



SERVING FEMALE SMALLHOLDER FARMERS' FINANCIAL NEEDS - DIGITAL INPUT CREDIT AND CREDIT SCORECARD DESIGN

Learnings from the evolution of DigiFarm input loan and credit scorecard

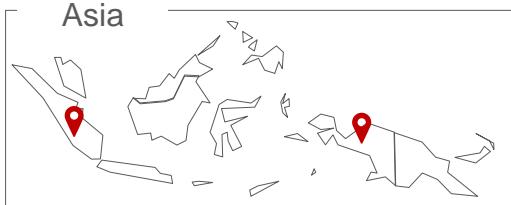
JULY 2021



MERCY CORPS | AGRIFIN

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About AgriFin



Countries

- Indonesia
- Nigeria
- Ethiopia
- Kenya
- Uganda
- Tanzania
- Zambia
- Zimbabwe

Mercy Corps' AgriFin programming (MCAF) represents USD 35 million in innovation funding from the Mastercard Foundation, Bill and Melinda Gates Foundation and the Swiss Development Corporation to support development, testing and scale of digitally-enabled services for smallholder farmers.

Our objective is to develop sustainable services that increase farmer income and productivity by 50%, with 50% outreach to women.

MCAF works as an innovation partner with private sector scale partners and such as banks, mobile network operators, agribusinesses, as well as technology innovators and governments committed to serving smallholders at scale.

We help our partners develop, test and scale bundles of digitally-enabled financial and non-financial services supporting partnership development between market actors that leverage their strengths.

We combine MCAF team expertise with strategic subsidy to jointly implement iterative, fail-fast engagements with partners on a cost-share basis, sharing public learnings to drive market ecosystem growth.

Since 2015, we have completed more than 200 engagements with over 120 partners across Africa.

With the onset of the Desert Locust in East Africa, the Skoll Foundation funded AgriFin's first emergency response work leveraging digital tools.

With this support, AgriFin now reaches more than 8 million smallholders

This report leverages lessons learnt from the evolution of the digital input loan and credit scorecard to better serve women smallholders' financial needs

Context

- The agriculture sector in Africa has been facing productivity challenges over the past decades due to issues around markets, infrastructure, and exclusion. These challenges have a disproportionate impact on smallholder farmers (SHFs) who are also the most underserved group by financial services, with women at a particular disadvantage.
- Digital credit products have emerged as a potential scale pathway to reach SHFs, especially women smallholders, with affordable, accessible, tailored financial products and services at low costs.

Objectives

The Digital Input Credit and Credit Scorecard case study captures lessons from evaluations of evolution of Digifarm's digital input loan product and credit scorecard. It aims to answer the following key learning questions.

- 1 *How can digital loan products be designed to increase applications, redemptions, and repayments among women smallholders?*
- 2 *How can digital credit scorecards de-bias financial service provision among women smallholders?*
- 3 *How can product engagement and implementation be improved to better serve women smallholders?*
- 4 *What role can data play in designing better credit products for women?*

Digifarm input loans have provided credit to over 5000 women smallholders, supporting their farming practice and enhancing agency

Overall relevance for women SHF's financial needs

Insights

- Digifarm's digital input loan products were able to reach a significant number of women smallholders' Kenya over the two-year period under study:
 - Through its activation and customer mobilization drives, Digifarm was able to attract 46,000 applications for loan products from women smallholders
 - Almost 12,000 applications from women smallholders were approved for loans during the two-year period under study
 - Over 5,400 loans by women smallholders were redeemed, giving them easy access to high-quality and certified inputs to support and improve their farming practice
- Overall, the repayment behavior of women smallholders were similar to that of men
 - There were no significant differences in the non-repayment rates of women and men smallholders
 - Women had higher delayed repayment rates than men in some months, however they did eventually repay
- The input loan product in its design and implementation supported women in their livelihoods¹:
 - Improved yields and productivity through increased access to quality inputs
 - Increased incomes through guaranteed markets for produce
 - Increased disposable cash for other needs as digital loans require smaller down payments to access
 - Greater control over finances and financial decision making as sales from produce are sent directly to women's cell phones
 - Greater trust from domestic partners to make agricultural and financial decisions at home

