potential to expand or develop new export sectors.

FIGURE 5 | EXPORT VALUE OF PRINCIPAL COMMODITIES, 2017.

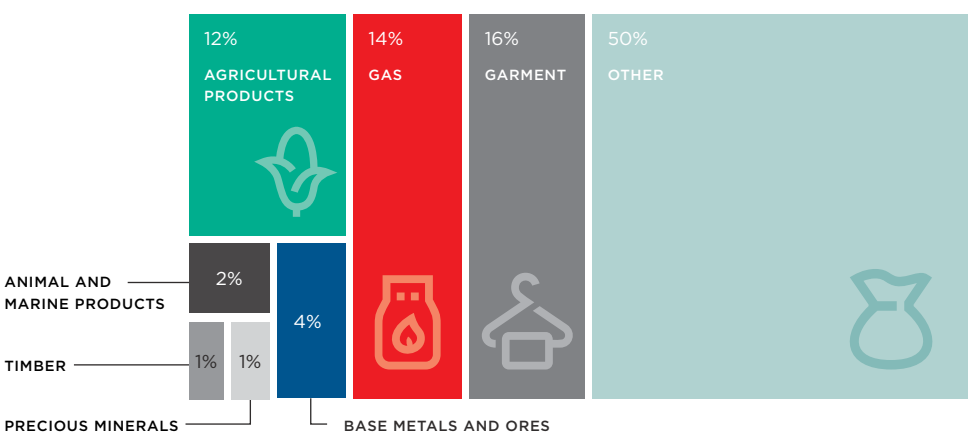
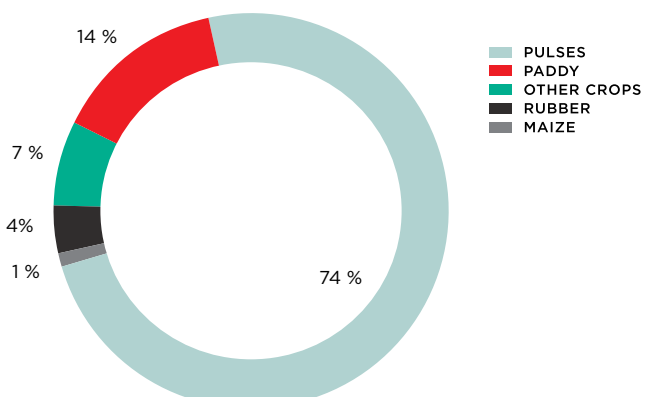


FIGURE 6 | EXPORT VALUE OF PRINCIPAL AGRICULTURAL COMMODITIES, 2017



3.1 Financial inclusion in Myanmar is second lowest in Southeast Asia

Financial inclusion in Myanmar is second lowest among Southeast Asian countries.[7,8] According to the 2017 Global Findex, of the 38.4 million people in Myanmar aged 15 and over, only 26 per cent had an account at a financial institution or mobile money provider in 2017 (25 per cent for those living in rural areas) (Figure 7). Mobile money's contribution to digital financial inclusion was minimal.

Access to credit from formal financial institutions, such as banks and microfinance institutions (MFIs), is limited in Myanmar, with just two in 10 adults (19 per cent) reporting borrowing money from the formal sector in the last 12 months.[9] Commercial bank outlets tend to be concentrated in urban areas, leaving rural areas underserved.[10] As a result, borrowing in rural areas happens informally between family, friends, pawnshops and money lenders.

FIGURE 7 | OVERVIEW OF FINANCIAL INCLUSION IN MYANMAR, 2017

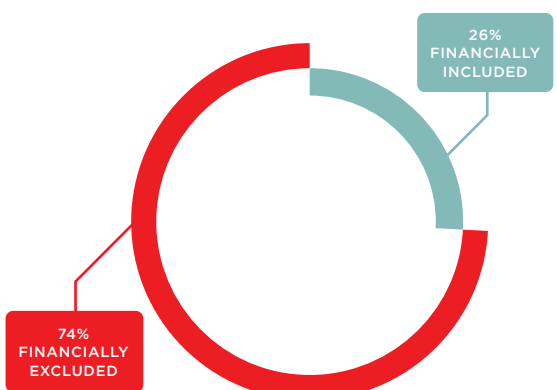


FIGURE 8 | ACCOUNT TYPES, 2017

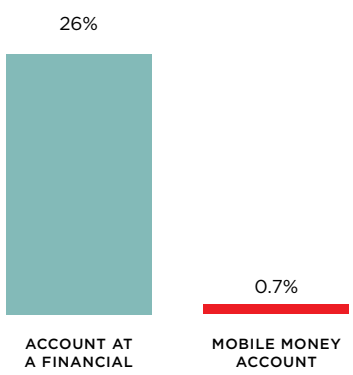
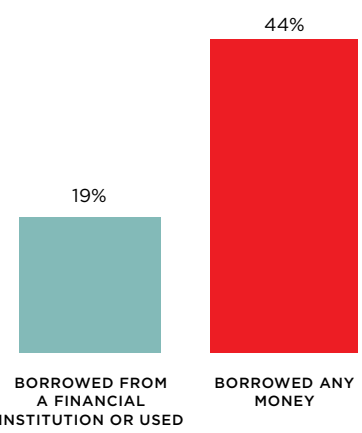


