Digital Agri Hub

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Reaching and Empowering Women with Digital Solutions in the Agricultural Last Mile

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Digital Agri Hub

Digital Agri Hub strives to build a sustainable digital agriculture (D4Ag) landscape towards agriculture transformation in low- and middle-income countries (LMICs).

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Introduction

In low- and middle-income countries (LMICs), the digitisation of agricultural value chains is enabling access to markets, assets and services for smallholder farmers. Digital agriculture (D4Ag) solutions, such as digital payments and digital procurement, create efficiencies for both agribusinesses and farmers in the last mile.[1] Digital procurement solutions can generate a range of records, including farmers' production data that enable the creation of economic identities and help them access finance.[2] Digital procurement solutions can also be bundled with digital advisory services that provide farmers with vital information on new farming techniques, weather forecasts and crop production.

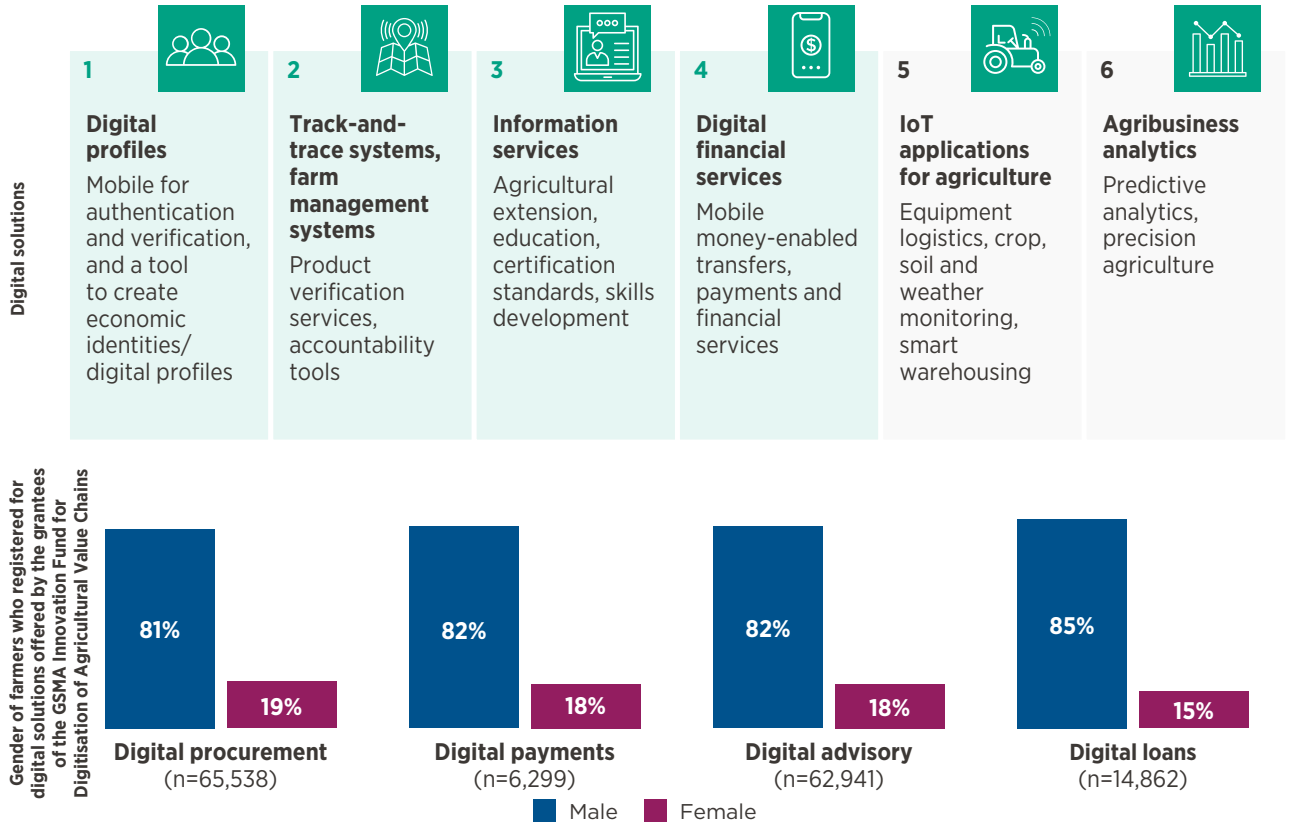
Yet, women farmers are being left behind. Although they represent 43 per cent of the agricultural labour force, women face social and structural barriers that typically relegate them to traditional, low-value and labour-intensive activities, such as plowing, sowing and harvesting.[3] Restrictive social norms, lack of access to resources and the mobile gender gap all make it more challenging for women to participate fully in agricultural value chains and embrace the digital agriculture solutions that can connect them to markets and services and strengthen their decision-making power.[4]

The GSMA AgriTech programme supports the digitisation of the agricultural last mile through the GSMA Innovation Fund for Digitisation of Agricultural Value Chains.[5] The fund supports seven D4Ag providers to scale up digital solutions for the agricultural last mile through four main use cases: digital profiles, track-and-trace and farm management systems, information services and digital financial services. However, in all the last-mile digitisation projects currently implemented by the GSMA and our partners, less than a quarter of D4Ag registered farmers are women (see Figure 1).

1 In agricultural value chains, the "last mile" is the web of relationships and transactions between buyers of crops, such as agribusinesses, cooperatives and intermediaries, and the farmers who produce and sell the crops.
2 Economic identities are a form of functional identity that enables financial institutions to use innovative credit-scoring models that assess the credit risk of previously unbanked farmers and their ability to repay loans. See: GSMA. (2020). GSMA AgriTech Toolkit for the Digitisation of Agricultural Value Chains.
3 Food and Agriculture Organization of the United Nations (FAO). (2011). Women in Agriculture: Closing the Gender Gap for Development.
4 FAO. (2018). Gender and ICTs: Mainstreaming Gender in the Use of Information and Communication Technologies (ICTs) for Agriculture and Rural Development.
5 The GSMA Innovation Fund for Digitisation of Agricultural Value Chains was launched in 2019 with financial support from UK Aid and intends to improve smallholders' income and climate resilience through the adoption and regular use of digital services.

Figure 1

Digital solutions in the agricultural last mile



Source: GSMA (data as of March 2022)

To address the social and structural barriers that women face, D4Ag interventions need to be guided by a gender-inclusive approach. Many interventions simply do not reach women because they overlook the fact that women are overworked, face mobility restrictions or do not own a mobile phone. Sometimes, interventions do not take women's literacy into account, including the ability to read and write, understand finance or navigate digital tools.[6] These gender-blind approaches risk excluding and marginalising women even more and can have harmful consequences for food systems and the environment.

Box 1

Defining a gender-inclusive approach

In this document, a gender-inclusive approach means applying a gender perspective (or gender lens) to the preparation, design, implementation and evaluation of agricultural interventions, with a view to promote gender equality between men and women. Gender inclusivity encompasses approaches that are gender sensitive (acknowledge gender issues), gender specific (address men's and women's needs) and gender transformative (address the root causes of discrimination). This is in contrast to a gender-blind approach, which does not differentiate between the needs of men and women, and a gender-negative approach that exacerbates gender discrimination and bias.