Women were less likely to apply for or redeem approved loans. Improving design and product engagement features could enhance women's uptake

Loan uptake including applications, approvals and redemption

Insights

- **Loan applications** by women farmers are lower than those by men. Potential key drivers include:
 - Low awareness / negative perception about loan
 - Lower digital literacy among women
 - Limited agency to make autonomous financial decision; and
 - The nature of the product acquisition drives – during fairs, market days, and exhibitions which are attended more by men farmers
- There were no significant gender differences in **loan approval rates** between men and women. But women were approved for lower credit limits due to risk adjusted credit limits based on data on mobile money turnover and mobile network usage which were lower for women
- **Loan redemptions** by women farmers are lower than men farmers, likely due to
 - Mobility constraints and time poverty which does not allow women farmers to visit distant input depots, visit multiple stores, or the same store multiple times in case of late input delivery
 - Limited agency, especially the need for spousal consent before withdrawing a debt

Recommendations

Product design features:

- Ensure to explain digital input loan features, including flexible repayments to convince women of their benefits and address negative perceptions
- Embed longer lead time for women's decision making and spousal consent
 - Increase the product lead and promotion time before the planting season
 - Extend timelines for loan redemption
 - Follow up post approval / pre-redemption to understand any pain points and barriers
- Increase vendor partners and align loan approval with input access and stocks to address women's mobility and time constraints

Product engagement features:

- Incorporate DVA support to engage male spouses and household heads during loan registration and application processes
- Incorporate DVA support to engage women with lower levels of digital literacy
- Explore more gender inclusive acquisition processes (e.g., in selection of location or timing of acquisition drives)

Evaluation of the DigiFarm input loan product generated several key learnings on the barriers women face to meaningfully engage with financial services

Loan repayment

Insights

- **Non-repayment** rates were about the same between men and women farmers
 - Yet, women were more likely to delay their repayment (while many end up repaying) than men, potentially due to other financial obligations such as education or medical expenses
- Non-repayments do not appear to be associated with credit scorecard use (and hence borrower selection), rather has been found to be related to other factors associated with loan product design, customer acquisition, technology failures, and other exogenous market and climatic factors
 - Non-repayments (both delays in repayments and complete non-repayments) are primarily related to the **tenor of the loan** (short term loans are more likely to be misaligned with crop cycles and cause late repayments or defaults) and **influenced by external gender agnostic factors** (crop failures due to drought, market price volatility)

Recommendations

Product design features:

- Ensure loan tenors are appropriately aligned to crop cycles to reduce the probability of default
- Introduce flexible repayment schedules which are especially useful for women given their other household financial obligations
- Introduce bundled crop insurance products (already in place for Digifarm as mandatory insurance products)
- Ensure loans that are approved are linked to value chains where farmers have prior experience
- In case of loans given to farmers cultivating certain crops for the first time, there is a need to support them with field agents / DVAs with necessary agronomy training
- Loan products can be developed with smart guarantee facilities (with a core focus on gender) and crop insurance to bring equitable financing to women smallholders and reduce lending risk

Collection, analysis, and use of gender disaggregated data can also support creation of financial products and services that cater to women's needs

Insights

Gender disaggregated data collection and use

- Gender disaggregated data is collected to some extent but not sufficiently nor consistently across stages of the loan customer journey, with limited use for strategic decision making for more gender transformative products
- Data on gender was not used in the credit scorecard construction, and gender impacts were not considered in the credit scorecard design

Recommendations

- Develop a framework and process to collect and analyze gender disaggregated data
- Gender fairness in credit scorecard based digital lending can be improved by:
 - Investigating whether credit scorecard characteristics may mis-estimate the risk to lending to women and adjust for the same
 - Regularly monitoring data to understand if the scorecard characteristics mis-represent the observed data
 - Supplement scorecard-based credit decisions with policies to improve gender transformative lending policies based on data on women's needs, collateral assets, etc.
- Women smallholders indicate a need for tailored savings products, especially to support household financial management. Provision of such services can also support collection of gendered data on financial and savings behavior which can be used to further develop tailored credit products.