FIGURE 9 | ACCESS TO CREDIT, 2017



7 - Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam. No data exists for Brunei or East Timor; **8 -** The World Bank, Global Findex Database 2017. Available at: https://globalfindex.worldbank.org/; **9 -** Ibid.; **10 -** In Myanmar, there are 4.7 commercial bank branches and Automated Teller Machines (ATMs) per 100,000 adults.

3.2 Farmers' financing needs extend beyond farming activities

In Myanmar, low agricultural productivity is attributed to factors such as the undersupply of quality public services and the labour-intensive nature of current farming practices. Low productivity in turn results in lower yields and lower profits, which make it difficult for farmers to invest in their business and/or household. In Myanmar, digital tools play a major role in addressing the productivity gap created by insufficient agricultural extension services. For example, agritech platforms, such as Htwet Toe and Greenway, offer customised agronomic advice to farmers. Other digital tools, such as Tun Yat, use digital technologies to give farmers access to their productive assets. However, farmers' financing needs extend across a wider range of use cases, and digital technologies still play a limited role in addressing these needs.

Farmers require financing for both agriculture- and non-agriculture-related activities (Figure 10), and must often resort to borrowing to meet these needs. The timing of this financing is unique to agriculture. At the start of every growing season, there is a huge outflow of cash (e.g. to buy seeds or hire labourers to till the land) and this negative cash flow grows (see Figure 12) until farmers can harvest and sell their crops. In addition, non-agriculture-related financing needs can be unpredictable depending on the needs of the household and parallel economic activities.

FIGURE 10 | FARMERS' AGRICULTURE - AND NON-AGRICULTURE-RELATED FINANCING NEEDS

AGRICULTURE-RELATED FINANCING NEEDS

- Farm machinery (e.g. rice harvester)
- Tools (e.g. spades and hoes)
- Irrigation system (e.g. water pumps)
- Inputs (e.g. seeds, fertilisers, seedlings)
- Hired labour (e.g. at time of sowing)
- Livestock (e.g. calves)
- Livestock feed (e.g. fodder)

NON-AGRICULTURE-RELATED FINANCING NEEDS

- Emergency expenses (e.g. following an extreme climate event)
- Business expansion (e.g. village shop)
- Medical expenses (e.g. medication or hospitalisation)
- Education expenses (e.g. school fees)
- Living expenses (e.g. food and water)
- Repayment of another loan (e.g. informal loan)

3.3 Until recently, there was only one formal lender serving rural communities in Myanmar

Traditionally, credit to farmers has been driven by state-owned Myanmar Agricultural Development Bank (MADB).11 However, information from MADB indicates that around half of reported borrowers are in default, with a maximum of 2.2 million active credit clients (2018). This high default rate and limitations to MADB loans, such as disbursement delays and the narrow range of crops in the lending portfolio, challenge its ability to address the needs of farmers in the long term.[12]

As a result, farmers have opted for other sources of credit to meet their financing needs. The Central Bank of Myanmar currently applies annual interest rate caps to banks of 13 per cent for collateralised loans and 16 per cent for unsecured loans. For private banks, low interest rate caps do not justify the risk of issuing unsecured loans to farmers. Even when collateral is available, private banks are not willing to seize farmer assets to recoup losses as this would have a negative impact on their reputation. Private banks may also be unwilling to serve rural customers due to a lack of expertise in credit risk assessment and weak internal risk management systems.[13]

TABLE 1 | TYPES OF FORMAL LENDERS IN MYANMAR AND THE SERVICES THEY PROVIDE TO FARMERS

LENDER TYPE	DESCRIPTION	EXAMPLES
State-owned bank (MADB)	Loans are offered for 22 types of crops, although 90 per cent are still for paddy. MADB currently extends seasonal loans, based on group guarantees, of up to MMK 150,000 (USD 102) per acre of paddy and MMK 100,000 (USD 68) per acre of other crops, to a maximum of 10 acres. Disbursement of funds is often delayed. The annual lending rate is subsidised by the state and capped at eight per cent.	MADB
Private banks	Few banks offer tailored products and services in their portfolios that address farmer needs. Most private banks lack the tools and expertise to analyse value chain activities and assess farmers' credit risk. Banks require collateral such as land, buildings or cash deposits. The most common form of collateral for farmers is Form 7 Land Use Certificate, which grants farmers the right to cultivate the land. However, not all farmers have access to Form 7.	Yoma Bank MAB

