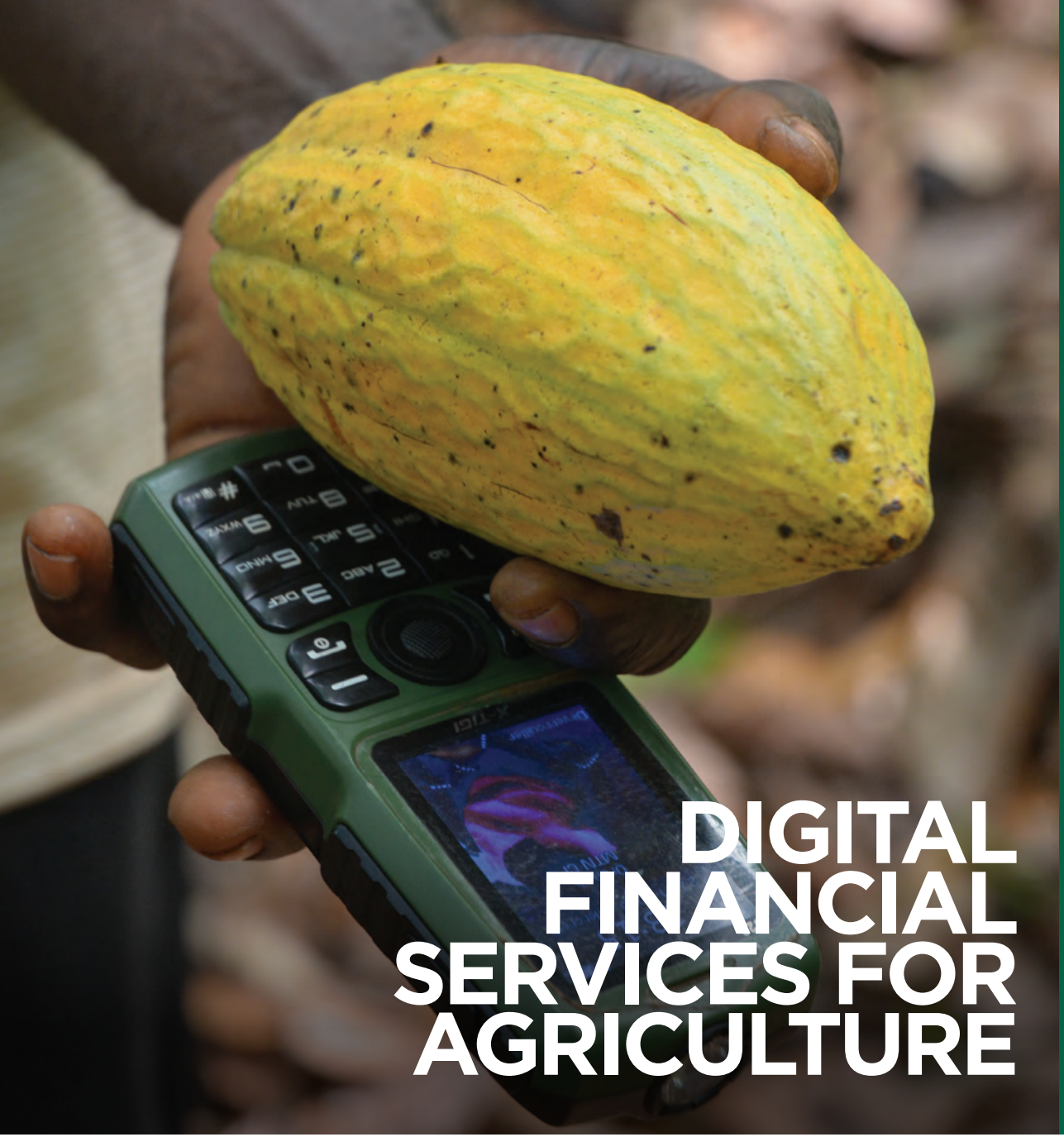

# DIGITAL FINANCIAL SERVICES FOR AGRICULTURE

# HANDBOOK

STRATEGIC IMPACT ADVISORS

mastercard foundation

IFC International Finance Corporation WORLD BANK GROUP

*Creating Markets, Creating Opportunities*

# ACKNOWLEDGEMENTS

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# HANDBOOK

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# Foreword

This is the fourth handbook published by the Partnership for Financial Inclusion, a joint initiative of IFC and the Mastercard Foundation to expand microfinance and advance digital financial services (DFS) in Sub-Saharan Africa. Previous handbooks have focused on the hardware and software components of a successful DFS deployment, risk management in mobile and agent banking, and the use of data analytics to expand access to financial services. This handbook is intended to provide information and guidance to financial service providers, including microfinance institutions, banks, mobile network operators, fintechs and payment service providers, on how to apply DFS in agriculture.

The spread of DFS and information technology offers new ways of approaching agricultural development. Digital tools and data sources are changing numerous dimensions of providing financial and information services to last-mile, rural actors in agriculture, a sector that has been challenging to reach commercially but is critical to food security and economic development. By leveraging the growing availability of connectivity, mobile money services, simple mobile phones and smartphones, satellites and sensors, providers are increasingly able to bundle packages of services that smallholder farmers and small-scale agribusinesses can use to increase productivity and efficiency.

There have not been many implementations of DFS in agriculture to date, and providers are just beginning to be able to benefit from emerging learnings. However, early feedback indicates that a key element of providing DFS products in agriculture is the necessity of creating diverse and new partnerships among actors who may not have worked together previously.

This handbook, therefore, combines information on how digital technology has changed the provision of financial and information services for agricultural value chain actors, sharing lessons learned and experiences by some of the pioneers in the market. We hope that it will reach a broad industry audience at an opportune time, considering the pace of digital innovation and the importance of the agricultural sector to the economies and future of Sub-Saharan Africa.

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# ACRONYMS

| | |
|---|---|
| **AML/CFT** | Anti-Money Laundering and Combating the Financing of Terrorism |
| **API** | Application Program Interface |
| **ARPU** | Average Revenue Per User |
| **ATL** | Above the Line marketing |
| **ATM** | Automatic Teller Machine |
| **B2B** | Business to Business |
| **B2P** | Business to Person |
| **BDRS** | Billing Data Record System |
| **BDS** | Business Development Services |
| **BTL** | Below the Line marketing |
| **CRM** | Customer Relationship Management |
| **DFS** | Digital Financial Services |
| **e-banking** | Electronic banking |
| **e-money** | Electronic money |
| **e-wallet** | Electronic wallet |
| **FMCG** | Fast Moving Consumer Goods |
| **FPO** | Farmer Producer Organization |
| **FS** | Financial Service |
| **FSP** | Financial Service Provider |
| **GDL** | General Distributed Ledger |
| **GIS** | Geographic Information System |
| **GPS** | Global Positioning System |

| | |
|---|---|
| **HCD** | Human-Centered Design |
| **ICC** | Integrated Circuit Card |
| **ICT** | Information and Communication Technology |
| **IMEI** | International Mobile Equipment Identity |
| **iOS** | Operating System developed by Apple |
| **IoT** | Internet of Things |
| **IP** | Internet Protocol |
| **IRR** | Internal Rate of Return |
| **ISO** | International Organization for Standardization |
| **IVR** | Interactive Voice Response |
| **J2ME app** | Java 2 Platform, Micro Edition |
| **JSON** | JavaScript Object Notation |
| **KPI** | Key Performance Indicator |
| **KYC** | Know Your Customer |
| **LAN / WAN** | Local Area Network / Wide Area Network |
| **m-banking** | Mobile Banking |
| **MFI** | Microfinance Institution |
| **MIS** | Management Information System |
| **MNO** | Mobile Network Operator |
| **MSME** | Micro, Small, and Medium Enterprise |
| **MVP** | Minimum Viable Product |
| **m-wallet** | Mobile Wallet |
| **NBFI** | Non-bank Financial Institution (i.e. credit union, MFI, SACCO) |
| **NGOs** | Non-governmental Organization |
| **OECD** | Organisation for Economic Co-operation |

| | |
|---|---|
| **P2B** | Person to Business |
| **P2P** | Person to Person |
| **PAYG** | Pay As You Go |
| **PSP** | Payments Service Provider |
| **QoS** | Quality of Service |
| **QR** | Quick Response |
| **ROSCA** | Rotating Savings and Credits Association |
| **SACCO** | Savings and Credit Cooperative Organization |
| **SAM** | Serviceable Addressable Market |
| **SHF** | Smallholder Farmer |
| **SLA** | Service Level Agreement |
| **SME** | Small and Medium-sized Enterprise |
| **SMS** | Short Messaging Service |
| **SSA** | Sub-Saharan Africa |
| **TAM** | Total Addressable Market, alternatively Total Available Market |
| **UI** | User Interface |
| **USSD** | Unstructured Supplementary Service Data |
| **UX** | User Experience |
| **VAS** | Value-Added Services |
| **VSLA** | Village Savings and Loan Association |

# *Executive Summary*

## A hard nut to crack: access to financial services in the agricultural sector in emerging markets

In many emerging markets, the story is a familiar one. It is the story of challenging operating environments, weak or non-existent linkages among actors within agri-value chains, and insufficient investment. It is also the story of a chronic lack of suitable financial products for smaller actors – from farmers to input retailers and commodity traders, processors, or buyers. And it touches a sizeable percentage of the world's population, with smallholder farmers comprising approximately 2 billion people or nearly 500 million households.