6 Criado Perez, C. (2019). Invisible Women, Exposing Data Bias in a World Designed for Men. Vintage.

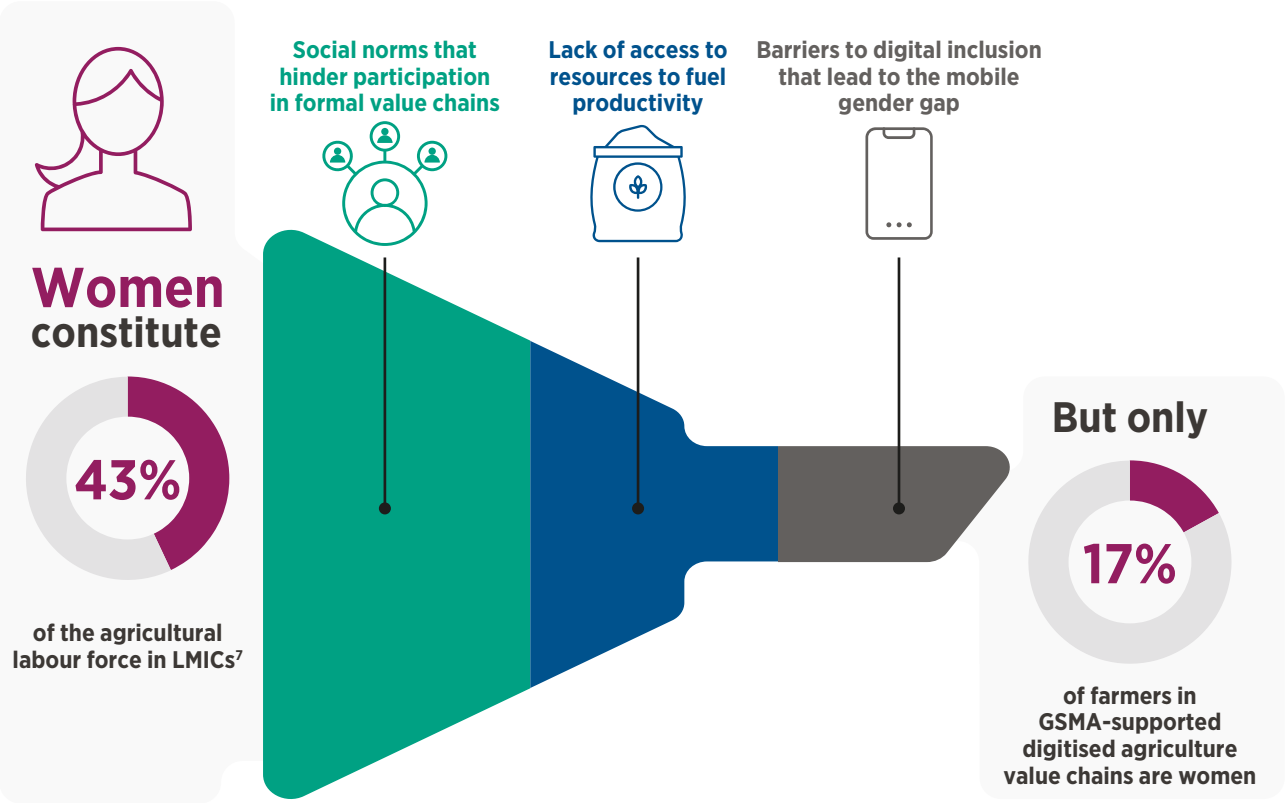
The objective of this document is to examine the limited participation of women in digitised agricultural value chains by identifying the main barriers for women in D4Ag initiatives, and shedding light on best practices to increase women's participation and empowerment in these value chains. The insights and recommendations are aimed mainly at donors and investors, who are uniquely positioned to support gender-inclusive interventions, to help them identify existing barriers and what is still needed to promote gender equity in digitised agricultural value chains. The recommendations are based on the data and experience of the Digital Agri Hub, the GSMA and GSMA grantees, key expert interviews with agriculture and gender experts, interviews with D4Ag practitioners and an extensive literature review.

The barriers facing women in digitised agricultural value chains

Women face three main barriers to participating in, and reaping the benefits of, digitised agricultural value chains: 1) social norms; 2) lack of access to resources to fuel productivity and increase yields; and 3) barriers to digital inclusion that contribute to the mobile gender gap (see Figure 2).

Figure 2

Barriers to women's participation in digitised agricultural value chains



Source: International Labour Organization (ILO); GSMA Innovation Fund for Digitisation of Agricultural Value Chain (n=497,575 farmers).

Social norms

IN BRIEF

Social norms often preclude women from participating in formal agricultural value chains. In many settings across LMICs, men are traditionally heads of households and primary land owners with formal relationships with crop buyers, such as agribusinesses and cooperatives. Women's contribution is typically relegated to agricultural labour, including planting, cultivating and harvesting. In these contexts, women lack a voice and the decision-making power to be truly empowered to participate, which ultimately renders them invisible in agricultural value chains.

Gender and social norms prescribe which activities and behaviours are acceptable for women farmers, including the crops they grow and the value chains they work in.[8] Although women contribute to commercial agricultural production, either on their own family farm or as employees, they are usually left out of the most profitable part of the value chains.[9] Research by the International Women's Coffee Alliance (IWCA) shows that "women do practically all the agricultural work up until the product is taken to market, but have little participation in actually selling the coffee".[10] Although women do most of the field work, men are deemed to own the produce and the profits. For example, in the cocoa value chain in Côte d'Ivoire, women make up 68 per cent of the farming workforce, but earn only 21 per cent of the income generated.[11]

7 The International Labour Organization (ILO) defines the agricultural labour force as "those persons of working age who are actively engaged in the agriculture labour market. It is the sum of persons employed and the unemployed." See: ILO. (2020). Rural and urban labour markets: Different challenges for promoting decent work. Spotlight on Work Statistics, No. 11.
8 Centre for Agriculture and Biosciences International (CABI). (18 March 2021). "Gender-Related Social Norms and How They Affect Women's Futures in Agriculture". Agrilinks.
9 USAID. (2021). A Briefer: Gender Inequality Causes Poverty.
10 Ibid.
11 Garbarino, S., Duggan, A. and Beevers, K. (2022). "The Power of Women in Cocoa: Supporting Female Farmers Could Boost Liberia's Access to Lucrative Premium Markets". NextBillion.

It is worth noting that women's participation in formal agricultural value chains varies depending on the context and the value chain. There are scenarios in which women farmers own the production (most often low-value and subsistence crops) and play the primary role in commercial procurement. In traditionally women-owned value chains, such as the shea value chain in Ghana, all sellers are women. However, social norms often discourage them from engaging with men and maintaining a social network outside their families. This challenges their ability to interact with formal market players and form commercial relationships with crop buyers.

Social and gender norms limit women farmers' time and mobility. Culturally, men are typically heads of households with the duty to control resources and make decisions, while women are usually expected to care for children, fetch water, cook and work in their male family members' fields.[12] It is estimated that women spend around 60 per cent of their working time on unpaid activities (domestic and care work) while men only spend 23 per cent of their time on the same tasks.[13] All this unpaid work limits the time that women farmers can dedicate to finding quality inputs and resources, information and buyers. Women's lack of mobility is also a major logistical challenge to engaging in the last mile.[14] Women find it challenging to commute to collection points as they often do not have the tools nor the means to transport their merchandise to agribusinesses. This typically increases their reliance on intermediaries, which offer less advantageous commercial terms. In more conservative settings, women might not even be allowed to leave the farm and are restricted to the vicinity of their homes or villages, making it difficult to access local markets.