11 - In the latest FinScope survey (2018), some 4.2 million adults reported having credit from MADB; **12 -** UNCDF (2018), "Making access possible". Available at: http://www.uncdf.org/Download/AdminFileWithFilename?id=8674&cultureId=127&filename=map-myanmar-diagnostic---2018pdf; **13 -** UNCDF (2018), "MAP Refresh Myanmar Diagnostic". Available at: http://finmark.org.za/wp-content/uploads/2019/04/Myanmar_Diagnostic_2018_CB3_repro.pdf.

3.4 MFIs are filling the formal lending gap in rural areas

In rural Myanmar, MFIs have stepped in to meet unsatisfied demand for credit and offer an alternative to informal credit. MFIs are typically small organisations with a certain degree of flexibility and appetite for experimentation in new markets. MFIs see rural areas as a niche market underserved by private banks that allow them to provide customised financial services and grow their reputation as the go-to lender in rural communities for specialised credit. For example, MFIs offer longer repayment periods (up to 10 months), less frequent repayments, loans for crops not covered by the MADB scheme (e.g. pulses) and a larger portfolio of innovative products. However, limited access to funds for lending combined with regulatory hurdles, such as the inability to offer collateralised loans or set interest rates, has restricted the growth of MFIs. However, a number of MFIs have built their business models to target Myanmar's rural customers, notably Maha Agriculture Microfinance and Proximity Finance (Figure 11).

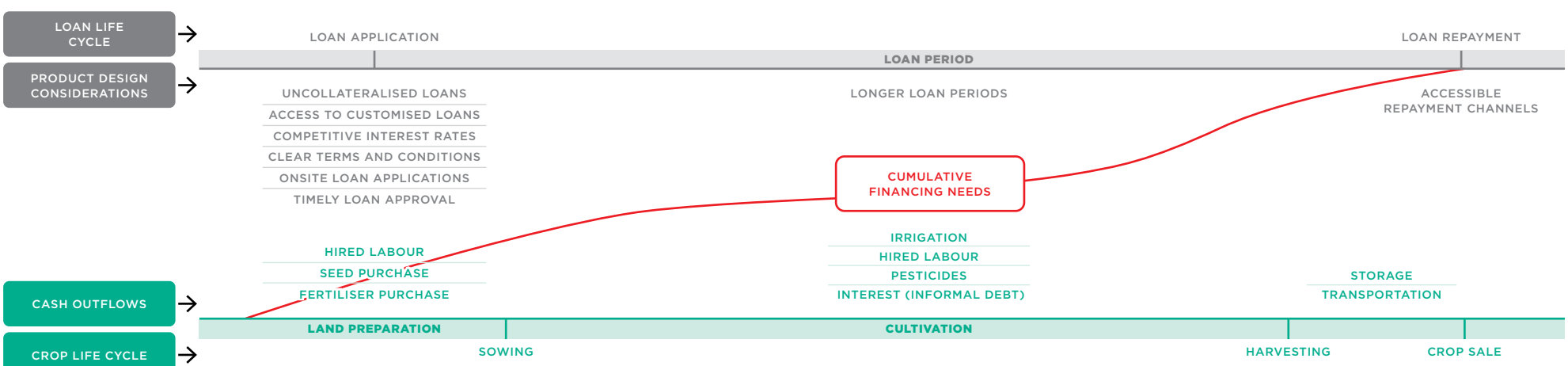
FIGURE 11 | CREDIT PRODUCTS FOR FARMERS IN MYANMAR OFFERED BY MFI PROXIMITY FINANCE

LOAN PRODUCT NAME	LOAN DESCRIPTION	AVERAGE LOAN VALUE IN MMK (USD)
Crop loan	Seasonal loan that covers input costs, such as seeds and fertiliser, hired labour, tools, and harvesting equipment	MMK 250,000–600,000 (USD 170–408)
Livestock loan	Input finance for purchasing livestock and farm materials	MMK 200,000 (USD 136)

3.5 Credit product design needs to account for the needs and circumstances of farmers

The financing needs of farmers are determined by expenses and cash outflows at various stages of the growing season. Credit products must therefore be customised to farmers' unique circumstances, financing needs and revenue-generating activities. When a credit product for farmers is being designed, a range of considerations come into play, including the life cycle and stages of an agricultural loan (Figure 12). FSPs must consider a range of other issues as well, such as taking a gender-neutral approach to credit (e.g. enabling collateral to be registered under women's names), providing loans that cover a range of crops, using innovative models to enable access to higher priced items (e.g. farming assets and machinery) and being transparent with data ownership and sharing.