Small-scale farms[1] in emerging markets play a vital role in feeding domestic populations and meeting international demand for agricultural commodities. Smallholder farming households in Sub-Saharan Africa (SSA), for example, manage as much as 80 percent of the region's farmland. The SSA food market alone is currently valued at $300 billion and may be worth nearly $1 trillion by 2030.[2] Despite the important role of smallholder farming households, they are largely excluded from the formal financial system and have been for decades. An estimated 1 percent of bank lending in Africa is allocated to the agriculture sector.[3] Yet agriculture contributes to almost 18 percent of GDP across SSA.[4] Recent estimates put the demand for smallholder farmer financing to exceed $200 billion for approximately 270 million SHF in Latin America, Sub-Saharan Africa, and South and Southeast Asia.[5] Beyond access to working capital, smallholder farmers and other agri-value chain actors lack financial products – savings, insurance, and payments – appropriately tailored to their needs in terms of design, accessibility, and affordability.

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[1] Small-scale in this context refers to an agricultural plot size of up to 7 hectares (Ha) but typically within the range of 0.5 to 2 Ha. The World Bank's CGAP defines smallholder farmers as farmers that work a plot of land no larger than 1 Ha. A single hectare is approximately the size of an international rugby field.

[2] Africa Agriculture Status Report 2017, AGRA, vi (https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf)

[3] Access to Finance for Smallholders Farmers, IFC, iii (https://www.ifc.org/wps/wcm/connect/071dd78045eadb5cb067b99916182e35/A2F+for+Smallholder+Farmers-Final+English+Publication.pdf?MOD=AJPERES)

[4] World Bank Open Data (https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS)

[5] Inflection Point: Unlocking Growth in the Era of Farmer Finance, Dalberg Global Development Advisors, 2016, 5. (https://www.raflearning.org/sites/default/files/inflection_point_april_2016.pdf?token=OS8hc14U)

## Handbook purpose and orientation

The target audience for this handbook is financial service providers (FSPs) with a commercial presence in SSA . Broadly defined, this includes commercial banks, non-bank financial institutions (NBFIs), mobile network operators (MNOs), payments service providers (PSPs), insurance companies, and digital technology providers offering software or hardware solutions to clients in the banking/finance, insurance, or agriculture sectors, i.e. fintechs and agritechs. It is important to note, however, that the digitally-enabled offerings described and discussed in this handbook are ultimately intended to add value for different customer segments operating in agriculture. While these customers are not the intended audience, their needs, preferences and constraints were at the forefront during the design and development of this handbook because they are critical to any provider's ability to effectively offer services that are appropriate and beneficial for these chronically underserved segments.

The handbook's orientation, structure and content were developed based on several assumptions regarding this audience's strategic priorities and operational capabilities:

- First, these providers are not heavily invested in the agriculture sector at present but are actively exploring opportunities to enter it or re-evaluating earlier decisions to exit.
- Second, some have launched DFS offerings in one or more SSA markets and have at least a basic familiarity with digitally enabled services.
- Third, few have deployed DFS offerings for use by individual, enterprise, or corporate customers operating in the agriculture sector.

This handbook, therefore, is meant to support FSPs that find themselves at a pre-launch phase with respect to DFS offerings for agriculture. These assumptions also prompted a focus on two perceived knowledge gaps. The first relates to the agriculture sector; how it is structured, the players commonly involved in commodity value chains, the transaction dynamics that exist among them, and their respective needs and capabilities. The second relates to new sources and types of data made possible by digital solutions and how FSPs are incorporating these non-financial elements into their offerings.

The handbook contains approaches, examples, and tools to help FSPs understand how to engage the agriculture sector and serve a range of rural customer segments through innovative digital solutions, from farmers all the way up the value chain. Throughout this handbook, case studies are interspersed to emphasize ideas and highlight findings. These studies draw content and context from actors currently working at the intersection of DFS and agriculture. There are also reference guides, worksheets, and other materials located in the annexes. These are designed to aid readers seeking to develop or advance project planning, research, or conversations around the topic of DFS and agriculture within their organizations.

**The handbook is organized as follows:**

- **Section 1:** The 'Introduction' considers the context in which DFS offerings for agriculture are emerging, identifies persistent needs and challenges vis-à-vis access to financial services in this sector, describes why digital solutions offer new opportunities to them, and highlights the broader implications of deepening financial inclusion within agriculture in SSA markets.

- **Section 2:** 'Ways to Approach Agriculture-focused Client Offerings' presents examples of conceptual frameworks for assessing DFS opportunities in agriculture through a holistic, value-chain approach. It also maps relevant actors involved in the provision of DFS offerings in agriculture, with an emphasis on capabilities and needs.
- **Section 3:** 'Digital Solutions for Expanding Access to Financial Services' surveys the landscape of existing DFS offerings in agriculture and describes the digital innovations that have been applied to traditional financial and information services within the context of farmer-facing, person-to-business (P2B) offerings and enterprise-facing business-to-business (B2B) offerings.
- **Section 4:** 'Building a DFS Offering' approaches the topic by focusing on three stages: 1) Assess and Design, 2) Developing the Offering, and 3) Go To Market. It adopts a problem-solving orientation focused on farmers to provide adequate context to discuss service development and implementation.
- **Section 5:** 'Conclusion' provides a summary of the handbook, highlighting key themes as well as putting forward some predictions regarding the future of DFS offerings in agriculture.

## DFS offerings in agriculture: an active and diverse, yet nascent, landscape

Within the last eight to ten years, a relatively small but growing stream of investment has led to a proliferation DFS and related information services aimed at the agriculture sector. These have been launched by incumbents from the finance and payments sectors as well as new entrants, such as MNOs and digital technology companies – such as fintechs – that specialize in some combination of hardware and software solutions designed to generate, capture, and analyze digital data generated from a range of sources. While these offerings exhibit a diverse range of financial and operating models, they all rely on digital solutions for many, if not all, of their business operations. Offerings can range in financial complexity from layaway payments for smallholder farmers to buy inputs without a loan to index-based weather insurance for global reinsurers. In terms of digital complexity, these offerings exhibit a similarly wide range: from no requirement on the part of a smallholder farmer to own or have access to a mobile device, to the use of smartphones and QR codes by smallholder farmers and cloud-based MIS systems by other enterprise or corporate actors in an agri-value chain.

In researching and drafting this handbook, however, few, if any, of the offerings identified have reached a mature, steady state. A significant percentage of these offerings have been on the market for less than three to four years. As a result, the observations, trends and developments identified should be viewed as emerging lessons and early experiences. Our view is that, at this stage, it would be premature to present established best practices or proven models. That said, two important trends surfaced that are worth highlighting as their relevance will likely endure: partnerships and bundled services.

### Recognizing the utility of partnerships

In most of the case studies profiled, multiple services were offered simultaneously or are envisioned as part of the provider's broader service offering road map. There was also at least one partnership that enabled each DFS offering; whether from a purely back-office, technology systems perspective or from a front-office marketing or sales and distribution perspective. Sometimes, DFS offerings combined a range of partnerships. The roles partners play can cover a wide range of issues and responsibilities from systems infrastructure, investment and maintenance, risk management, supervisory policies and procedures; to marketing and promotion, client/user acquisition, after-sales support, and service network management. And while these partnerships are an essential ingredient in DFS deployments in agriculture, they can introduce complexity that must be actively managed.