Social norms are reflected in land ownership policies that deny land ownership to women, which is the biggest limiting factor for women in agriculture. In most LMICs, men traditionally inherit or have the resources to own land. According to the FAO, women represent less than 15 per cent of all agricultural landholders.[15] Yet, land ownership is strongly correlated with access to markets, as it is usually required to access agribusiness capital and support systems such as cooperatives. When women do not own land, they are likely to have little or no decision-making power over agricultural production.

Lack of access to resources

IN BRIEF

Even when women farmers have commercial relationships with buyers in formal value chains, for example, by joining a women-led value chain or cooperative, they often face barriers to accessing resources. For example, they may struggle to access: markets to sell their produce; advisory services to learn new techniques and receive market and weather information; agri digital financial services (DFS) to receive capital and risk protection; and inputs and assets to increase productivity.

Even when women do supply agribusinesses and cooperatives as the primary farmer – usually because they inherited a field or participate in women-led value chains – they often lack access to resources to invest in their land, making them less productive than male farmers. Numerous studies have found a gender gap in agricultural productivity. Research by UN Women in six countries quantified gender gaps in agricultural productivity that ranged from 11 per cent in Ethiopia to 28 per cent in Malawi.[16]

Low access to resources and equipment are key reasons why women in agricultural value chains usually produce and earn less. Women farmers find it difficult to afford and source quality agricultural inputs that can increase yields, such as seeds and fertilisers. Farm equipment that would enable mechanisation and automation of on-farm activities (tractors, storage, irrigation systems, etc.) remains largely inaccessible to women farmers. Low access to resources is mainly driven by structural constraints, such as a lack of

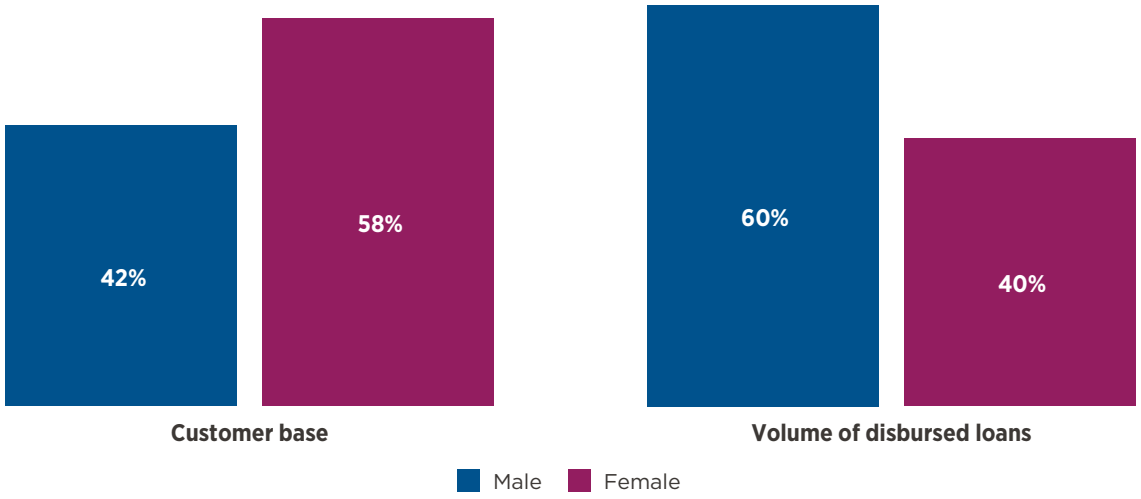
12 International Food Policy Research Institute. (2021). Gender equality, women's empowerment, and food systems: Consensus and gaps in the literature.
13 Chmielewski, M. (21 May 2019). "Advancing Women's Empowerment in Agriculture: Sharing Our Vision". Agrilinks.
14 International Food Policy Research Institute. (2021). Gender equality, women's empowerment, and food systems: Consensus and gaps in the literature.
15 FAO. (2018). The Gender Gap in Land Rights; FAO Gender and Land Rights Database.
16 Rodgers, Y. and Akram-Lodhi, H. (2021). The gender gap in agricultural productivity in sub-Saharan Africa: Causes, costs and solutions. Policy Brief 11. UN Women.

identity documents (ID) and access to capital or education. The FAO estimates that if women farmers had the same access to productive technologies and resources as men, their yields could increase by 30 per cent.[17]

Women face challenges accessing financial services other than those provided by value chain actors or informal mechanisms. This limits their ability to invest in their farm and improve their productivity. In LMICs, only 22 per cent of bank account holders in rural areas are women.[18] Even when women can access financing, loan amounts are generally lower than what men receive. For example, Fin'elle, a microfinance institution (MFI) in Côte d'Ivoire that purposely targets women farmers, is reaching a clientele that is mostly female (58 per cent of clients are women), but 60 per cent of their loan portfolio (by volume) still goes to men (see Figure 3). This financial divide is due to women not having collateral (e.g. land) and it is amplified by issues such as low financial literacy, lack of formal documentation and restricted mobility.[19]

Figure 3

Fin'elle gender-disaggregated customer base and loan portfolio (by volume)



Source: Fin'elle

Finally, women tend to have less knowledge of input use, sustainable farming practices and industry trade practices that would make them more productive. According to the FAO, women farmers receive only five per cent of agricultural extension services overall.[20] In formal value chains, Olam reported that, for example, in 2019, women farmers represented just 13 per cent of farmers trained in the agribusiness Good Agricultural Practices (GAP) programme across all value chains.[21] One reason for the low participation of women in agribusiness-led extension programmes is that trainings typically target landowners and heads of households. Another challenge is related to cultural norms and the approval that is often required from male community members to reach out to women with extension services. For example, research conducted by the GSMA AgriTech programme with Innovation Fund grantees in Ghana and Rwanda found that agribusinesses that procure from women-led cocoa and tea value chains need to consult male heads of households to organise training for women farmers to avoid upsetting gender dynamics. Women's time poverty and restricted mobility also mean they are often unable to attend training sessions.

17 Rodgers, Y. and Akram-Lodhi, H. (2021). The gender gap in agricultural productivity in sub-Saharan Africa: Causes, costs and solutions. Policy Brief 11. UN Women.
18 Ibid.
19 Interview with Fin'elle, November 2021.
20 Quoted in: International Finance Corporation (IFC). (2016). Investing in Women along Agribusiness Value Chains.
21 Olam. (9 October 2020). "Improving every day for rural women". Olam Blog.