FIGURE 12 | PRODUCT DESIGN CONSIDERATIONS FOR AGRICULTURAL CREDIT PRODUCTS

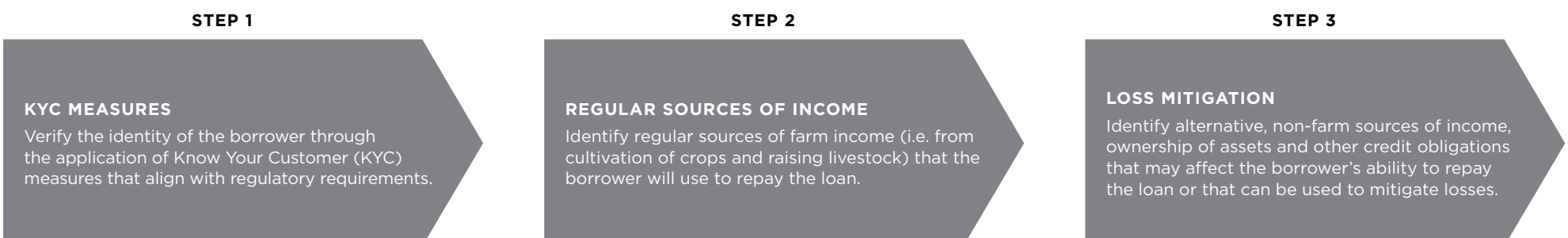


4.1 Lenders in Myanmar turn to traditional data collection methods to assess a farmer's credit risk

FSPs collect and analyse a range of customer data to calculate a numeric score (i.e. credit score) that is used to assess the risk profile of the borrower. Typically, data comes from traditional sources, either internal (e.g. survey instruments, demographic information) or external (e.g. credit bureau data). However, unbanked farmers who have not received loans from FSPs in the past are unlikely to have a file with a credit bureau. The lack of a credit bureau in Myanmar makes this an even greater challenge as FSPs are not able to make credit decisions based on past repayment performance.[14]

As a result, lenders in Myanmar typically use internal sources of data and assess credit risk through a time-consuming process. Data is usually collected on farm visits by loan officers who either record the information on paper or in a digital format. The data is then taken to the FSP's office for analysis and the farmer's credit score is calculated. For a previously unbanked farmer, the credit decision is based on a selection of data points. During a loan application, lenders like Maha Agriculture Microfinance collect this information through a three-step process (Figure 13):

FIGURE 13 | STEPS IN THE CREDIT-SCORING PROCESS



14 - Myanmar is working closely with the World Bank Group and the International Finance Corporation to establish a private credit bureau in the country. The bureau is expected to launch in early 2020.

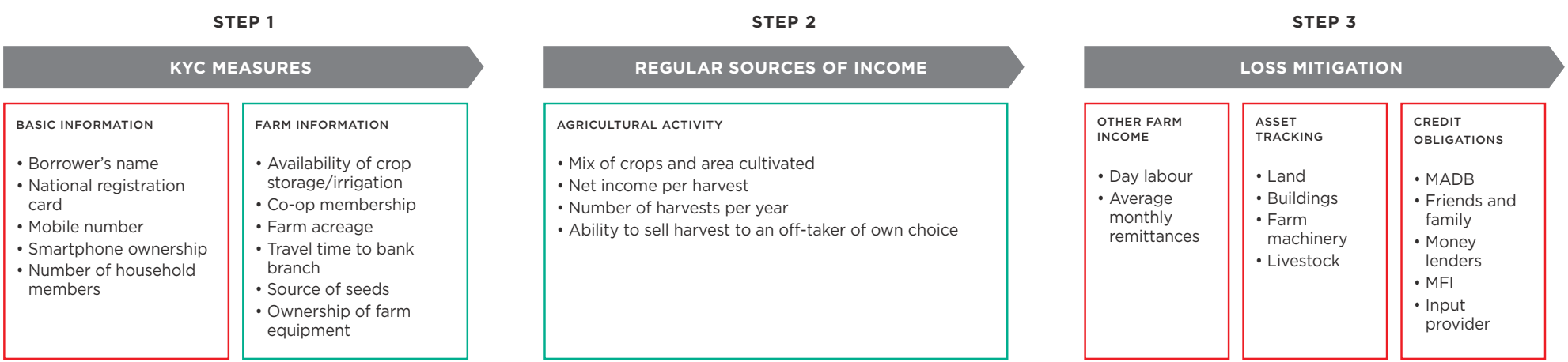
4.2 Using agriculture- and non-agriculture-related data to make credit decisions

To facilitate credit decisions for farmers, FSPs collect a variety of agriculture- and non-agriculture-related data (Figure 14). Since agricultural production cash flows are inherently difficult to estimate accurately, expanding the range of data points that loan officers collect can reduce FSPs' risk and allow them to make more informed lending decisions. At the same time, loan officers need to strike a balance between having all the necessary information and inundating farmers with questions that could make them feel overwhelmed.