### Putting the farmer at the center

The chronic problems farmers face in terms of production capacity and quality, access to markets, improved trading positions, and higher incomes are interconnected with problems facing other agri-value chain actors at multiple levels. These farmer-centric problems are also a function of the overall composition and organization of the agri-value chains to which they are connected. Different approaches to serving rural customer segments at the retail, enterprise, or even corporate level are justified as a number of models and offerings have progressed in a range of markets over the last decade that warrant closer attention. These models emphasize developing a more nuanced understanding of customer needs, patterns, preferences, and perceptions – specifically as they relate to farmers. When providers more effectively target the problems of this segment, their offerings will also address the problems of other rural customer segments adjacent to or above them. This approach also enables DFS providers to invest in offerings with a compelling value proposition for a much larger percentage of a market for financial services. For these reasons, this handbook aims to give providers tools and frameworks to better understand rural customers in a new, more nuanced way, which will hopefully result in financial services that will add meaningful and durable value to their lives.

**When provided with appropriate DFS products and access to well-designed rural acceptance networks, farmers are realizing benefits that effect income, financial management, and economic resilience.**

Emerging points of evidence suggest that DFS can improve aspects of a smallholder farmer's quality of life and that of other rural agricultural actors by expanding access to financial services, improving resilience, and raising income. Products that facilitate access to markets and price information help farmers sell their goods at times and places in which higher prices may be available. Digital savings and insurance can give farmers the capital to weather a failed crop or medical emergency. Digitally-enabled credit may allow farmers to purchase inputs that increase yields and therefore income. Recent studies also show that, in specific communities, rural households with access to savings have enjoyed more food security, increased farm investment and augmented education spending. [6]

Digital credit does not always lead to greater investment in agriculture but has been documented to smooth consumption, a measure of resilience. Index insurance products have been documented to increase farmers' expenditure on yield-increasing inputs. And digital payments through the East African product M-PESA have allowed households to borrow from friends instead of reducing consumption during an economic shock.[7] While acknowledging the promise offered in these studies, DFS does not constitute a silver bullet for rural poverty reduction or economic growth. Rather, it represents one of many tools that can be employed by rural households and agricultural communities to improve their lives. Further, available evidence points regarding DFS usage are typically not nationally representative and frequently localized to a community or district.

This handbook, therefore, does not advance the notion that DFS offerings broadly, or in agriculture, must lead to positive impacts irrespective of geographic location or other factors. At the same time, there are reasons to be optimistic as encouraging trends continue to emerge across a range of market contexts. This handbook was motivated, as a result, by a belief in the practical value of promoting deeper comprehension and capacity among providers seeking to better serve rural customer segments through DFS offerings in the markets where they operate.

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[6] https://scholar.harvard.edu/files/rpande/files/research_and_impacts_of_digital_financial_services.pdf

[7] Karnal, Dean, Jake Kendall, Rebecca Mann, Rohini Pande, Tavneet Suri, Jonathan Zinman. "Research and Impacts of Digital Financial Services." Working Paper 22633, National Bureau of Economic Research, 2016

# SECTION 1

*Introduction*

## Applying a digital lens to the chronic challenge of financial exclusion in agriculture

Agricultural actors in developing countries have historically contended with limited access to capital and other financial services, but digital technology is opening new avenues for financial service providers.

Aggregated estimates put the demand for smallholder farmer (SHF) financing for approximately 270 million SHF in Latin America, Sub-Saharan Africa, and South and Southeast Asia.[8] The precise amount of financing demanded per SHF household depends on the type and number of crops or livestock grown, whether it produces capital-intensive cash crops versus staple crops, and the volume of the production. Both short and long-term working capital is needed to purchase annual inputs as well as equipment that is used over many seasons. Credit and other financial and informational services could be used by the world's approximately 500 million SHF households, which represent around two billion people with some form of agricultural livelihood.[9] The SSA food market, to which smallholders contribute by managing as much as 80 percent of the farmland on the sub-continent, may be worth nearly $1 trillion by 2030, up from its current valuation at $300 billion.[10]

An estimated one percent of bank lending goes to the agriculture sector in Africa.[11] However, agriculture contributes to almost 18 percent of GDP across the continent.[12] As a further example, in Kenya, 75 percent of the population makes living in agriculture while generating 24 percent of the country's GDP, yet only 4 percent of total credit is supplied to the sector.[13] There is also a dearth of account access among smallholder farmers, globally and in SSA. Though it's difficult to precisely quantify the gap, financial account ownership in developing economies tends to be lower in rural areas than in urban areas.[14] Further,

[8] Inflection Point: Unlocking Growth in the Era of Farmer Finance, Dalberg Global Development Advisors, 2016, 5. (https://www.raflearning.org/sites/default/files/inflection_point_april_2016.pdf?token=OS8hc14U)

[9] Africa Agriculture Status Report 2017, AGRA, iv (https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf)

[10] Africa Agriculture Status Report 2017, AGRA, vi (https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf)

[11] Access to Finance for Smallholders Farmers, IFC, iii (https://www.ifc.org/wps/wcm/connect/071dd78045eadb5cb067b99916182e35/A2F+for+Smallholder+Farmers-Final+English+Publication.pdf?MOD=AJPERES)

[12] World Bank Open Data (https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS)

[13] Nyawira, Brigitta. How Mobile Money is Closing the Agricultural Finance Gap for Women in Kenya. Center for Financial Inclusion, 2017. (https://cfi-blog.org/2017/10/03/how-mobile-money-is-closing-the-agricultural-finance-gap-for-women-in-kenya/)

[14] World Bank Global Findex, 2017.

the unbanked tend to be clustered in poor households; globally, half of unbanked adults are in the poorest 20 percent of households, which is twice the percentage of the unbanked in the wealthiest 20 percent of households.[15] Given that there is a strong correlation between families living below the poverty line and working in agriculture globally,[16] it can be inferred that while smallholders are a diverse group, many remain unbanked.

Farmers, especially smallholder farmers operating on plot size of one hectare (Ha) or less, and agribusinesses face chronic challenges of limited supply of financial services – including savings, credit, and insurance – as well as to agricultural information and other related support services. The agriculture sector is, however, a significant and in many cases untapped market for financial service providers. By introducing new channels of communication, mechanisms of distributing and accessing financial products, as well as new sources of data and information, digital technology is changing the relationships between such providers and farmers or agribusinesses. The fundamental characteristics of DFS products in agriculture remain the same as traditional financial products, but they are now available to rural customers via technology platforms enabled by the digital collection and integration of financial and non-financial data, which customers can access on a range of mobile or other digital devices.

DFS offerings also leverage business and operating models that have shifted significantly with the reduction or removal of brick-and-mortar service networks in favor of customer-driven or agent-facilitated account access. There are also related digital value-added services (VAS) with a non-financial, information focus – such as agricultural extension and market linkages – typically offered in parallel or as part of a 'service bundle'. Finally, technology providers and MNOs are interacting with bank and non-bank financial institutions, agribusinesses, cooperatives and non-governmental organizations (NGOs) in new partnership formations. Initial market reactions and early trends from these implementations indicate that DFS offerings can find a valuable and sizeable customer base in the agriculture sector among various agri-value chain actors.

For FSPs invested in urban retail customer acquisition and investment portfolios in the housing, construction, transportation, manufacturing, or automotive sectors, the business case for serving rural customers at the individual retail or enterprise level is relatively less compelling. There are limited examples of smallholders accessing finance from state-run agricultural banks. Supplier credit is a more popular source, but is not available everywhere. Generally, informal finance remains a significant means of access to capital in rural areas. Farmers and smaller agribusinesses are by nature rural and dispersed. It is not cost-effective for banks to build branches that adequately reach these rural areas. As a result, as of 2017, there were approximately 5.3 commercial

[15] World Bank Global Findex, 2017.

[16] Smallholders and Family Farmers, FAO. (http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf)

bank branches for every 100,000 adults in SSA, as compared to 21.5 in OECD countries.[17]

Where farmers are able to access formal financial products, they are often available at unaffordable rates or are not designed to meet agricultural needs. Microcredit, for example, is typically offered in small amounts that may not be sufficient to fund a whole season's inputs and must be repaid frequently; presenting a challenge to farmers who have positive cash flow only at harvest times. It may therefore be used more for funding off-farm enterprises than farming activity. The cash held in savings groups typically cannot be accessed flexibly and therefore may not be available for seasonal input or transport purchasing needs.

The complexity of agriculture requires that farmers and their investors understand and are able to accurately manage a variety of risks.[18] Risk in this sector is hard to assess partially because most smallholders and small-scale agribusinesses do not meet formal banks' requirements to maintain and furnish financial records and statements, and because many lack assets for collateral (land can be problematic to use as collateral when land titling is not well documented or subject to dispute) and records of their farm activities, financial transactions or formal credit histories. The seasonality of farming also means that agricultural business activities (cash flows, payments, transactions) can change from year to year or season to season.