Mobile gender gap

IN BRIEF

Although digital solutions can help women access markets, be more productive and improve their incomes, women are less likely than men to own and use a mobile phone. There are several reasons for this, including lack of access to affordable handsets and low literacy and digital skills. These barriers are also experienced by men, but women tend to experience them more acutely due to structural inequalities and underlying social norms, including education and income disparities between men and women.[22]

Women farmers working in agricultural value chains are less likely to be digitally included than men, which reduces their likelihood of accessing and using digital agriculture solutions. The ability to use D4Ag solutions would require women farmers to own (or have sufficient access to) a mobile phone and, ideally, use mobile internet. Although this does not necessarily translate into D4Ag usage, it is a prerequisite to participate in digitised value chains. The GSMA Connected Women programme reports that, overall, women in LMICs are seven per cent less likely than men to own a mobile phone and 16 per cent less likely to use mobile internet.[23] This mobile gender gap widens in rural areas. For example, in Mozambique, there is a 16 per cent gender gap in mobile ownership and a 24 per cent gender gap in mobile internet use in urban areas, while in rural areas it is more than double, at 33 and 47 per cent, respectively.[24]

The GSMA has identified five overarching barriers that limit women's digital inclusion:

ACCESS

Overall, women are less likely than men to have access to formal ID, quality mobile network coverage, agents and handsets. Low access to handsets reduces access to digital advisory services provided via SMS or mobile internet. Even when women do own a phone, spending time online can be judged by others negatively. This is because women are often considered vulnerable to threats on the internet (e.g. fraud, misuse of personal images or exposure to explicit images), which is perceived to put a family's reputation at risk.[25] Lack of official ID means women are likely to encounter issues complying with KYC requirements to open a fully-fledged mobile money account.[26] This especially hinders women from receiving digital payments for their crops from agribusinesses or cooperatives.[27] For example, in Rwanda, a cooperative involved in a project run by the GSMA Innovation Fund for the Digitisation of Agricultural Value Chains has found that mobile money payments for the procurement of tea leaves usually goes to men since they are the mobile phone owners, even when the registered farmer is a woman. Mobility restrictions ("domestic curfews"), time poverty and remote locations (where agent networks are sparce), also decrease the likelihood of women visiting agents and can influence their decision to opt for digital payments over traditional cash payments.

AFFORDABILITY

Women are less likely than men to be able to afford handsets, data plans and the transaction fees associated with the use of mobile money services. Given that the average income of female farmers is lower than male farmers (due to less cultivable land and the gender productivity gap), their ability to afford handsets and data to download and use digital agriculture apps is more limited. Women are also more likely to spend their income on family expenses (e.g. school fees), which reduces the amount available for handsets and mobile internet. The COVID-19 pandemic has had a particularly severe impact on women's finances and

22 GSMA. (2021). The Mobile Gender Gap Report 2021.
23 GSMA. (8 March 2022). Our latest data highlights the urgency to address the mobile gender gap two years into the COVID-19 pandemic. GSMA blog.
24 GSMA. (2021). The Mobile Gender Gap Report 2021.
25 GSMA. (2017). Triggering Mobile Internet Use Among Men and Women in South Asia.
26 GSMA. (2018). Mobile Money Policy and Regulatory Handbook.
27 GSMA. (2020). Digitising Payments in Agricultural Value Chains: The Revenue Opportunity to 2025.

made the use of mobile technology even less affordable.[28,29] Mobile money cash-out fees also affect women's ability to afford digital payments, which are one of the entry points to a digitised agricultural last mile.[30]

KNOWLEDGE AND SKILLS

Women are less likely than men to be literate, have confidence in their digital skills and be aware of, and understand, mobile technology. They are less likely than men to be able to read and write,[31] and they consider handset use (i.e. navigating interfaces) a major barrier to using mobile services.[32] Women also tend to be less confident than men in their ability to perform a new task on a mobile phone,[33] which means self-exploration of D4Ag solutions modules is limited. They tend to have more challenges using complex USSD platforms and mobile apps than men,[34] although in value chain digitisation initiatives, USSD menus are often used to deliver bundles of digital services to farmers (advisory and training services, digital payments).[35] Finally, low financial literacy among women farmers creates a negative perception and limited understanding of digital credit and insurance products.[36]

SAFETY AND SECURITY

Women are less likely than men to feel safe using a mobile handset, using mobile internet or visiting an agent. Research shows that women are often concerned about being exposed to harmful content online, such as scams, explicit content or cyberharassment, and this is a core barrier to women's digital inclusion.[37] In digitised agricultural value chains, farmers still need some human interaction with field agents or mobile money agents (e.g. to cash-out payments for the sale of crops), who are primarily male. Research by the GSMA Connected Women Programme found that women can sometimes feel unsafe when visiting agent locations because they can experience harassment if their mobile number and personal details are overheard or exploited by the agent when they share it for mobile transactions.[38] In many settings women can also feel unconfortable interacting with men who are not their relatives, or feel less confident approaching a male agent than a female agent.[39]

RELEVANCE

Women are less likely than men to believe that mobile products, services and content are relevant to their lives. Women often do not see the value of digital over cash since cash is tangible and provides immediate liquidity.[40] This is due, in part, to a lack of information, awareness or understanding of how technology can help boost yields. Because women are also less digitally and financially included, there is not as much data on women farmers as their male counterparts. This gender data gap leads to solutions that are designed mainly for men – a "default thinking" according to which "male is universal, and female is niche".[41] This means most last-mile digitisation initiatives are not necessarily relevant to women. Research on digital input loans shows that a lack of data on women's financial lives for credit scoring leads to creditworthiness assessments that are biased towards men.[42] MercyCorps AgriFin also found that women farmers are less likely than men to apply for or redeem digital credit and, when they do, have similar digital credit approval rates as men but receive lower amounts.[43]

28 GSMA. (2021). COVID-19: Accelerating the Use of Digital Agriculture, p. 24.
29 Lindsey, D. (20 April 2020). "Why COVID-19 has increased the urgency to reach women with mobile technology". GSMA blog.
30 GSMA. (2020). Digitising Payments in Agricultural Value Chains: The Revenue Opportunity to 2025.
31 UN Women. (2012). Commission on the Status of Women.
32 GSMA. (2021). The Mobile Gender Gap Report 2021.
33 Ibid.
34 MercyCorps AgriFin. (2021). 5th Annual Learning Event Report April 26–29 2021.
35 MercyCorps AgriFin. (2021). The Impact of Digital Services on Women Smallholder Farmers.
36 MercyCorps AgriFin. (2021). Gender Transformative Approaches in Agriculture.
37 GSMA. (2017). Triggering Mobile Internet Use Among Men and Women in South Asia.
38 GSMA. (2018). A Framework to Understand Women's Mobile-related Safety Concerns in Low- and Middle-Income Countries.
39 The Partnership For Financial Inclusion. (n.d.). Women Make the Best DFS Agents. Field Notes #5. MasterCard Foundation and IFC.
40 FinEquity consultation, "DFS and Gender", led by GRID Impact, 2020.
41 Criado Perez, C. (2019). Invisible Women, Exposing Data Bias in a World Designed for Men. Vintage.
42 Center For Financial Inclusion at Accion. (2021). The Stories Algorithms Tell: Bias and Financial Inclusion at the Data Margins.
43 MercyCorps AgriFin. (2021). Serving female smallholder farmers' financial needs: Digital input credit and digital scorecards design.

Best practices to increase women's participation in digitised value chains

Reaching and empowering women in digitised value chains represents an enormous opportunity for D4Ag providers to contribute to global food security while also improving their business performance.[44] To seize this opportunity, providers need to address the barriers facing women farmers and create agricultural interventions that target all farmers, regardless of gender. This section introduces some emerging best practices to increase women's participation in digitised value chains. They cover key pillars of gender inclusive-approaches, from gender strategies to foundational interventions that raise the voices of women farmers and systematically applying a gender lens to farmer engagement and product design.