Overview of the digital loan product

What are the loan solutions under consideration?

With Mercy Corps AgriFin's support, DigiFarm launched a digital input loan product for smallholders in end-2017 which evolved over the next two years



Overview of the digital input loan product

- DigiFarm launched a digital input loan product for smallholders in December 2017. From the pilot to December 2019 the **offering expanded to include 4 loan products** (30-day, 60-day, 90-day and 120-day) and to **service a variety of farmers across crop and dairy value chains**.
- **FarmDrive and iProcure were key partners** involved in the implementation of the input loans. FarmDrive supported with a digital credit scorecard creation which was used for risk-adjusted credit limit setting and iProcure supported with input provision. During this period FarmDrive was also responsible for on-ground implementation of the loan.
- The DigiFarm input loan product went through **4 different phases of evolution** over the two years:
 - **Phase I** – provision of 30-day digital input loans for dairy farmers
 - **Phase II** – provision of 30-day, 60-day, 90-day digital input loans to dairy, crop and mixed farmers
 - **Phase III** – provision of 30-day, 60-day, 90-day digital input loans and 120-day digital market linked input loans to dairy, crop and mixed farmers with a stronger focus on crop farmers
 - **Phase IV** - provision of 30-day, 60-day, 90-day digital input loans and 120-day digital market linked input loans to dairy, crop and mixed farmers with a stronger focus on crop farmers, along with a mandatory crop insurance bundled into the offering

Note:** Details will be available in a research paper pending publication in July 2021 by CGAP and Dean Caire, CFA

Source: FarmDrive data, Evaluation of DigiFarm Input Loan Pilot, Dalberg analysis, Digitally-Enabled Agri-Business Models for Gender Inclusion: Betting on Women, 2021

The input loan customer journey was analyzed over the 2-year DigiFarm loan period to derive insights on designing gender inclusive financial products

DIGIFARM INPUT LOAN CUSTOMER JOURNEY



DigiFarm registration

Farmer uses cell phone to register on the DigiFarm platform



Loan application

Farmer applies for a loan product and gets a confirmation message on their DigiFarm application



Loan approval

Farmer receives a voucher on their cellphone upon loan approval to redeem for inputs

KEY LEARNING AREAS

- *How can digital loan products be designed to increase applications among women smallholders?*
- *How can digital loan product acquisition and registration processes be designed and delivered to encourage applications by women smallholders?*
- *How can digital credit scorecards be designed and implemented to debias lending decisions against women smallholders?*
- *How can digital credit products and their engagement be designed to improve redemption by women smallholders?*
- *How can digital credit products be designed to encourage repayment by women smallholders?*

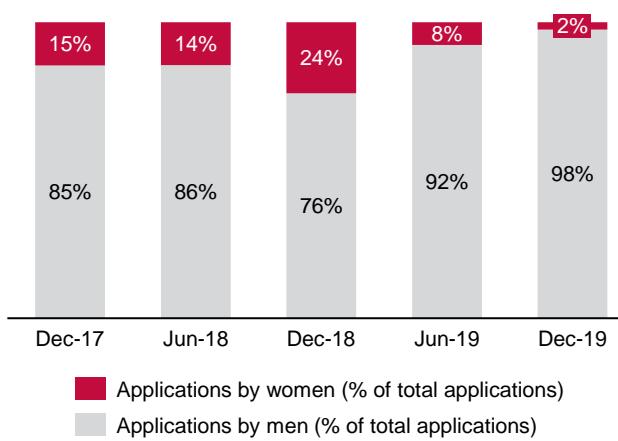
Key insights

How can digital credit scoring and digital loan products support more gender inclusive finance?