It is also important to note that production is dependent on environmental and climatic risks that are inherent to the sector and becoming increasingly volatile due to climate change. Climate change affects "the incidence of agricultural pests and diseases, and direct effects on crop productivity"[19] as well as livestock and fishery health. For example, yields of rainfed maize are expected to drop 25 percent or more by 2050, as compared with 2000 levels, in a generally agreed-upon climate change model.[20] This source of volatility has direct relevance to FSPs that may base lending decisions or the pricing of insurance premiums on predictions of yield and crop risk.

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[17] World Bank Open Data (https://data.worldbank.org/indicator/FB.CBK.BRCH.P5?locations=ZG-OE)

[18] Making Climate Finance Work in Agriculture, World Bank Group. (http://documents.worldbank.org/curated/en/986961467721999165/pdf/ACS19080-REVISED-OUO-9-Making-Climate-Finance-Work-in-Agriculture-Final-Version.pdf)

[19] Wiebe, Keith, Timothy Sulser, Daniel Mason-D'Croz, Mark Rosegrant. The Effects of Climate Change on Agriculture and Food Security in Africa, 2017. (http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/131459)

[20] Ibid.

# Digital innovation can shape financial services for agriculture in myriad ways

Digital technology impacts the business case, operating model, product design, and distribution methods for financial services – offering greater accessibility, affordability, and more tailored products that meet the distinct needs and capabilities of rural customers.

Digital technology and the use of digital means to communicate, transact, source and analyze data have introduced new channels of service delivery and new product types that are changing the business model, incentives and cost/benefit analysis of serving the agricultural sector for financial service providers in Sub-Saharan Africa, the only world region in which more than 20 percent of adults have a mobile money account. The share of adults with such an account has risen twice as fast as that of adults with a traditional, formal bank account.[21] Approximately two-thirds of the world's unbanked population now have access to a mobile phone[22].

Innovations such as satellites, sensors, data analytics, and improved means of connectivity impact the way agricultural activities take place along the value chain. Among these innovations is a range of digital financial services (such as alternative credit scoring, payments, insurance and savings) as well as digital tools for agricultural information and advice (disseminated via interactive voice response and text).

Today, providers can for example use satellite data to predict insurance risk or analyze airtime consumption patterns to assess credit risk. While digital technologies render many changes within the landscape of financial services and information access in agriculture, these are especially affecting the cost and ease of service provision to rural areas. Where serving rural markets may have been cost prohibitive, risky and inconvenient, financial institutions now have the opportunity to reexamine this sector with the advantages such digital tools and channels bring.

[21] World Bank Global Findex, 2017.

[22] Ibid, 92

# An appropriate time to assess market offerings in Sub-Saharan Africa

DFS sector activity oriented toward agriculture and rural customers has progressed to a level in Sub-Saharan Africa where capturing observations, trends and developments has commercial relevance.

Digital financial services are expanding widely in availability and type around the world. In 2017, there were 276 live mobile money deployments in 90 countries, around 20 percent of which also include a savings, investment or pension product.[23] Digital financial services have gained the greatest traction in terms of users and commercial viability in urban areas. Registered mobile money accounts increased 25 percent globally from 2016; with Western and Central Africa the fastest growing regions in SSA in terms of growth in accounts in 2017.[24] Mobile insurance, credit and savings have all experienced growth in the recent past; globally, there are over 120 mobile insurance products in 33 emerging markets and 90 percent of mobile customers can apply for loans directly from their phones.[25]

While there has been considerable experimentation recently with DFS in agriculture, few offerings have reached scale or maturity. Rural customers, including farmers and SME agribusinesses, remain one of the "most untapped commercial opportunities for providers."[26] As a result of this sizeable market segment, a range of financial service providers continue to invest in expanding their rural reach through digital channels. Mobile money providers, for example, have increased their share of the addressable market in predominantly rural areas by five percentage points since 2015 and many providers identify expanding rural reach as a top strategic priority.[27]

Banks and other financial service providers now see an opportunity to serve a market of smallholder farmers and other rural agricultural value chain actors that has not been a commercial priority to date. This handbook explores the ways in which pioneering financial service providers have gone about leveraging digital technology in agriculture, and the lessons that have been learned from these initial efforts.

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[23] State of the Industry Report on Mobile Money, GSMA, 2017, 8. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/05/GSMA_2017_State_of_the_Industry_Report_on_Mobile_Money_Full_Report.pdf)

[24] Ibid.

[25] Shulist, Janet. New State of the Industry Report on Mobile Insurance, Mobile Savings and Mobile Credit, 2016. (https://www.gsma.com/mobilefordevelopment/programme/mobile-money/new-state-industry-report-mobile-insurance-mobile-savings-mobile-credit/)

[26] State of the Industry Report on Mobile Money, GSMA, 2017, 12. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/05/GSMA_2017_State_of_the_Industry_Report_on_Mobile_Money_Full_Report.pdf)

[27] State of the Industry Report on Mobile Money, GSMA, 2017, 12. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/05/GSMA_2017_State_of_the_Industry_Report_on_Mobile_Money_Full_Report.pdf)

# Strengthening the agriculture sector can unlock more than commercial benefits

In addition to improving investment potential, digital solutions applied to the agriculture sector can support a reduction in extreme rural poverty, increase domestic food security, strengthen environmentally sustainable farming practices, and contribute to economic growth.

Achieving increased economic growth and food security requires successful smallholder farmers and micro, small and medium-sized (MSME) agribusinesses. Agriculture is a predominant livelihood and income source across SSA. Smallholder farmers make up around 70 percent of the population, with 80 percent of farmland in SSA managed by smallholders.[28] According to the 2017 World Bank Findex survey, 50 percent of SSA adults surveyed live in a household where growing crops or raising livestock is a "main source of household income."[29] Further, strong agricultural production is required for adequate food security. Agricultural production in SSA needs to increase by 60 percent in the next 15 years to meet the demands of a growing population.[30] A number of countries in SSA are exposed to recurring food emergencies for which the stabilization of domestic food production would be an antidote.[31] Smallholder farmers also provide up to 80 percent of the food supply in this region and their success is crucial to food security.[32]

Growth in agriculture production is eleven times more effective at reducing poverty in Sub-Saharan Africa than growth in other sectors.[33] The World Bank estimates that across countries GDP growth from agriculture is "at least twice as effective in reducing poverty" as GDP growth from other sectors.[34] Further, agriculture and climate change are causally linked.[35] Investing in the ability of farmers to mitigate the drivers of climate change and adapt farming practices can serve to reduce climate change-related risks to economic growth. For example, an IFPRI study showed that heat-tolerant varieties of wheat could increase crop yields by as much as 17 percent, while no-till farming could increase maize yields by 20 percent[36].

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[28] Smallholders and Family Farmers, FAO (http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf)

[29] World Bank Global Findex, 2017

[30] Foresight Africa 2016: Banking on Agriculture for Africa's Future. Brookings. (https://www.brookings.edu/blog/africa-in-focus/2016/01/22/foresight-africa-2016-banking-on-agriculture-for-africas-future/)

[31] Agriculture for Development. World Bank World Development Report, 2008. (http://documents.worldbank.org/curated/en/587251468175472382/pdf/41455optmzd0PA18082136807701PUBLIC1.pdf)

[32] Smallholders and Family Farmers, FAO (http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf)

[33] Contribution of agricultural growth to reduction of poverty, hunger and malnutrition, FAO, 2012, 28. (http://www.fao.org/docrep/016/i3027e/i3027e04.pdf)

[34] Agriculture for Development. World Bank World Development Report, 2008, 29. (http://documents.worldbank.org/curated/en/587251468175472382/pdf/41455optmzd0PA18082136807701PUBLIC1.pdf)

[35] Agriculture is responsible for 19 to 29 percent of greenhouse gases and is the largest producer of non-carbon dioxide greenhouse gases (https://ccafs.cgiar.org/bigfacts/#theme=food-emissions&subtheme=direct-agriculture)

[36] Agricultural Technologies Could Increase Global Crop Yields as Much as 67 Percent and Cut Food Prices Nearly in Half by 2050", IFPRI, 2018 (https://www.ifpri.org/news-release/agricultural-technologies-could-increase-global-crop-yields-much-67-percent-and-cut)

## Understanding what farmers really value is key to designing DFS products that have strong uptake and commercial success.

While formal studies seek to measure benefits of DFS identified and prioritized by the research designer, it is important for service providers to understand what benefits and value-add farmers themselves see in these products to maximize the impact and uptake.

CGAP's Smallholder Diaries, for example, showed that farmers in Mozambique and Tanzania expressed interest in using mobile money particularly as a means to increase the speed of transactions. Yet during the study very few farmers actually used the service[37]. Limited connectivity, low awareness of the product's functions, and price sensitivity could have been among the reasons for the scant uptake. Understanding this discrepancy is, for providers, the key to better serving this customer segment.