44 IDH. (16 November 2021). Press Release: "Gender Transformative Business Models in Agriculture Boost Business Performance while Tackling the Root Causes of Inequality".

Figure 4

Gender transformation in the agricultural last mile

1 Digital agriculture (D4Ag) provider gender strategy
Define gender intentionality and strategic actions based on business case of serving women farmers

2 Foundational interventions
Build up internal resources and processes to better represent women farmers

3 Gender-inclusive interventions
Design solutions that take social and structural barriers into account

Source: GSMA analysis, adapted from MercyCorps AgriFin's "Gender Transformative Approaches in Agriculture"

STEP 1

Defining a gender strategy to guide gender-inclusive interventions

A gender-inclusive approach starts with understanding the reasons and the business case for reaching and empowering women in the agricultural last mile, and then defines a gender-inclusive strategy to realise this business case.[45] For D4Ag providers that offer business-to-business-to-consumer (B2B2C) solutions to agribusinesses and cooperatives, as well as agribusinesses that develop in-house solutions, the business case of serving women includes higher productivity and profitability and stronger, more integrated value chains.[46] Examining the business case for gender inclusion provides strong incentives to develop gender-inclusive strategies, although not all last-mile digitisation providers have articulated their business case or strategy for reaching women farmers. The Centre for Agricultural and Rural Cooperation (CTA) found that 57 per cent of surveyed agribusinesses do not identify women's inclusion as a priority because they consider the challenge too great.[47] Currently, only two grantees of the GSMA Innovation Fund for the Digitisation of Agricultural Value Chains work with agribusinesses that have gender strategies, although they do not necessarily include binding gender targets for operations and staff. Most agribusinesses are reluctant to increase the ratio of women farmers they buy from, mainly due to social norms and the fear of tarnishing relationships with farming communities.

A sound gender strategy not only sets a vision and numeric target for reaching women farmers, but also identifies the supporting activities and interim results to achieve it.[48] D4Ag providers, as well as the partners involved in last-mile digitisation initiatives, should consider developing a monitoring, evaluation and learning (MEL) plan that incorporates sex-disaggregated data and gender-focused outcomes and indicators from the beginning. This will allow them to be agile enough to re-examine their performance against numeric targets and adjust their plans as needed.

45 GSMA. (2020). Reaching 50 Million Women with Mobile: A Practical Guide.
46 IFC. (2020). The Business Case for Women's Employment in Agribusiness.
47 CTA. (2021). The Digitalisation of African Agriculture Report, 2018–2019.
48 InsuResilience Global Partnership. (2021) Step by Step Guidance: A gender-smart approach to monitoring and evaluation (M&E) of Climate and Disaster Risk Finance and Insurance (CDRFI) Programmes.

STEP 2

Creating a gender-inclusive environment through foundational interventions

A GENDER-BALANCED WORKFORCE

Progressive agribusinesses recognise that diversity in their workforce is a growing and important strategic issue that needs to be backed up with action (e.g. investing in better jobs and working conditions for women workers). The International Finance Corporation (IFC) recognises that investing in women's employment can improve the agribusiness labour and talent pool, lower recruitment and turnover costs, support innovation and increase access to quality buyers.[49] Having the perspectives of women represented at both workforce and management levels is another benefit of a gender-balanced workforce.[50] Agribusinesses such as Afrifresh, Biosev and Vinaseed have found that women workers approach problem-solving differently and contribute different perspectives and experiences.[51] Ensuring a diverse workforce is particularly important at customer touchpoints where clerks and rural agents are in direct contact with women farmers.[52]

Yet, women are still underrepresented at all levels of organisations engaged in the last mile. For example, Olam reported in 2020 that of their 62,500 full-time staff (which includes seasonal, contract and temporary employees), only one in three workers were female (31 per cent of the total workforce).[53]

Specific measures can improve women's employment in agribusinesses, such as enforcing strict rules on sexual harassment, investing in employee health or creating safer and more secure working environments. In Rwanda, for example, Rwanda Mountain Tea (RMT) provides support for working parents through early childhood development centres that help to alleviate the caring responsibilities of women farmers. The agribusiness also introduced paid maternity leave for women farmers contracted on a short-term basis, especially pluckers, based on historical tea production. This means a women farmer receives the amount equivalent to the volume she was harvesting before going on maternity leave. In Tanzania, Tanga Dairy Cooperative Union (TDCU) introduced a gender desk to inform the cooperative's decision-making and management. In India, InI Farms, a leading global horticulture company, increased the proportion of women working in packaging by shifting packaging from nighttime to daytime hours, as it was found that it was not suitable for women to work overnight.[54]

PARTNERSHIPS

Providing bundled digital services in agricultural value chains through partnerships has proven to be a strong value proposition for women farmers because they address multiple barriers to farm productivity at the same time.[55] End-to-end value chain solutions support women with financial services, inputs, technical assistance and guaranteed buyers and empower them as commercial farmers.[56] Higher productivity and revenues compound this positive impact and increase customer loyalty and stickiness.[57]

49 IFC. (2016). Investing in Women along Agribusiness Value Chains.
50 IFC. (2016). The Business Case for Women's Employment in Agribusiness.
51 Ibid.
52 GSMA. (2020). Reaching 50 Million Women with Mobile: A Practical Guide.
53 Olam. (2020). Olam Annual Report: Unlocking Long-Term Value and Driving Sustainable Growth.
54 Interview with InI Farms, January 2022.
55 Bafana, B. and Hosenally, N. (23 May 2019). "Delivering 'bundles' of services offers boost to women agripreneurs". CTA Blog.
56 MercyCorps AgriFin. (2021). Gender Transformative Approaches in Agriculture.
57 IFC. (2016). Investing in Women along Agribusiness Value Chains.

Partnerships play an important role in enabling agribusinesses to implement a suite of solutions that appeal to women farmers. Agribusinesses and cooperatives, which hold the relationship with farmers in the last mile, can find it challenging to address the specific barriers women face in formal value chains. Bundled digital solutions, such as digital advisory, agri DFS, precision farming or an online marketplace, offer the opportunity to address multiple pain points related to women's lack of resources, all at once. However, they cannot implement them on their own. To succeed, agribusinesses need a network of partners, including agritech companies from digital marketplaces to digital advisory providers, financial service providers and insurance companies.

For D4Ag providers, the ability to reach women farmers through their relationship with agribusinesses and cooperatives allows them to tap into new market segments and roll out gender-smart interventions. For example, Advans, a leading MFI in Côte d'Ivoire, leverages their partnership with agribusinesses and cooperatives to provide digital school loans to cocoa farmers. Fin'elle, another MFI in Côte d'Ivoire, also leverages partnerships with agribusinesses to provide financing to women farmers in the karite value chain. The backing of the agribusinesses through a three-party contract (farmer, MFI, agribusiness) means Fin'elle does not need to request collateral from farmers and, instead assesses creditworthiness based on a farmer's production history collected from the agribusiness's connected weighting scales. The MFI is now in the process of digitising payments, working with a fintech to allow bank-to-wallet services and provide a more convenient way for women farmers to repay their loans.[58]

However, the potential of partnerships and bundled services to increase women's participation in the agricultural last mile depends on partners being aligned on gender inclusion. Gender-inclusive organisations that are seeking partners should, in the matchmaking process, systematically discuss how they approach gender inclusivity and include this in the reputational background checks. This helps to ensure that partners are aligned and that gender-inclusive initiatives have the greatest chance of success.