In partnership with farm machinery dealers, Myanmar's Yoma Bank runs a Hire Purchase scheme tailored to the financing of agricultural vehicles, machinery and equipment. Under the scheme, Yoma Bank collects a range of data points that can support all three steps in a credit-scoring process.

FIGURE 14 | METRICS COLLECTED DURING A LOAN APPLICATION FOR YOMA BANK'S HIRE PURCHASE SCHEME

NON-AGRICULTURE-RELATED DATA | AGRICULTURE-RELATED DATA



4.3 Digital agriculture tools provide alternative data for lenders

Increasingly, FSPs are using alternative sources of data to improve customer understanding and optimise the risk assessment process. The digital agriculture tools they use and the new types of data they generate can play a key role in building economic identities and facilitating access to formal credit. Typically, digital agriculture solutions in Myanmar are direct-to-farmer smartphone apps. The most common use cases addressed by these solutions are access to services, such as information (e.g. agronomic advice, financial literacy training) and weather and climate services (e.g. localised weather forecasts, emergency alerts). More recently, agritech companies have begun looking at new use cases, such as smart farming and digital procurement, to expand their value proposition, differentiate themselves from their competitors and strengthen their business model (Table 2).

TABLE 2 | NEW USE CASES IN DIGITAL AGRICULTURE

Smart farming (access to assets)	Agritech company Tun Yat aims to address Myanmar's low rate of agricultural mechanisation by connecting farmers with farm machinery owners to rent equipment (e.g. harvesters, tractors). Although the bulk of users are still paying for equipment rentals in cash, payments using mobile money are also available. Tun Yat uses IoT technology to track asset utilisation. Through the service, farmers can use fewer resources to increase yields and profitability, while machine owners better utilise their asset.
Smart farming (disease monitoring)	Impact Terra's Golden Paddy app uses satellite-based insights to capture vital agricultural insights, such as extreme weather, pest outbreaks, flooding and local and large-scale droughts. The company then combines this data with advanced crop calendars and AI-based predictions to generate customised agronomic information. The app allows Impact Terra to provide farmers with actionable advice on the timing of farming activities and inform them of changing conditions that affect their crops. For farmers, the solution allows them to better time the planting of their crop, manage pests and diseases and reduce crop loss.
Digital procurement (traceability)	Through its Greenway mobile app, Greenovator has recently launched Farming Record, a digital notebook in which farmers record important information about their activities, such as farm expenses (e.g. hired labour), production practices (e.g. use of pesticides) and yields. Analysis of this information empowers farmers to make more informed decisions and increase production and profits, while sharing this information enables farmers to meet the requirements of sustainability and traceability initiatives.

4.4 Digital footprints support farmer credit scoring

Agritech companies capture a plethora of data that can support farmers in developing an economic identity. A digital footprint consists not only of farmer-level data (e.g. transactional data generated by the Tun Yat app), but may also extend to farm-level data (e.g. farming record data in the Greenway app) and location-based data (e.g. satellite-based insights that feed into the Golden Paddy app). Data can be structured, semi-structured or unstructured, and may not always be directly related to financial services. For example, satellite-based insights used for disease monitoring could be combined with weather forecasting data to conduct damage assessments or issue crop insurance payouts to eligible farmers.

TABLE 3 | SAMPLE DATA POINTS CAPTURED BY AGRITECH SOLUTIONS IN MYANMAR

USE CASE	DIGITAL TOOL	DATA POINTS THAT CAN SUPPORT FARMER CREDIT SCORING		
		KYC MEASURES	REGULAR SOURCES OF INCOME	LOSS MITIGATION
Smart farming (access to assets)	Tun Yat	• Name • National registration card	• Mobile money transactional data	• Machinery rental • Asset utilisation rate
Smart farming (disease monitoring)	Golden Paddy	• Farm location • Farm acreage	• Crop condition • Input costs	• Asset tracking (e.g. land, buildings)
Digital procurement (traceability)	Greenway	• Mobile number • Gender	• Cultivation practices • Production data	• Expense tracking