Farmers do not always have access to traditional or digital financial services, for reasons that will be explored in depth in this handbook. While digital channels are touted as means to addressing restricted access to traditional financial services, farmers may still face literacy, connectivity, trust and other barriers. Trust has been shown to be a barrier to access where customers are unfamiliar with formal financial services and where limitations around household resources lead to risk aversion. Trust is a particularly significant barrier to access for women.[38]

In an IFC study, trust was found to be a significant factor in differences of DFS uptake across four countries in SSA and that trust was in turn influenced by the historical and social context of each economic and banking system and by individual digital literacy.[39] Further, there is a "crucial gap" between simply having access to a mobile device and being able to use it to access diverse financial services. The relevance of the delivery method (SMS vs. internet) and the content (in terms of cultural and social relevance as well as language) "must be carefully targeted to each customer profile."[40] Generally, a strong preference for cash remains across SSA and uptake of DFS does not occur just because it is marketed as a tool that increases convenience and decreases the cost of holding cash. Uptake also depends on subjective perceptions of accessibility, relevance and the individual's level of exclusion or inclusion in the financial system.[41] Supplying DFS to rural, low-income customers requires more than simply building and releasing a product. Success entails understanding and designing for a customer with particular needs, desires and limitations.

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[37] Anderson, Jamie and Wajiha Ahmed. Smallholder Diaries, CGAP, 2016, 9. (http://www.cgap.org/sites/default/files/CGAP_Persp2_Apr2016-R.pdf)

[38] The Role of Trust in Increasing Women's Access to Finance. (https://www.usaid.gov/sites/default/files/documents/15396/The_Role_of_Trust.pdf)

[39] deBruijn, ME, IC Butter, AS Fall. An ethnographic study on mobile money attitudes, perceptions and usages in Cameroon, Congo DRC, Senegal and Zambia, IFC. (https://www.ifc.org/wps/wcm/connect/98d5d3a6-a2a9-4c35-88fa-770d9ec5bc87/Final+Report+Ethnographic+Study+on+Mobile+Money_December+2017.pdf?MOD=AJPERES)

[40] Anderson, Jamie and Wajiha Ahmed. Smallholder Diaries, CGAP, 2016, 9. (http://www.cgap.org/sites/default/files/CGAP_Persp2_Apr2016-R.pdf)

[41] deBruijn, ME, IC Butter, AS Fall. An ethnographic study on mobile money attitudes, perceptions and usages in Cameroon, Congo DRC, Senegal and Zambia, IFC. (https://www.ifc.org/wps/wcm/connect/98d5d3a6-a2a9-4c35-88fa-770d9ec5bc87/Final+Report+Ethnographic+Study+on+Mobile+Money_December+2017.pdf?MOD=AJPERES)

# Capturing observations, trends, and developments relevant for financial service providers

This handbook documents recent learnings from initial DFS implementations in agriculture. In particular, it explores the role of partnerships and the importance of developing bundled offerings that combine a range of financial or information services depending on the needs of specific rural customer segments.

The objective of this handbook is to support financial service providers with practical guidance to utilize newly available digital technologies to expand the reach of their services into rural, agricultural value chains. After reading the handbook, practitioners will possess a more informed view of challenges in providing financial services in agriculture, the roles of the various players in the marketplace and their potential solutions, how to evaluate the needs of different rural customer segments, how to approach developing an offering, and what role partnerships can play.

While digital technology simplifies or accelerates communication, information sharing and financial transactions, expanding the digital frontier to rural areas requires adopting new capabilities and developing expertise in mobile and online platform development, digital user experience and interaction design, data capture, data management and analytics. There are typically multiple players involved in each offering. A variety of players, such as MNOs and third-party technology providers, e.g. fintechs, have entered the DFS landscape. Their decision to enter financial services was motivated by several factors, including opportunities to deploy new technology solutions that offered a more attractive user experience to meet a perceived market gap not being catered to by traditional financial institutions.

Newer market entrants exhibit an openness to, and are in many cases actively seeking, partnerships to leverage complementary skills and capabilities. These may include data management and analytics, or leveraging large digital distribution networks of other players to engage harder-to-reach customer segments, for example in agriculture. Moreover, financial service providers have a significant role to play in the provision of financial services to various customer segments in the agriculture sector. Should banks and NBFIs eschew partnerships in favor of a “go it alone” approach to building and deploying DFS products, they may fall short of their commercial objectives because of the specialized skills and capabilities mentioned above and the need to understand a complex sector.

# SECTION 2

## *Ways to Approach Agricultural Focused Client Offerings*

### Overview

The landscape of offerings at the intersection of digital financial services and agriculture is diverse and evolving. To reach market and to expand, many DFS offerings require the involvement of a range of commercial and non-commercial actors. Before diving into *what* exactly they provide, this section will address *who* might be involved and *why* their involvement is relevant. Because this landscape includes agriculture, answers to *who* is behind an offering will be shaped by factors unique to this sector; namely how well commodity value chains are organized, or not, which types of crops are produced, and to what extent growers are connected to other actors within a given value chain.

As Exhibit 1 illustrates, offerings can range in financial complexity from a piecemeal payments plan for smallholder farmers to buy inputs without a loan or credit line to index-based weather insurance for global reinsurers. In terms of digital complexity, these offerings exhibit a similarly wide range: from no requirement on the part of a smallholder farmer to own or have access to a mobile or digital device, to the use of smartphones and QR codes by smallholder farmers and cloud-based MIS systems by other enterprise or corporate actors in an agri-value chain.

This section opens by presenting ways to conceptualize variations in agri-value chain structure. It continues with the identification of actors commonly found within agri-value chains and the drivers that inform their potential DFS needs. The section then examines how differences in production cycles correspond to distinct customer journeys for farmers based on the type of crop or livestock grown. These nuances in agriculture are noteworthy because they must inform how offerings are designed and which customer segments to target.

Finally, the section presents a mapping of actors relevant to the provision of a DFS offering in agriculture; their respective capabilities and needs, and where potential opportunities for collaboration exist. Some actors are established incumbents in banking, payments, or mobile telecommunications. Some are technology start-ups or spin-offs. Others are smaller, less formal enterprises that play a key intermediary role in value chains, or NGOs with a rural-agricultural development mandate.

# Exhibit 1:

## *Showcasing the diversity of DFS offerings for agriculture*

*The six offerings highlighted here provide a window to the wide range of DFS currently explored by market actors.*

### myAgro

***Offering:*** Micropayments, agri-inputs delivery.

***Description:*** myAgro allows farmers to self-finance the purchase of agri-inputs packages via piecemeal installments. Farmers pay installments in cash at affiliated input retail locations, then receive scratch cards that must be redeemed using a mobile device to log their progress. myAgro also guarantees package delivery via a network of affiliated input retail locations.

***Role of Digital:*** myAgro's platform issues accounts for every farmer registered as well as for all affiliated input retailers. The platform tracks payments progress, supports package delivery, and is used at the point of distribution. Mobile money is used as a payments collection and money transfer service by myAgro field staff after visiting affiliated input retailers that temporarily store farmer micropayments.

***Role of Partners:*** myAgro relies on agri-input suppliers for seed, fertilizer and other agri-products. It also partners with agri-businesses for storage access and transport needs based on seasonal demand. NGOs operating in rural areas are also potential partners as they can support with farmer mobilization and aggregation.

### Tulaa

***Offering:*** Financing, savings, insurance, and agri-information.

***Description:*** Tulaa provides farmers with access to agri-inputs financing, with an option to mobilize savings and enroll in insurance, as well as tailored agri-information content via mobile phone. Additionally, agri-input suppliers and commodity offtakers are able to transact with financial institutions on Tulaa's platform. Financing is delivered directly to the agri-inputs supplier and repayment is made by the commodity offtaker, with the remaining balance distributed by Tulaa to the farmer.

***Role of Digital:*** Tulaa's platform connects input suppliers, commodity offtakers, financial institutions, and farmers. Farmers interact with the service via mobile device, either to access information or collect harvest sale payments via mobile money. Tulaa field staff/agents are equipped with smartphones and access the platform via a mobile app over wifi. Enterprise customers have access to a platform dashboard via desktop/laptop as well as via the mobile app.

***Role of Partners:*** Tulaa needs agri-input suppliers to meet farmer demand. Commodity offtakers provide Tulaa with the ability to process more lending repayment transactions at a B2B level and create a dedicated market for farmer harvests.