Applications: Women farmers have significantly lower loan application rates due to structural barriers, gender unintentional acquisition features

Digifarm loan applications by gender, as percentage of total applications, by month (%)



While applications by women farmers increased in absolute numbers over the digital loan product evolution, men's application rates consistently outpaced women's by **over 8 times**

Loan applications by women smallholders were much lower than those by men smallholders due to structural barriers and loan acquisition features:

- Barriers such as **lack of or limited digital literacy and savviness** hindered some segments of women from engaging with digital loan products effectively
 - Prior behavioral research shows that women who are 'low' or 'average' users of digital products are more likely to have limited awareness and low engagement during the customer loan journey
- **Lack of agency and decision-making power** led to a significant proportion of women not making autonomous decisions on financial services and relying on spousal consent to apply for credit products.
 - Anecdotal evidence indicates that driven by norms around gender roles and responsibilities women often feel the need to consult their spouses or male household head before taking on financial obligations
- Product acquisition features such as **conducting drives on 'market days'** have the potential to bias applications against women smallholders
 - Women's time and mobility constraints are a barrier to women's attendance of the exhibitions and market days, and their caretaker roles often require them to remain close to their households
 - In farmer groups, men sometimes self-select to attend these exhibitions, fairs, and market days



Applications: Loan applications by women farmers can be encouraged through increased spousal engagement and awareness raising support

Digital input loan products can be designed to be more gender transformative by understanding the pain points of female farmer borrowers, creating interventions across their customer journey, and establishing helpful touch points.



Recommendations for product design features

Increase the product lead and promotion time before the planting season

- Longer promotion and lead time before planting seasons can help women who have high risk aversion, gather evidence supporting the benefits of input loans from friends and neighbors to reach a decision for themselves
- A longer lead time would also provide women a chance to discuss with their spouses or household heads and gain approval if needed, and apply for the input loan before planting
- Introduce features like chatbots in the mobile applications which can send automated follow-ups, feedback questions, and link to support to ease the application process



Recommendations for product engagement features

Incorporate support of DigiFarm Village Advisor (DVA) to engage during registration and application phase of the loan

- DigiFarm Village Advisors (DVAs) can support women who have lower digital literacy levels compared to men, to register and engage with the platform, through features like IVR
- Increased DVA engagement can help increase awareness among women about digital input loans and their benefits. DVAs can also engage spouses or household heads as they may have significant input or agency over the primary borrower's decision-making
- Provide training to DVAs to sensitize them around prevalent social norms which lead to designated gender roles and barriers for women to access financial services



Approval: While for DigiFarm loans credit scorecard use was limited to credit limit assignment, they have the potential to further gender financial inclusion



Insights

- DigiFarm's digital input loan product utilized the FarmDrive credit score (along with M-Pesa wallet usage) to set risk adjusted credit limits, not for approval decisions. As such there was **no significant variation between the approval rates for men and women smallholders**.
- **Women smallholders were approved for lower credit limits (on average) compared to men smallholders.** This was due to setting risk-adjusted credit limits primarily based on mobile money turnover (as a proxy for disposable income)¹. Women applying for DigiFarm loans, specifically, but also more generally, tend to have lower network usage than men².