5.1 Monetising digital agriculture data: three emerging models for agritech companies

When monetising digital agriculture data, agritech companies can use one of three models to add value and expand their business model (Figure 15). Under the first model, "Data sharing", an agritech company may share relevant farm and farmer data with an FSP to fill data gaps and assess the creditworthiness of farmers. Under the "Data aggregation" model, an agritech company may play a leading role in centralised data collection, connecting parties and exploring ways to connect disparate data sets. This allows the company to create a new data-sharing ecosystem and drive digital disruption. Under the "Data analysis" model, an agritech company may use its organisational capabilities in data editing and analytics to lead part of the credit-scoring process in close collaboration with FSP partners. In this last model, the company combines innovative digital technologies with the provision of financial services, traditionally the role of fintech companies. This incremental approach requires an agritech company to have a set of organisational capabilities that expand alongside the data monetisation model. It also requires the company to rethink its business model, as well as the accompanying risks, to unlock new sources of value and redefine its customer value proposition.

FIGURE 15 | DATA MONETISATION MODELS FOR AGRITECH COMPANIES

DATA MONETISATION MODELS	DATA SHARING	DATA AGGREGATION	DATA ANALYSIS
DATA STRATEGY	Agritech company shares digital farm and farmer data with third parties, such as lenders and insurers. No data editing or analysis takes place.	Agritech company aggregates digital data from multiple sources, such as digital tool data and satellite data. Some data editing takes place.	Agritech company performs data editing and analytics to varying degrees. It may also lead part of the farmer credit-scoring process.
ORGANISATIONAL CAPABILITIES REQUIRED	Data storage and privacy	Data processing and warehousing	Business intelligence (e.g. data mining, predictive analytics)

VALUE ADDITION

5.2 In farmer credit scoring, not all data is equal

As digital agriculture tools become more established, a proliferation of data sets will become available to agritech companies. Those interested in leveraging their agile structures and in-house expertise to expand their business model can take an active role in aggregating and analysing data for farmer credit scoring. In addition to data captured on agritech platforms, there are a variety of data sources that can feed into a balanced scoring model and support the assessment of a farmer's creditworthiness. FSPs are interested in objective and reliable data that can be collected consistently for all applicants and are relevant to assessing a farmer's ability to repay their loans. It is possible to assess the usability of each type of data against several factors: relevance, availability, cost, reliability and predictive power (Table 4).[15]

TABLE 4 | RANKINGS OF DATA SETS FOR FARMER CREDIT SCORING

DATA TYPE	RELEVANCE	AVAILABILITY	ACQUISITION COST	RELIABILITY	PREDICTIVE POWER
CREDIT HISTORY	High	Low	Low	High	High
TRANSACTIONAL RECORDS	High	High	Low	High	High
KYC DATA	High	High	Average	Average/High	Average/High
MOBILE MONEY DATA	High	Average	Average	High	High
SOCIAL MEDIA	Low	High	High	Low	Low/Average
SATELLITE	High	Average	Average	High	Average