DATA AND INSIGHTS

Applying a gender lens to data collection, research and evaluation enables women's voices to be heard and women to be more visible in the agricultural value chain. Very little is still known about the millions of women working in agricultural value chains. If women are invisible, it is because there is not sufficient data to capture and understand their experiences. This leads to D4Ag providers making decisions that are gender blind.[59]

Collecting and using sex-disaggregated data is not yet a common practice among agribusinesses, agritech companies and even mobile money and financial service providers.[60] However, it is key to understand women's roles, needs and, most importantly, how women farmers interact with digital agriculture services, as the data can reveal the opportunities and challenges of reaching women farmers.[61,62] Improving the availability and accuracy of gender data requires strengthening data collection processes during farmer registration or using machine-learning tools[63] while also ensuring that existing systems are able to capture sex-disaggregated data seamlessly.[64]

To collect insights on women, D4Ag providers should also design and implement research frameworks that target women participants effectively. Research frameworks have traditionally prioritised heads of households, who are usually male. To capture women's voices and collect data more systematically, both men and women in a household need to be consulted. Ideally, agribusiness field

58 Interview with Fin'elle, December 2021.
59 UK Aid and Work and Opportunities for Women (WOW). (2020). Hidden in plain sight: Why we need more data about women in global value chains.
60 Only 20% of MercyCorps AgriFin partners are collecting this type of data. See: MercyCorps AgriFin. (2021). 5th Annual Learning Event Report April 26–29 2021.
61 GSMA. (2016). Using your Data to Drive Growth in Women's Use of Mobile Money Services.
62 GSMA. (2020). Reaching 50 Million Women with Mobile: A Practical Guide.
63 GSMA. (2018). The GSMA's Gender Analysis and Identification Toolkit (GAIT).
64 InsuResilience Global Partnership. (2021). Step by Step Guidance: A Gender-smart Approach to Monitoring and Evaluation (M&E) of Climate and Disaster Risk Finance and Insurance (CDRFI) Programmes.

agents should be the same gender as the farmer,[65] but since this is not always feasible, it is important that agribusinesses have a code of conduct and training modules to build the capacity of field agents to engage with female farmers. Field staff, for example, need to be aware that women farmers would be more likely to agree to an interview or meeting if it is close to their home, in a familiar location, and at a time when they are less likely to be busy with chores or children. Likewise, field staff should be sensitive about informing male relatives of their intentions (and, in some settings, even asking permission first), while ensuring the conversation takes place in a private space where women are more likely to share unbiased information.[66]

USER EXPERIENCE (UX)

Women-centric design helps to tailor services – from digital procurement payments to agri DFS and digital advisory – to the specific needs, preferences and behaviours of women in agricultural value chains. Typically, gender-agnostic products and services do not address women's needs and barriers. Creating solutions that are tailored to women as well as men – from ideation to prototyping and iteration – refines the value proposition to be more relevant. When GRID Impact, a UX consulting firm, worked on designing a mobile money app in Pakistan to increase the financial inclusion of women (farmers and non-farmers), co-creation and prototyping sessions with women helped them identify several design tweaks.[67] GRID Impact found that adding adding audio instructions to the service, for example, boosted the confidence of women who used the app. In Fiji, UX design informed the sketching of the PacFarmer app. It helped providers learn that women farmers tend to rely on children to help them understand digital technology, and they saw an opportunity, based on women's suggestions, to add education modules for children alongside guidance and information for farmers. Other ideas suggested by women were creating buyer notifications and simplifying the log-in process.[68] These examples show that, for women with low incomes and low literacy levels, such as women farmers, UX design can make the difference between using or not using a digital service.[69,70]

Past research by the GSMA AgriTech programme also shows that tailoring digital advisory content to women boosts the number of female users.[71] It is even more effective when women are considered in their diversity through a segmentation strategy, given that women's needs and preferences vary depending on their unique and intersecting characteristics (age, profession, family situation, place of residency, literacy levels, social context, etc.).[72] Identifying personas or "archetypes" through which women farmer segments can be understood and described helps D4Ag providers to design more relevant services and move away from a one-size-fits-all approach. DigiFarm, a Kenyan digital platform, identified several segments of women users – from super-users to low users – and this helped to identify the cognitive biases affecting women's decisions about adopting and engaging with the platform and to inform the value propositions.[73]

65 GSMA. (n.d.). The mAgri Design Toolkit: User-centered design for mobile agriculture.
66 GSMA. (2018). A toolkit for researching women's internet access and use.
67 GRID Impact. (2017). Bringing the benefits of mobile money to more women.
68 UNCDF. (20 May 2020). "Empowering Women With Technology: Lessons Learnt from a Talanoa Dialogue". UNCDF News.
69 Fiorillo, A. (17 January 2017). "3 Customer Insights for Better Mobile Money UI/UX in Pakistan". CGAP Blog.
70 GSMA. (2017). Creating scalable, engaging mobile solutions for agriculture – A study of six content services in the mNutrition Initiative portfolio.
71 Ibid.
72 Jarden, F. and Rappoldt, A. (2021). Why a segmentation strategy matters for serving the women's market: Insights from Access Bank market research. KIT Working Paper.
73 Busara and Dalberg on behalf of MercyCorps AgriFin. (2021). DigiFarm: Gender Impact Study.

STEP 3

Addressing women's barriers through gender-inclusive interventions

A third area of intervention for D4Ag providers is applying a gender lens to the services they offer and to how they engage with farmer communities.

Best practices to address the social norms limiting women's participation and decision-making power in the last mile

ADDRESS EXPECTED ROLES

Engaging men alongside women in gender-inclusive projects is key to facilitating household dialogue and changing how women are perceived and treated. Evidence shows that inviting male partners and "gatekeepers" to literacy workshops or other capacity-building activities can help challenge gender role stereotypes and prompt discussions about household financial goals and how families can meet them together.[74] In Nigeria, AgroMall, a provider of digital procurement solutions, faced strong resistance from male members of a smallholder community when it tried to engage women to participate in a digital credit pilot.[75] AgroMall found that men in this community were fearful of women's empowerment. This might be linked to men's perceiving women's empowerment as a zero-sum game where one benefit at the expense of the other, as research with onion growers in Northern Tanzania shows.[76] To address social norms, AgroMall realised they first needed to on-board and train men, so they could understand that husbands are stronger with empowered wives, and that women's empowerment brings prosperity to families and communities. This example shows that when husbands are kept out of the process, they are more likely to resist change. For example, they are unlikely to support women's access to credit or other empowering services, and are unwilling to elevate their roles within value chains. Keeping male farmers out of the loop can lead to gender-based violence and would ultimately force women to take a step back to keep peace at home.