Recommendations for credit scorecard development and use

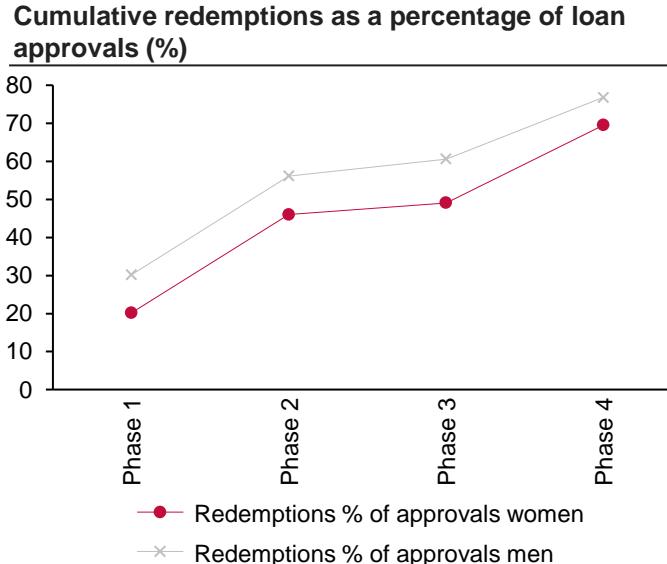
- Credit scorecard development can benefit greatly from **data sharing partnerships** between organizations collecting digital agriculture data of varying categories³ which would require overcoming barriers around capacity building to collect and analyze data and private commercial concerns around data, among others.
- **Credit scorecards and their underlying algorithms should be assessed periodically to understand if there are any adverse effects on gender groups.** This can be done by sub-setting data by gender and monitoring the relationships of each scorecard characteristic to repayment data. This analysis would inform whether scorecard points adequately reflect risk by gender. This would however as a first step require robust gender disaggregated data collection.
- **Credit scoring models can facilitate consistent and transparent treatment of female smallholder borrowers and align with financial and gender inclusion goals.**
 - If there is data on indicators which have driven gender bias historically, those can be corrected for in a model. However, that does require historical knowledge and data on borrowings.
 - Gender transformative lending policies (such as different limits for women farmers, less conservative collateral requirements for women farmers, etc.) can be built into a credit scorecard model

Note:** for further details on the scorecard evolution refer to document pending publication in July 2021 by CGAP and Dean Caire, CFA

Source: (1) Refer to the annex for more details on the credit scorecard (2) [Mobile Gender Gap: Africa, GSMA](#), FarmDrive DigiFarm data, (3) [Digital data sharing in agriculture: Mercy Corps Agrifin case study, 2020](#)



Redemptions: Women have lower redemption rates compared to men, due to product design features exacerbated by gender-specific structural barriers



While redemption rates by women farmers increased over the digital loan product evolution, they consistently remained **lower than those of men**

Loan redemptions by women smallholders were at much lower rates than those by men smallholders due to structural barriers and loan redemption features:

- Barriers such as **time poverty** and **mobility constraints** faced by women smallholders hinder their ability to redeem input vouchers the same way as their male counterparts can
 - In the scenario of few and far input stores or agrovets to redeem input loans, women's time and mobility constraints **limit their ability to go to distant agrovets** to redeem their loans
 - Women often do not have **access to or ownership of modes of transportation** (bicycles or boda-bodas) that can be used to shorten travel times and carry inputs
 - In the case of frequent stock outs at agrovets, women are less likely to be able to check or compare sufficient and preferred stocks at different agrovets compared to men. If they find stock outs or delayed inputs at the closest store, women's time constraints inhibit them from checking multiple times when preferred inputs have been restocked
- Structural barriers such as **low agency to redeem loans without spousal consent** also reduce the redemption rates for women
 - In scenarios which women have not had sufficient lead time to discuss with their partners before applying for the loan, they may be wary of the consequences of redeeming it without agreement from their spouses first



Redemptions: Loan redemptions by female farmers can be improved by addressing structural barriers like time poverty and spousal consent

Digital input loan products can be **designed to be more gender transformative by understanding the pain points of female farmer borrowers**, creating interventions across their customer journey, and establishing helpful touch points. At the redemption stage, a better understanding of what specifically prevents women farmers from redeeming their loans, whether it is time poverty, mobility, or a combination of factors- is needed to address their concerns and pain points