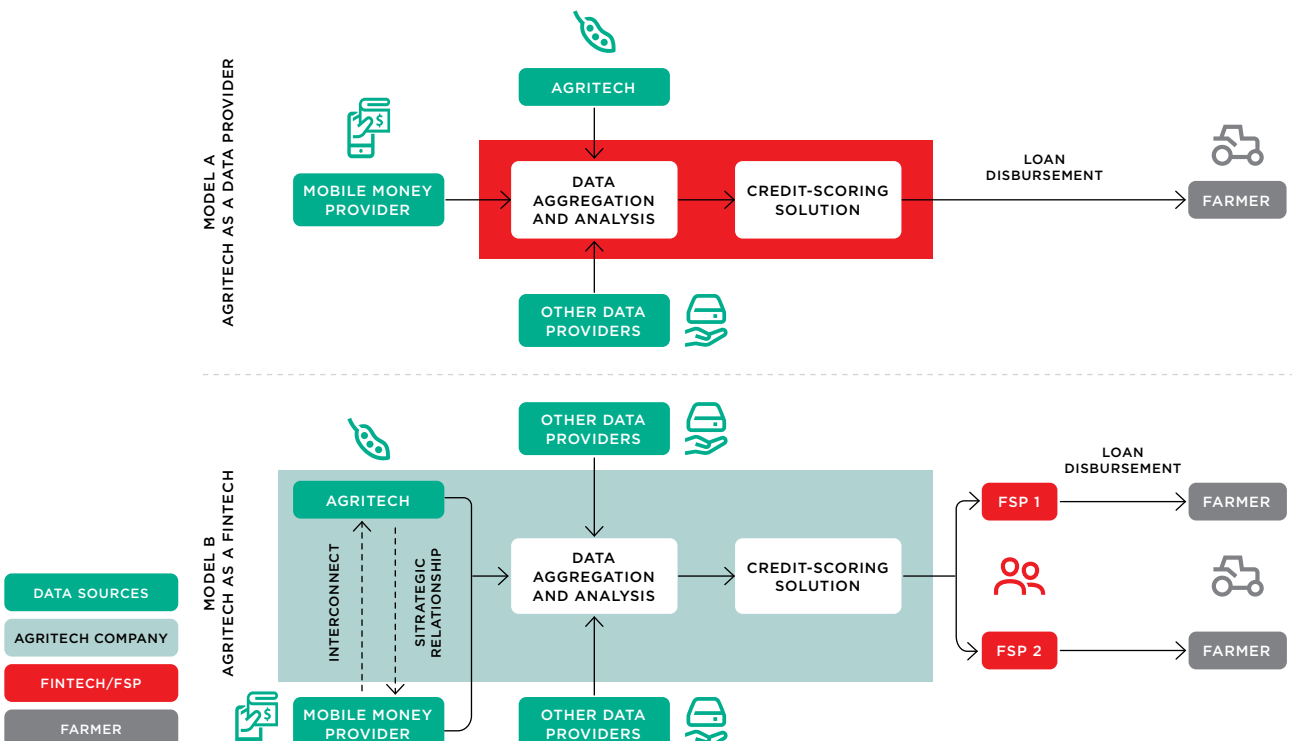
15 - Grow Asia (2018), "Digital credit scoring in agriculture: best practices of assessing credit risks in value chains". Available at: http://exchange.growasia.org/system/files/GA_Digital%20Scoring%20Guide_Double.pdf.

5.3 Agritech companies can play a proactive role in driving financial inclusion

The GSMA has identified two models that broadly describe the relationships agritech companies can form with FSPs to support credit scoring for farmers (Figure 16). Under the first model (Model A), an agritech integrates with an FSP to share data that can facilitate credit scoring (see Steps 1–3 in section 4.1). The partner FSP may reach out to other data providers for relevant data.

Alternatively, an agritech company can take a more proactive approach by aggregating and analysing data in-house. This allows the credit-scoring process to be completed with varying degrees of involvement from the agritech company (Model B). The credit-scoring solution can then be marketed to multiple FSPs. When an agritech company integrates mobile money, reliable transactional data can be shared on a farmer's regular sources of income.

FIGURE 16 | THE ROLE OF AGRITECH COMPANIES IN FARMER CREDIT SCORING: TWO MODELS



5.4 Case study: Agritech as a data provider – Myanmar MFI uses pre-KYC data captured during user registration on an agriculture app

Village Link's Htwet Toe app uses geodata to offer a real-time, weather-based advisory service for farmers and extension officers. In 2019, Village Link partnered with Maha Agriculture Microfinance to offer crop loans to farmers. When farmers register on the app, they are prompted to activate the GPS on their mobile device to capture their location in real time.

To apply for a loan, a farmer fills in a form on the app that, together with a set of pre-KYC data captured at registration (i.e. name, mobile number and location), are shared with the MFI for credit scoring. Loans are then disbursed to farmers in cash. To repay their loans, farmers use Ongo Mobile Money. Village Link stores transactional data generated during loan repayment, which can be used for farmer credit scoring in future loan applications.

5.5 Case study: Agritech as a fintech – Impact Terra explores innovative models in farmer credit scoring

In January 2019, Myanmar agritech company Impact Terra signed an agreement with the country's second largest MFI, Sathapana Bank, to develop a smallholder finance pilot scheme in Shan State. Through its Golden Paddy app, Impact Terra collected digital data on maize farmers, a subset of the 50,000 farmers registered on the app. Farmer data was either self-reported by farmers, captured during farmer registration on the app or originated in weather and agronomic advice sent to maize farmers during the growing season. With farmers' consent, Impact Terra analysed the data and then used the analysis to populate detailed profiles and segment farmer credit risk for Sathapana's crop loan (Figures 17 and 18). Detailed profiles fed into a customised farmer credit-scoring model that allowed farmers to apply for credit. During the pilot, 50 per cent of the maize farmers repaid their loans early, while the remaining 50 per cent repaid the loans at the agreed time.