INCENTIVISE FEMALE LAND OWNERSHIP

Supporting women's access to land may be the most transformative way to increase the participation of women farmers in commercial value chains. Although shifting social norms around land ownership requires profound societal and political transformation, some companies have found innovative ways to address this challenge. In India, where 80 per cent of women work in agriculture but less than 15 per cent own land,[77] agribusiness InI Farms incentivised farming families to extend land ownership to women by offering premium payments to female landowners. This has incentivised male farmers to give part of their land to their wives.[78]

ADDRESS TIME POVERTY AND MOBILITY

Several agribusinesses are experimenting with ways to reach women through direct procurement at the farm gate, rather than expecting women to travel to collection points. For example, DigiFarm introduced harvest collection services to address the mobility constraints of women farmers. DigiFarm's Village Advisors (DVAs) collect produce directly from women farmers at their homes or farms in exchange for additional commission and a transport allowance.[79]

74 McDougall, C., Elias, M. and Abenakyo Mulema, A. (2021). The potential and unknowns of gender transformative approaches. CGIAR.
75 Obodoekea, P., Agbejule, F. and Olusanmokun, O. (14 December 2021). "For AgroMall, Extending Credit to Women Requires First Convincing Men". CGAP Blog.
76 International Institute for Science, Technology and Education (IISTE). (2012). Women Empowerment in Agricultural Value Chains: Voices from Onion Growers in Northern Tanzania.
77 Oxfam India. (15 November 2018). "Move over 'Sons of the soil': Why you need to know the female farmers that are revolutionizing agriculture in India". Oxfam India Gender Justice Blog.
78 Interview with InI Farms, November 2021.
79 MercyCorps AgriFin. (2021). The Impact of Digital Services on Women Smallholder Farmers.

Best practices to facilitate access to resources

ACCESS TO AGRICULTURAL KNOWLEDGE AND SKILLS

Using digital agriculture solutions to ensure that women have access to agronomic advice and market information on their mobile phone, or through trusted community members, goes a long way towards increasing women farmers' skills and improving the overall productivity and quality of agricultural produce. Women farmers operating in informal value chains as well as women labourers, who sow and harvest crops that are sold to agribusinesses, usually do not benefit from the knowledge and skills that agribusinesses provide as part of their extension services (also known as agricultural advisory services). Deliberate outreach efforts are needed to ensure agriculture advisory reaches women farmers. These can include using digital procurement solutions, which allow agribusinesses to collect farm data, to record data on male and female labourers involved in agricultural production. Seeking partnerships with organisations that work with women farmers is another route digital agriculture providers can pursue to cater to this segment.[80] Because women are particularly receptive to advisory services from trusted organisations, engaging with organisations they trust, but also community leaders and other influencers can help ensure the information is being conveyed and is trusted by female farmers.

Another key best practice is to design advisory products, features, and content in ways that fit within the different needs and contexts of men and women, to make the services more relevant. For example, in Kenya, Arifu, an agritech that provides digital advisory services via SMS and social media, discovered that women farmers are more interested about land preparation while men are interacting more with crop management content.[81] Researching and addressing differentiated agricultural needs (by gender, but also by value chain and activities) has helped Arifu improve the accessibility and relevance of its solution to men and women farmers, leading to adoption of better practices and improvement in incomes for women.

Finally, the complementary use of e-learning and in-person touchpoints has proven effective at reaching women farmers with educational content. Agribusinesses and agritech companies supported by MercyCorps AgriFin in East Africa learned that integrating in-person support in digital training helps to address digital literacy barriers.[82] This approach allows for customised learning as women can ask questions that are relevant to their needs and become familiar with technology at their own pace. Using interactive voice response (IVR) or short format videos to supplement the information that women access in their own time has been an important lesson in empowering women with agricultural training content.

ACCESS TO FINANCE

Using digital procurement and mobile money data unlocks access to capital and risk management tools that help women farmers manage their land and improve their productivity and income. Access to finance is a key barrier for women in agricultural value chains since they lack collateral (land) to provide a guarantee to lenders. This prevents them from hiring farm labour, accessing quality inputs and equipment and building safety nets to protect them in case of disaster. Past GSMA research has shown that the data generated by digital procurement solutions and mobile money payments in agricultural value chains supports the creation of digital identities for male and female farmers.[83] Digital identities are increasingly used in the last mile to assess a farmer's creditworthiness, their income and ability to repay their loan.

80 Arifu. (2021). Gender Dynamics of Using Mobile Technology.
81 Ibid.
82 MercyCorps AgriFin. (2021). 5th Annual Learning Event Report April 26–29 2021.
83 GSMA. (2020). "Digital footprints and economic identities for farmers" in The GSMA AgriTech Toolkit for the Digitisation of Agricultural Value Chains.

Although using alternative data for credit scoring is an important way to increase women's access to capital, D4Ag providers should closely investigate potential gender bias in their digital credit-scoring solutions. Credit-scoring algorithms that use alternative data can perpetuate gender bias in credit assessment unless deliberate attention is paid to detecting gender discrimination. Research shows that digital credit algorithms can unintentionally reflect existing societal biases.[84,85] Because women in rural areas are less digitally included than men, the amount of mobile data that can be used for credit scoring is more limited. Predictive algorithms that rely on such data for loan assessments can further exclude women. As research by Women's World Banking highlights, if credit-scoring algorithms include criteria such as location, phone and app usage history, rural women farmers who only use their phone occasionally would receive low scores. DigiFarm in Kenya, which offers digital loans to farmers, reports that the credit approval rates of women are comparable to approval rates of men, but the average loan amounts disbursed to women are lower because their mobile money and mobile phone usage data is less meaningful.[86]

ACCESS TO MARKETS

Deliberately reaching out to groups of women farmers through community-based organisations, such as village savings and loans associations (VSLAs), has allowed D4Ag providers to recruit more women farmers. In Kenya, Aquarech, a D4Ag provider that connects fish farmers, traders and suppliers, is creating contractual fish farming arrangements with women-led savings groups to increase sourcing from female farmers.[87] By working with women-led community-based organisations, D4Ag providers are able to identify women farmers they can support through last-mile agriculture solutions while also relying on trusted channels (the group leaders) to increase awareness and understanding of the benefits of last-mile digitisation.

84 Kelly, S. and Mirpourian, M. (February 2021). Algorithmic Bias, Financial Inclusion, and Gender: A primer on opening up new credit to women in emerging economies. Women's World Banking.
85 Center For Financial Inclusion at Accion. (2021). The Stories Algorithms Tell: Bias and Financial Inclusion at the Data Margins.
86 MercyCorps AgriFin. (2021). Serving female smallholder farmers' financial needs: Digital input credit and digital scorecards design.
87 Interview with Aquarech, October 2021.

Best practices to facilitate the financial and digital inclusion of female farmers

ACCESS TO DIGITAL PAYMENTS

Facilitating mobile money and bank account opening for women farmers is a simple way to ensure women can access digital payments. Digital procurement payments can have valuable benefits for women (e.g. economic identities, greater financial discipline), but only if they are delivered directly to their phones. This means that women must have a mobile money account in order to receive digital payments. This is often not the case, as research shows that across LMICs women are 33 per cent less likely than men to have a mobile money account, and this gap widens in rural areas.[88] It is therefore not unusual for women to provide their husband's mobile money account number to receive payments when they do not have one. As mentioned earlier, this is often due to difficulties related to mobility and time poverty, although not having an ID to comply with KYC requirements can also be a barrier.