### Commercial Bank of Africa (CBA)

***Offering:*** Savings, credit.

***Description:*** Through MNO partner e-wallet services, CBA provides a white-labeled financial account for interest-bearing savings and micro-credit, based on an alternative credit scoring model using mobile voice and data consumption patterns from MNO partners.

***Role of Digital:*** Customers register for and access CBA accounts via the MNO partner's mobile money platform. The MNO's billing data records system (BDRS) provides anonymized data for a credit scoring algorithm that determines whether an account holder qualifies for credit and up to what amount.

***Role of Partners:*** MNOs provide a range of customer-facing services, from product marketing/promotion and customer acquisition, to call center and customer relationship management (CRM) support activities. In some markets, public and private institutions may support customer aggregation, sensitization, and acquisition activities (e.g universities, corporations/enterprises, agribusinesses).

## HelloTractor

***Offering:*** MIS platform for small-scale agri-equipment and remote GIS-based booking service.

***Description:*** MIS platform to optimize use and maintenance of small scale agri-equipment (e.g. two-wheel tractors) for equipment owners and operators as well as supports remote service booking for farmers.

***Role of Digital:*** Farmers interact with the service via mobile devices, either via SMS message or voice. Equipment owners or fleet managers interact with the service via account dashboard on a desktop/laptop application or a wifi-enabled smartphone with mobile app. Sensor hardware, GIS software, and other applications power the platforms equipment location, management, and performance evaluation services.

***Role of Partners:*** Manufacturers and dealers provide agri-equipment inventory for sensor installation or retrofitting. Input suppliers and commodity offtakers provide access to grower networks. MNOs provide a mobile-based transaction method for farmers to pay booking agents and for agri-equipment owners or fleet managers to pay equipment operators.

## AgUnity

***Offering:*** Payments, accounting/record-keeping, e-commerce platform for agri-products and services.

***Description:*** Farmers digitally transact with their cooperatives and other market actors and can track individual activity patterns to improve trust within agri-value chains and, in particular, between farmers and farmer cooperatives.

***Role of Digital:*** Farmers interact with service via closed smartphones distributed at no-cost to farmers and with preloaded mobile applications. QR code technology is used to conduct transactions between smallholder farmers and other agri-value chain actors. A general distributed ledger (GDL) technology is deployed to record transactions at the individual farmer level.

***Role of Partners:*** NGOs and farmer cooperatives play a critical role in rural customer identification, outreach, and acquisition.

## aWhere

***Offering:*** Predictive analytics for agribusinesses and index-based weather insurance.

***Description:*** aWhere offers “virtual weather stations” that draw on data from multiple sources (i.e. satellites, weather stations, other sensors) to generate localized climate and weather patterns in agri-production areas that lack this information. It can also be used by agribusiness or commodity traders to estimate yield volumes and provide a credible baseline against which to develop and manage index-based weather insurance products.

***Role of Digital:*** Imagery data and other information is sourced digitally and can be pulled from a database or collected manually using a digital collection tool. Corporate or enterprise users interface with the information and dashboard analytics via desktop/laptop or mobile app.

***Role of Partners:*** aWhere relies on public and private sector entities for access to climate, weather, and other agri-related data. It also requires partnerships with agribusinesses to provide access to farm plots to support more granular data collection.

## Agri-Value Chains: A Closer Look at Differences in Structure

The metaphor of a value "chain" invokes notions of defined linkages, durable bonds, as well as rigidity. If one piece in the chain moves, other pieces move or are affected. This metaphor resonates in industrialized sectors such as manufacturing, construction, transportation, or mining. However, in most Sub-Saharan African and other emerging markets, the realities of how agriculture value chains are structured require a more flexible interpretation. This is due to several factors, including but not limited to: poor or non-existent infrastructure in rural areas (i.e. roads, power, water, and mobile telecom), production volatility inherent to agriculture (i.e. soil, seed or livestock health, weather, climate, farming practices), and weak or fragmented markets for the provision of inputs or purchase of commodities due to the presence of non-competitive forces.

To better appreciate these differences, we propose a spectrum approach that focuses on degrees of organization, using a range of characteristics. The purpose behind making these distinctions is two-fold: 1) recognizing differences supports the evaluation of commercial opportunity and risk to serve rural customer segments; and 2) understanding how actors are connected and what shapes their transaction relationships helps with developing a go-to-market strategy that positively leverages existing relationships and other market dynamics.

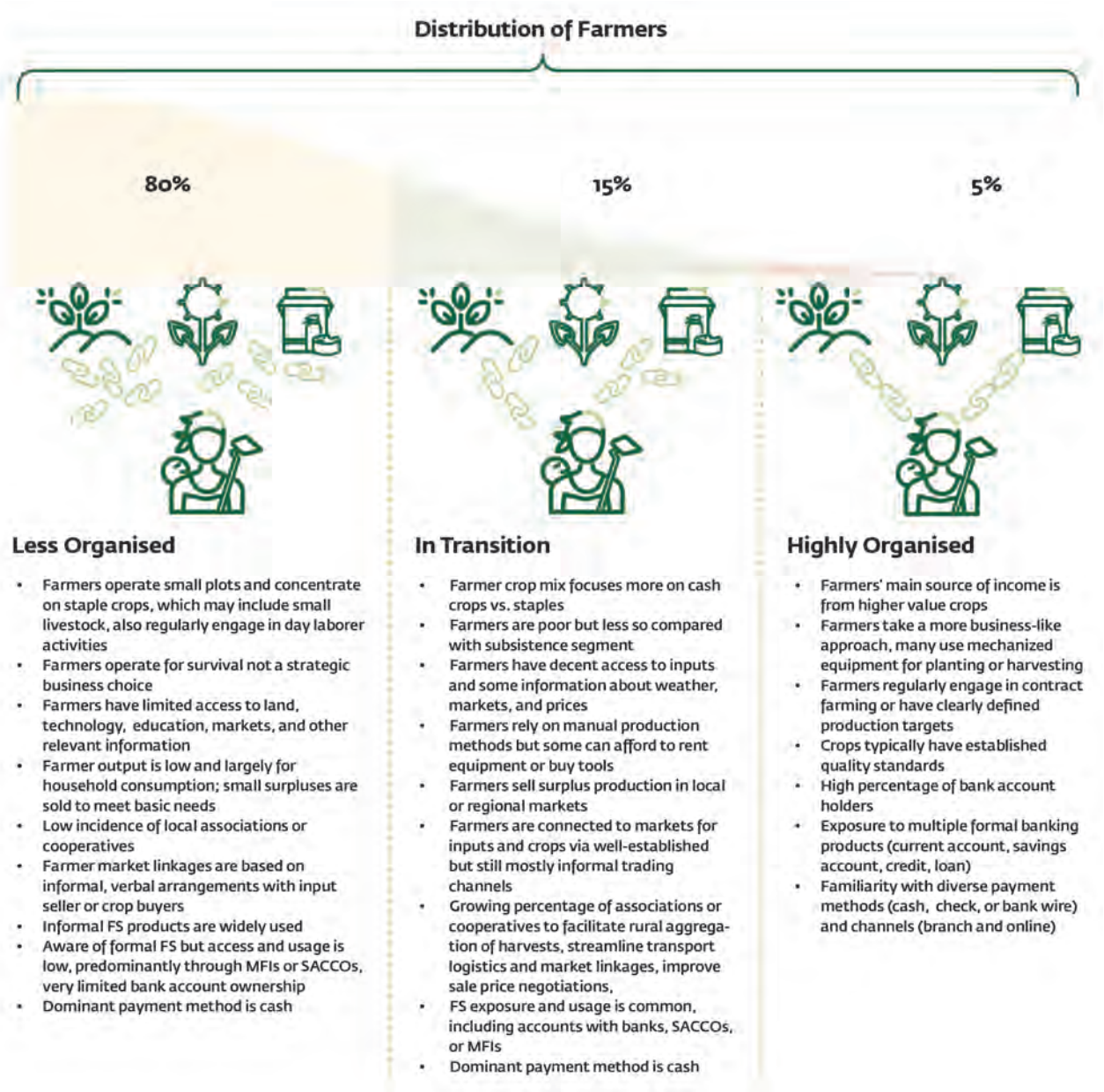
At one end of the spectrum, these structures appear highly informal and fragmented. At the other end, they are more formal and closely integrated. Several characteristics help determine where exactly a value chain's structure falls, including but not limited to:

- Production capacity of farmers and standardization of growing practices[42]
- Presence of local organizations (e.g. cooperatives) and farmer participation in those organizations
- Density of actors at other levels in the value chain and their degree of formalization
- Number of levels within the value chain and the degree of independence or dependence
- Presence of a multinational or national corporation (e.g. a global exporter) positioned at the top of a value chain, referred to as an apex organization
- Access to and usage of formal financial services by farmers and other value chain actors

Further, we divide this spectrum into three distinct segments: less organized, in transition, and highly organized. If we only consider the distribution of farmers – by far the largest customer segment by number within any agri-value chain – along this spectrum, the heaviest concentration of farmers are found in less organized structures operating on small plots under 7 hectares (Ha). A growing percentage of farmers fall into structures that are transitioning to more formal, commercial activity. The smallest percentage of farmers fall into highly organized structures. Of this small percentage, a majority operate large farms managed according to clear commercial production methods; although cooperatives and financial institutions such as a SACCOs, MFIs, or VSLAs, are increasingly providing smaller farmers with access to a single larger buyer, processor, or distributor.