FIGURE 17 | DIGITAL DATA USED TO POPULATE FARMER PROFILES

- CONTACT DETAILS (E.G. MOBILE NUMBER, ADDRESS)
- DEMOGRAPHICS (E.G. AGE, SEX)
- FARM PROFILE (E.G. ACREAGE, LOCATION)
- FARM PRODUCTIVITY AND INCOME (E.G. YIELD, CROP INCOME)
- FARM EXPENSES (E.G. SEED AND FERTILISER)
- FINANCING NEEDS

FIGURE 18 | CREDIT RISK SEGMENTATION FOR MAIZE FARMERS[16]

THE BUSINESS MAN	is a role model to other farmers. The farmer has been in the business for a while and has optimised their farming practices and is eager to invest their time in increasing performance.
THE ENTREPRENEUR	is a skilled farmer who has learned how to manage their farm properly and is actively growing and expanding their business, always on the lookout for the latest tech.
THE LEARNER	has been successfully farming for longer and is eager to learn new and improved methods to grow their business.
THE NEWCOMER	has just started growing crops meant for the market on a relatively more experienced farmers small piece of land.
THE SUBSISTENCE FARMER	grows crops for personal use; yields are used for survival and household needs with little to no surplus trade.

16 - This is the segmentation used by Impact Terra during the recent pilot (shared by Impact Terra).

6.1 Lessons and recommendations

1. **Agritech apps in Myanmar can capture a wide variety of data to create a pathway to financial inclusion for farmers.** Digital agriculture tools are capturing farm and farmer data during registration and farmer profiling, such as farm location, contact details and ID number. Through an app, additional data points can be stored, from data on agricultural activities to loan applications, recorded either by farmers or other sector stakeholders who use the app. The digital footprints these tools generate can help develop economic identities for smallholder farmers. When shared with FSPs, this data can be used to determine the creditworthiness of farmers and facilitate access to credit for more farmers (see section 5.5).

2. **In credit-scoring models, not all data is equal.** A variety of data points are proving useful for FSPs to verify the identity of the borrower, identify regular sources of income and alternative, non-farm sources of income for loss mitigation (see section 4.1). However, certain types of data are better at supporting credit scorecards and assessing the creditworthiness of farmers. For example, digital transactional data generated by mobile money use are extremely relevant and reliable for farmer credit scoring. However, in Myanmar, where mobile money is poorly integrated in agritech platforms, transactional records are often self-reported by farmers.

3. **Agritech companies can play a proactive role in farmer credit scoring.** As agritech companies in Myanmar recognise the role they can play in creating economic identities for farmers, there are two emerging business models that can help guide them in forming relationships with FSPs to support credit scoring. Under the first model, an agritech company integrates with an FSP to share data that can facilitate farmer credit scoring (see section 5.3). An alternative model envisages agritech companies proactively promoting data aggregation and analysis. Under this second model, agritech companies may need to develop advanced organisational capabilities, such as data processing and warehousing and business intelligence and analytics, to perform their role (see section 5.1).

4. **To extend their value proposition, agritech companies need to rethink their business model.** The potential of digital data to create a pathway to financial inclusion for farmers can create new revenue streams for agritech companies. To take advantage of the monetisation opportunities, companies must be bold and make the organisational changes needed to adapt their business model to address new threats and opportunities in their operating environment. With many agritech companies in the start-up phase, investor support may be needed to provide the financial backing to support radical changes. Being small can be an advantage for agritech start-ups as it allows them to employ an agile approach to customise solutions and develop sustainable and profitable business models.

6.2 Lessons and recommendations

5. **Agritech companies underwriting loans to farmers could face difficulties scaling up their farmer financing service.** For agritech companies, proactive involvement in farmer credit scoring may be the first step towards offering and underwriting loans to farmers directly. Although this may seem like a natural extension of their current role in Myanmar, there are challenges. Underwriting loans requires sufficient liquidity to address farmer demand for loans. It also requires agritech companies to acquire and retain a unique set of capabilities that fall outside their usual remit, such as the ability to develop custom credit-scoring models that comply with a range of regulations while also addressing customer needs.

6. **Loan product design must respect farmers' cash flow cycle and market conditions.** For FSPs in Myanmar, tapping into and reaping the benefits of unmet demand for credit in rural areas is highly dependent on their ability to build farmers' unique needs into the design of loan products. Farmers lack access to farming assets (e.g. machinery and irrigation systems) that have potential to increase yields and incomes. Agricultural production is seasonal by nature and leads to irregular cash inflows and outflows over the course of a year. Farmer financing must start building up shortly before sowing and peak at harvest time. After crops are harvested, farmers can sell them to repay loans taken during the growing season. With supply maxing out immediately after harvest, commodity prices are at their lowest. Loan products with longer loan periods and accessible repayment channels can result in higher adoption rates while misuse of loans can be mitigated through creative loan product design (see section 3.5).

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