Account-opening campaigns where the agents of D4Ag providers travel to rural villages to open accounts for customers can help solve access issues for rural women farmers. Agents could also help to identify alternative proof of ID for women to comply with KYC requirements. TruTrade in Kenya and Uganda is one organisation providing this support. A market intermediary that also functions as a D4Ag service provider and agribusiness, TruTrade provides bespoke financial literacy training, organises campaigns for mobile money account registration and involves mobile money agents directly in account opening.[89] Although these efforts are directed at both men and women in rural areas, they have a disproportionate impact on women, who have more difficulties opening accounts. Providing access to accounts for women farmers also helps agribusinesses ensure that the account to which they send funds is indeed the woman's account and not that of a relative. For women farmers, receiving digital payments into their own account generates a financial history they can use to access credit, creating a virtuous circle and unlocking financial inclusion.

SAFETY AND DIGITAL SKILLS

Working with community mentors and field agents that women farmers trust has proven effective at building their financial and digital skills and increasing their confidence and trust in digital solutions. The nature and gender of farmer touchpoints of D4Ag providers is extremely important when implementing gender-inclusive approaches. Women are disproportionately receptive to information and guidance they receive from trusted channels.[90] Although trusted mentors can be male, female clerks and agents are more likely to establish trust with women farmers.

Creating more gender-diverse agent networks (both mobile money and field agents) can help women farmers feel more secure when using D4Ag solutions. Research shows that women mobile money customers often have more trust in, and feel more secure with, female agents.[91,92] An IFC study in the Democratic Republic of Congo also reports that women are more likely to make smaller transactions when dealing with male mobile money agents.[93]

88 The World Bank. (2017). The Global Findex Database 2017.
89 The World Bank. (2020). Digitization of Agribusiness Payments in Africa Building a Ramp for Farmers' Financial Inclusion and Participation in a Digital Economy, International Bank for Reconstruction and Development.
90 Busara and Dalberg on behalf of MercyCorps AgriFin. (2021). DigiFarm: Gender Impact Study.
91 The Partnership For Financial Inclusion. (n.d.). Women Make the Best DFS Agents. Field Notes #5. Mastercard Foundation and IFC.
92 GSMA. (2020). Reaching 50 Million Women with Mobile: A Practical Guide.
93 Reitzug, F. (2020). Gender-diverse Agent Networks Foster Channel Activity and Financial inclusion for Women: Insights from Gender-lensed Data Analytics in the Democratic Republic of Congo. Field Note 14. IFC and MasterCard Foundation.

Conclusions

Women's low participation in digitised agricultural value chains can only be addressed through approaches that purposely consider women as well as men. Gender-inclusive solutions that help address barriers related to access, knowledge and skills, among others, are crucial. To achieve their full potential, they would need to be accompanied by interventions that address underlying social norms to uplift women's voices and strengthen their decision-making power and participation in the last mile. Some best practices in this area are emerging, from involving husbands and male community members to challenge household gender roles, to relying on female agents and incentivising land ownership for women.

The early impact of gender-inclusive last-mile digital solutions on women farmers' participation and decision-making power is promising. MercyCorps AgriFin's gender impact assessment, which was carried out with four partners (Arifu, FtMA, AgriPay and DigiFarm), shows that women farmers who use digital agriculture solutions reported increased yields and incomes, as well as increased decision-making power in the household.[94] Women farmers in Zambia who have been using the digital banking platform Zanaco AgriPay to receive payments from agribusinesses reported better money management. In Kenya, evaluations of DigiFarm input loans show that using farming data as loan collateral and working on gender-smart loan design and engagement features enhance financial access for women farmers, although women are still less likely to apply for or redeem loans than male users.[95] Although promising, this impact would need to be consolidated with more evidence points from the 600+ digital agriculture solution in operation in LMICs.[96]

The GSMA will contribute to generating evidence, by assessing the impact of the Innovation Fund for Digitisation of Agricultural Value Chains as the programme comes to a close in March 2023. However, the quarterly data collected so far indicates that once women are registered on digital procurement platforms, they are 1.4 times more likely than men to actively use the service,[97] a sign of the disproportionate value of last-mile D4Ag solutions for women farmers.

94 MercyCorps AgriFin. (2021). The Impact of Digital Services on Women Smallholder Farmers.
95 MercyCorps AgriFin. (2021). Serving female smallholder farmers' financial needs: Digital input credit and digital scorecards design.
96 GSMA. (2020). Digital Agriculture Maps report (DAMs).
97 GSMA Innovation Fund for Digitisation of Agricultural Value Chains' grantee data.

A deeper understanding of women's agency and the social norms shaping their lives is needed to bridge the gap in commercial agriculture value chains. There is a need for more granular, sex-disaggregated data on how women interact with digital agriculture solutions and to identify their specific needs and preferences for digital agriculture solutions in the last mile, such as how to deliver content (e.g. USSD, IVR, SMS) and what design elements resonate most with women farmers. More specifically, we need to understand what prompts women to decide to use these services. More evidence is also needed to understand the long-term implications of gender-inclusive, and especially gender-transformative, approaches that aim to change social norms, including how they work, their short- and long-term impacts and how to scale them up efficiently. This will require trying and testing more gender-inclusive projects to delineate "impact pathways" for women in digitised agricultural value chains.

By incentivising and rewarding D4Ag providers, donors and impact investors can guide them towards gender-inclusive approaches that aim to improve women's influence, leadership roles and decision-making power, and promote sensitive and equal gender norms at all levels. Without this, gender inequalities are not only likely to remain, but become exacerbated.

Donors and impact investors are uniquely positioned to push gender inclusive interventions forward. They can inject capital in initiatives that purposely include and target women, and ultimately help to create a level playing field in which women smallholder farmers have equitable access to digital solutions. D4Ag providers that are designing and implementing digital agriculture solutions for the last mile need donor and investor support to provide patient capital to test and scale best-in-class interventions and achieve long-term sustainability. This gives donors and investors some influence over providers' strategies and interventions.

Donors and investors should first apply a gender lens to their own investment strategies to identify and reward new D4Ag investees that already apply, and want to test, approaches that reach both women and men. Gender Lens Investing (GLI) is an approach that considers gender-based factors across the investment process to advance gender equality and inform decision making.[98] GLI can support the growth of agribusinesses and D4Ag providers that are committed to including women. If new funding depends on the ability of an organisation to integrate women in both their labour force and user base, gender might become a more important strategic priority, and the proportion of gender-inclusive D4Ag providers might increase significantly. Investors have been increasingly applying GLI to investment strategies to achieve their targets for the United Nations Sustainable Development Goals (SDGs) (e.g. 50 per cent of their suppliers are women), although often with non-binding targets. However, applying GLI in digitised agricultural value chains has proven difficult when agriculture (SDG 2: Zero hunger) and women's inclusion (SDG 5: Gender equality) are considered competing priorities. Women in digitised agricultural value chains would benefit from investors capturing intersectionality in their investment strategies.[99]

Donors and investors should also leverage their ongoing investments to encourage investees to adopt best practices, such as consistently collecting and using sex-disaggregated data, or involving women in human-centric design research to inform the design of solutions. Investors can also make investments that strengthen the resilience of women farmers to climate change since they are disproportionately affected as a result of lower input use or weaker safety nets.

98 Definition from the Global Impact Investing Network.
99 Interview with the Netherlands Advisory Board on impact investing (NAB), November 2021.

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