Recommendations for product design features

Extend timelines for input redemption

- Longer timelines for input redemption can allow for spousal consent, if needed

Increase vendor partners and input stock

- Ensure sufficient coverage of input vendors before extending approval offers
- Ensure sufficient stock of inputs before the planting season, especially those in high demand



Recommendations for product engagement features

Incorporate support of DigiFarm Village Advisor (DVA) to engage during and after redemption

- DigiFarm Village Advisor (DVA) can **support continued engagement of spouses or household heads**
- **DVAs can also help reduce women's mobility and time constraints** by contacting or calling women with approved loans and offer to deliver inputs or provide details on when inputs can be collected
- Support understanding of the redemption process and **create awareness on various kinds of inputs that can be used**, in case preferred inputs are out of stock
- **Continuous engagement with women** through digital channels to understand their user experience and journey and highlight any barriers and pain points



Repayment: Repayment rates were about the same between men and women, while women were more likely to delay on repayment. Default or late payment were often related to crop failure or market volatility, or short tenure

Insights

- There was no significant differences observed in the trends of non-performing assets between men and women smallholder farmers over the period under observation
- Late repayments were more common in the shorter-term tenors. Generally, the arrears rate of men and women smallholders trended similarly at a portfolio level, in periods of spike in total arrears, women smallholders had a higher arrear rate than men. Potential reasons behind women repaying later than men include competing financial obligations (such as education and medical expenses), mostly growing subsistence crops (which tend to have lower margins), and lack of relationships with buyers and market linkages (which may cause them to take longer to sell their harvests).
- DigiFarm input loan product defaults can be attributed to product design features (shorter tenor) and exogenous factors (crop failure due to droughts, market price crashes and volatility)
 - In the cases of crop failure, a primary concern was that farmers were growing a new crop type in the region and had little prior experience or external support
 - In cases of price volatility, a primary concern was buyers' refusal to buy the produce at pre-agreed upon prices established before planting and farmers could not side-sell to other off-takers due to attached penalties
- Smallholders who borrowed short term loans were likely to continuously ask for loan extension terms
- Technology failures (such as application not working during repayment period, application not sending reminders) also contributed to delayed / no repayments in certain instances



Repayment: While crop failure driven defaults are gender agnostic; loan products with flexible repayment terms can support women farmers who tend to delay on repayment



Recommendations for product design features

Ensure loan tenors are appropriately aligned with crop cycles

- Loan tenors should be aligned appropriately to the various value chains across regions to allow smallholders to have sufficient time post harvest to sell produce and repay the loans

Introduce flexible repayment schedules, especially to support women farmers. This new product can be introduced at a cost and conveyed to the borrowers

- Data from this study and prior research show that women are generally loyal borrowers and do repay their debts. Higher late repayments by women can be partially attributed to them having competing financial and caretaking obligations such as paying school fees or providing for medical emergencies. It is also likely that women farmers have more than one loan with informal savings and lending associations and late repayments are caused by them managing these multiple portfolios.

Raise awareness and educate farmers about existing flexible repayment opportunities

- Encourage them to put surplus earnings towards the loan and good financial and debt-management practices

More generally for both genders, ensure loans are approved for crops where farmers have prior knowledge and experience, or provide support to create the knowledge

- Loan approvals need to be approached with caution for crops where farmers don't have prior experience in growing them combined with no support from DVAs or field extension officers. Where farmers are planting new crops and are seeking loans, field agents and DVAs should support with training and digital learning tools. Should loans be given out to expand the portfolio of crops, the product should be bundled with adequate access to agronomy training and support to grow the crop and get good yields



Repayment: While crop failure driven defaults are gender agnostic; loans with linked insurance products can support both farmers and loan providers



Recommendations for product design features

Introduce bundled crop insurance products to protect farmers and loan providers in the event of defaults driven by crop failures

- From mid 2019 Digifarm introduced a mandatory insurance product that was linked to the 120-day loan