[42] Use of inputs and tools/equipment; planting, tending, and harvesting techniques, etc.

*Figure 1: Spectrum of Smallholder Farmers Distributed According to Segments*



***Less Organized:*** These structures are characterized by farmers whose crop or animal husbandry practices are meant for subsistence, and production capacity is low. Yield quantity and quality is volatile due to poor access to inputs and less access to more recently developed farming practices. Cassava production in the northwestern region of Uganda would be one example of a less organized agri-value chain structure. Farmers in this type of structure buy inputs and sell their crops or livestock to mostly informal, often dense networks of small, independent retailers or traders. These retailers and traders are connected to multiple sources, some reputable and others operating in the grey or black market. This means input quality levels can be low and prices less favorable to farmers. While farmers in this type of value chain structure have well-established links to these first-line sellers and buyers, a large majority of them operate as non-registered, micro-to-small enterprises, and rarely use formal contracts. The income and expenditure patterns of smaller farmers in this type of value chain structure can be complex, unpredictable and often weak. While their annualized daily incomes are low, this figure belies a resourcefulness and sophistication around managing cyclical shortages, allocating capital to multiple productive activities and unpredictable external shocks (i.e. health emergency, bad weather, pest/disease outbreak). As we discuss in more detail later, time allocation and overall activity patterns of farmers in this structure are important considerations as this understanding may impact how assessments of risk and cash flow are conducted.

***In Transition:*** For those structures becoming increasingly organized, farmers grow a higher percentage of cash crops or are adopting better livestock management practices. They also typically enjoy greater access to quality inputs – including tools, machinery, and other equipment. Production capacity is more stable, larger, and of increasing quality. More commercially-focused activity can also lead to greater specialization in agri-related activity and less diverse income streams. Cow-based dairy production in Kenya would be an example of a value chain structure in transition. Farmers are linked to a smaller, more formal network of input sellers and commodity buyers. Links to both sets of actors are still driven by personal relationships but formal contracts are used, especially between farmers and higher value cash crop buyers. Sellers and buyers are also more likely to have formal relationships with larger distributors or off-takers, either as commissioned agents or paid staff.

***Highly Organized:*** Structures in this category include farmers that are capable of consistent high volume, high quality yields. This is due to strong, easy access to quality inputs, tools, equipment, as well as the application of commercial-grade techniques for planting, tending, and harvesting. On either the buying or selling side, farmers in these value chain structures deal with a finite number of agri-enterprises and primarily via formal contracts entered into directly by a farmer or through an aggregating entity (i.e. farmer cooperative, SACCO, MFI). In many instances, there are very few independent middlemen involved in trading or transportation. Farmers may even deal directly with a national distributor or buyer that will assume responsibility and cost of delivering inputs or collecting crops and livestock.

In Section 4. 'Building an Offering', the handbook explores the implications of these differences in value chain structure for DFS providers. It is worth highlighting here, however, that the immediate reaction or instinct *should not be to automatically dismiss less organized agri-value chains*. In fact, it is precisely these types of agri-value chains where opportunities to offer DFS may be greatest due to a) overall market size, b) anemic levels of traditional financial services usage, and c) latent demand for formal financial services as evidenced by the penetration of informal providers offering more costly finance terms (in many SSA markets annualized interest rates can exceed 75 percent) but highly flexible repayment options. If DFS providers successfully combine innovative digital solutions that lower cost and improve rural service expansion with greater knowledge of how rural market segments function, they can approach agri-value chains with an eye towards not only commercial feasibility but also profitability over the longer term.

## Identifying Common Agri-Value Chain Actors and Understanding Drivers of DFS Needs

With a firmer grasp of how agri-value chain structures differ, we turn our attention to the actors commonly found in these chains and the drivers that shape different DFS needs. We consider three basic categories of actors; those involved in farming for crop production or animal husbandry, the provision of agri-inputs, and the sourcing, trading, or distribution of outputs. We also propose a tiering approach that includes six distinct levels to differentiate these actors based on their roles and activity patterns in the value chain.

*Figure 2: Illustrative Agri-Value Chain Actor Map: Crop-based Outputs*

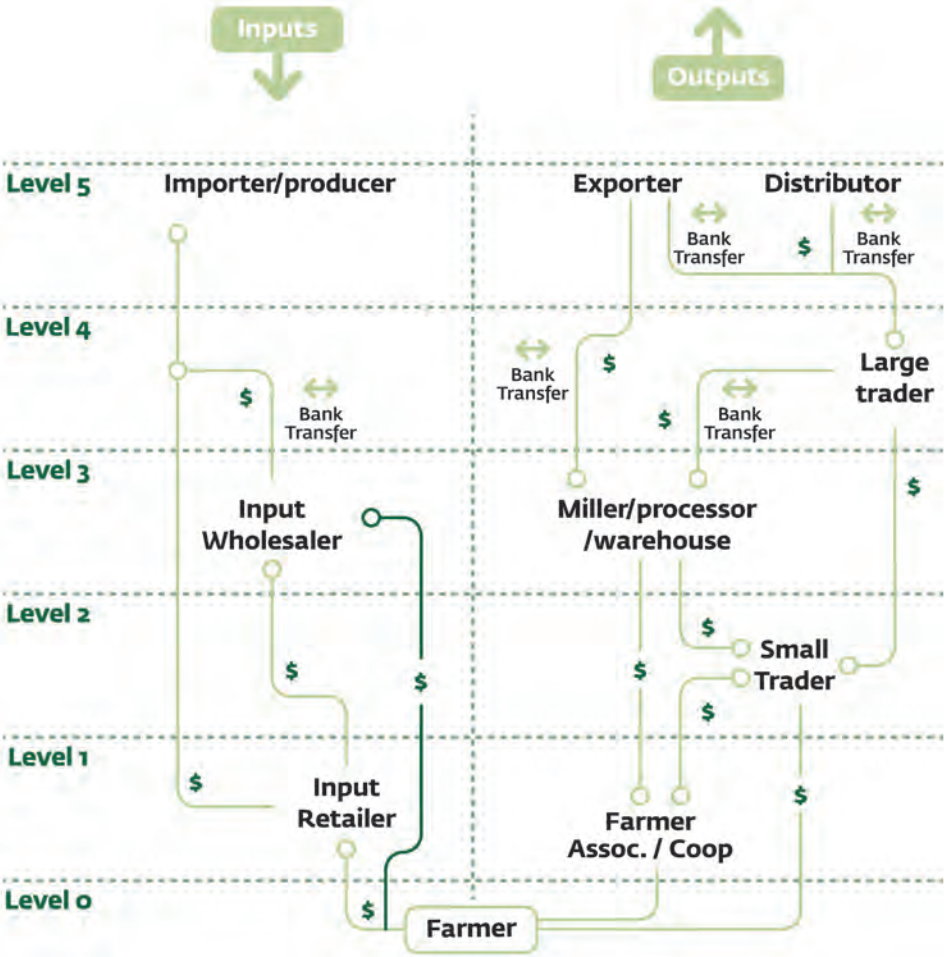


Figure 2 depicts input and output actors in a generic, less complex agri-value chain typically associated with crop-based commodities – such as cereals, coffee, cocoa, tea, or nuts – that involve milling, processing, or warehousing. On the inputs side, agri-value chains commonly exhibit a rather thin hierarchy with a smaller number of levels that includes an apex organization(s), regional or national wholesalers, and localized retailers. On the outputs side, multiple levels are also the norm, but the exact number varies widely based on several factors, including the type of commodity produced as some actors are not present in all production cycles.

Because these actors play different roles and exhibit specific activity patterns and capabilities, it is important to consider each different level since the drivers that shape specific DFS needs are not across actors. We recommend applying this level of detail to agri-value chain analysis as it supports a holistic approach to DFS offering design and deployment that can capture variations in customer needs based on how they operate and interact within a given chain.