Build awareness about the benefits of an insurance and the related processes

- Understanding and accessing the benefits of insurance can be complex, especially for those with no prior experience with such products. This constraint is especially acute for women smallholders who may have comparatively less time, skills or relationships to fully understand a new product or pursue claims¹. This requires in-person training, preferably through groups that women are more comfortable in (such as savings groups) during the pre-season to provide information and simplification around the value proposition of insurance products.
- There continues to be a low awareness around insurance products and their benefits. As such, DVAs can be trained to engage and provide information to smallholders as trusted advisors on the benefits of purchasing insurance or applying for loans which have an attached crop insurance feature

Partnerships with climate-based information and advisory service providers

- Financial service providers dealing with women smallholders can also forge partnerships with climate-based information and advisory service providers that leverage satellite and sensor data to provide early warnings around potential climate events which can lead to crop failures and potentially either prevent or mitigate losses

Ensure backend technologies are robust to support repayments by farmers

While collecting gender disaggregated data is an important first step; it is crucial to use it for gender analysis and tailor products towards women

Agriculture has one of the more significant gender gaps and disparities across the globe compared to other parts of the economy, yet it is also one of the less documented ones. Collecting and documenting gender disaggregated data for an input loan product along various indicators such as access to productive resources, agriculture household sizes, other income generating activities, time and labour distribution, etc. can contribute towards a better understanding of the pain points, needs and behaviors of women and design products for them.



Insights on gender disaggregated data and analysis

- Digifarm collected basic gender and demographic information on borrowers across stages of the loan.
- There was little utilization of the gender disaggregated data to make business decisions such as changing credit limits for women or understanding delayed repayment rates to adjust loan schedules or increase awareness around flexible repayment options.



Recommendations for gender disaggregated data collection and analysis

Develop a framework and process to collect and analyze gender disaggregated data

- Fields for gender disaggregated data should be made available during the loan application, approval, redemption and repayment stages, i.e., loan providers should be able to track the progress of the loans and quality of loan portfolio by filtering on men or women borrowers
- Gender disaggregated data indicators should cover diverse and varied realities of women borrowers - for example, instead of just focusing on the gender and demographic characteristics of the borrower, knowing the number of dependents (older family members, dependents) can indicate the level of time poverty and other financial obligations women borrowers can potentially face.
- Gender disaggregated data should not just be limited to issues or topics that are generally perceived to impact a given gender but also cover seemingly neutral topics such as climate change induced crop failures which can potentially have a more adverse impact on women's repayment rates.

Annex

Key features of FarmDrive credit scoring model

FarmDrive used a 6-feature scorecard that is similar to Kenyan banks' models for their digital lending consumer 'nano-loan' (very small amounts) products. The table below summarizes the scorecard characteristics and their modelled relationship to credit risk :

Description	Relationship to risk
Number of months on Safaricom network	Higher number of days indicate lower risk
Number of months on M-Pesa	Higher number of months indicate lower risk
Total number of paybill transactions over the last 6 months	Higher number of Paybill transactions indicate lower risk
Number of P2P recipients sent money from this wallet in the 6 months period	Higher number of send acceptors indicate lower risk
Airtime utilized over the last 6 months	Higher value of airtime utilized indicate lower risk
M-Pesa received amount + M-Pesa deposit amount + Total bank transactions B2C + Other receipts	Higher value of mobile money credit transactions indicate higher ability to pay a loan

Primary sources

DigiSoko Loan Product: HCD Assessment insights and recommendations, AgriFin Accelerate and Dalberg (September 2018)

Evaluation of DigiFarm Input Loan Pilot, AgriFin Accelerate and Dalberg (November 2018)

Digital Input Credit Case Study, AgriFin Accelerate and Dalberg (April 2019)

Digitally Enabled Agri-Business Models for Gender Inclusion, AgriFin Accelerate and Bill and Melinda Gates Foundation (February 2021)

Mercy Corps AgriFin: Gender Impact Assessment DigiFarm, AgriFin Accelerate (March 2021)

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