We identify the following categories of drivers shaping specific DFS needs:

a. ***Revenue Generation*** - considers the likely types, sources and patterns of revenue generated. This driver impacts DFS needs vis-a-vis willingness and capacity to pay for different products (savings, credit, lending) and potential terms and conditions (interest rates, repayment schedules).
b. ***Transaction Relationships*** - considers which other levels an actor would likely transact with and what the prevailing payments methods might be. This driver impacts DFS needs regarding product parameters around use (timing, velocity, and volumes of payments/transfers)
c. ***Formal Financial Services (FS) Usage*** - considers not only account ownership and type of product used – savings, credit, lending, or insurance – but also broader issues of awareness and access such as proximity to branch network, applicable fees, familiarity with alternative channels (i.e. ATMs, online, mobile banking, banking agents). This driver impacts DFS needs regarding which types of products may have greater viability given current usage and gaps.
d. ***Information Access/Digital Technology*** - considers the types, sources, and patterns of accessing information as well as the degree to which digital technology may have penetrated this process of sourcing information. This driver impacts DFS needs around service distribution and product design as account proximity and the overall user experience could include several digital components.

## The Digital Landscape of Farming in Africa

Digital technologies offer a range of solutions to many of the challenges smallholder farmers and other actors in agri value chains face in order to produce, trade and invest as efficiently and successfully as possible. This illustration highlights a few of the emerging DFS in the agricultural sector.

Production: DFS can help smallholder farmers better source and finance seeds and other inputs, as well as lease equipment such as tractors. Satellite and other data sources can help provide relevant weather and soil data for better production practices.

Market: DFS can help connect the various actors in the agricultural value chains to efficiently source and trade produce at various levels, from local to international markets. There are various digital solutions for monitoring stock, pricing information and for payments.

Data collection: A range of new digitally connected data sources, including satellite, sensors and drones, coupled with more traditional KYC and transactional data make it increasingly possible for service providers to offer credit and insurance to smallholder farmers.

Livelihoods: DFS make it possible for rural communities to connect to urban family members for fast money transfers, and pay for school fees digitally. An increasing body of evidence also show that access to mobile savings can help smallholder households better smooth consumption over the lean months.

## LEVEL 0: FARMERS

Farmers at this level are defined as those who grow crops or livestock on plot sizes of seven hectares or less, and they constitute the great majority of people engaged in farming in Sub-Saharan Africa. The land they cultivate or access may be theirs or they may rent. Their production is largely for subsistence, with limited selling onto local or regional markets depending on their participation in community-based organizations or linkages to traders that operate on a wider geographic scale.

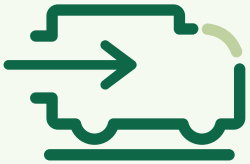
### Drivers of DFS Needs

***Revenue Generation:*** Farmers in this category generate multiple revenue streams throughout a calendar year. These streams result from selling different crops that are rotated on their fields, livestock, or animal by-products (e.g. dairy). Some revenue streams are un-related to crop selling but tied to agri-production such as manual labor, tool or land rental, as well as small scale trading.

***Transaction Relationships:*** Farmers rely on a complex web of relationships with agri-value chain actors immediately adjacent to, or just above, them. These relationships are widespread and well-established. In most instances, farmers directly engage these actors. While informal, these relationships are well-established and often influenced by senior or other respected members within a rural community (e.g. a lead farmer). Farmers, therefore, may have more freedom to choose who they sell to than who they buy from as the use of informal credit frequently binds farmers to a particular input distributor. Where cooperatives or other rural financial institutions are present, mature, and well-connected to larger value chain actors above the farmers, farmers may source inputs and connect to buyers through an intermediary. All transactions are conducted on a cash or barter basis unless informal credit is being extended to farmers – most commonly for the purchase of inputs.

***Conventional Financial Services Usage:*** Formal account ownership is quite low and typically restricted to male farmers. Personal savings accounts are the most common products used, although activity rates and running balances are very light. A small percentage of farmers may have successfully applied for and received a micro-loan from a bank. Informal savings methods such as tontines, VSLAs or other rural group-based models are widely known and frequently used. Some are quite mature and well-managed, with low membership turnover. They serve a range of purposes from income smoothing, to withstanding unexpected small shocks or acquiring a valued asset (i.e. construction materials, solar products). Farming households also take out microfinance loans but, for cultural and other reasons, these are often accessed through female family members. Further, these loans are commonly earmarked for non-farming activities; such as small-scale trading, other micro-enterprise activities or to cover important expenses such as school fees. Insurance products are rare unless part of a bundled offering brought by a microfinance institution or donor-driven initiative. Although usage levels are low, farmer awareness and interest in other formal products, loans and credit, is often high. Major barriers blocking the conversion of farmer interest into product use include fees, repayment terms, as well as proximity to service locations. Finally, the vast majority of farmers only access services within a branch, unless a bank agent visits them. Exposure to other delivery channels (e.g. ATM) is extremely low.

***Information Access/Digital Technology:*** Farmers rely heavily on social networks for information with radio and agri-extension services networks providing additional access channels. The mobile channel is the dominant if not the only means by which farmers interact with digital technology. Mobile ownership and usage can range considerably. Most farmers purchase cheap basic handsets for voice communication and may use their phones to source pricing information from friends, families or other contacts during harvest seasons. In many markets, this trend is increasing.



## LEVEL 1: LAST MILE AGGREGATORS/ DISTRIBUTORS

Last-mile aggregators are located on the outputs side in a value chain. They provide a central location in deep rural areas to combine harvest yields as well as serve to organize and build the capacity of farming communities. Last-mile aggregators usually take the form of a cooperative, association, or NGO.

On the inputs side, last-mile distributors are those retailers selling a range of agri-inputs (i.e. seeds, fertilizer, and herbicides/ pesticides) and related products or services. Typically, they are independently owned, but sometimes they form part of a regional franchise or national chain. Last mile distributors would also include hired services that rent tools or equipment to individual farmers or farmer groups.

### Drivers of DFS Needs

***Revenue Generation:*** Last-mile aggregators may or may not operate on a for-profit model. Those that do generate revenue are dependent on agri-production cycles unless additional dues or service fees are paid by

members. Commodity or livestock trading activity is also restricted to specific time periods that may be rather short, as in the case of perishable crops where there is little to no extended storage activity. Almost all revenue generated, therefore, is a function of finding markets and buyers for trading inventory.

Last-mile distributors face similar sales cycles, but with activity spikes preceding crop-planting or just after livestock purchasing. Some revenue smoothing can be achieved through inventory diversification into household items (e.g. hygiene or cleaning products). They may also generate revenue through letting land, tools, or equipment. To optimize revenue generation, last-mile distributors must actively manage inventory; although many lack formal tools to do this, whether analog or digital.

***Transaction Relationships:*** Last-mile aggregators have limited visibility up the value chain outside of their direct affiliations with larger enterprises such as a processor or wholesale commodity trader. Transactions are conducted in cash unless the organization has a bank account, in which case some percentage of transactions may involve a check or bank wire.

Last-mile distributors operate cash-based retail businesses, but informal credit is frequently extended to known or trusted customers at negligible to zero interest. This practice serves multiple purposes: commercial necessity, customer loyalty, and new customer acquisition. However, it can introduce an accounting requirement and a rather involved and sometimes costly collection process. Last-mile distributors purchase their inventory from larger sellers in cash, unless the enterprise or corporation is prepared to offer supplier credit, typically through formal financing channels (e.g. banks).

***Conventional Financial Services Usage:*** Among last-mile aggregators, formal account ownership is likely to be higher than among their farmer members, but broad utilization of financial services outside of conducting sales transactions with traders or other buyers that prefer wire transfers or check-based transactions is likely low. Reliance on formal financing for operational activities (i.e. bulking, weighing, and packaging) is quite limited as last-mile aggregators often lack detailed financial records, business plans and other documentation necessary for application processing and approval.

Among last-mile distributors, formal financial product ownership is typically higher than among farmers or last-mile aggregators. As for-profit entities, they have larger cash flows, a cash handling requirement for selling inventory, interact more regularly with formal enterprises above them, and have greater mobility to access branch locations. Given their size relative to other larger distributors however, formal financing is not actively sought after by last-mile distributors who are more likely to secure additional financing from family, friends or their community.

***Information Access/Digital Technology:*** Information access is stronger among last-mile aggregators and distributors than among farmers, as they both interact more frequently with actors above them and enjoy a level of mobility many farmers do not have. Formal education and basic numeracy/literacy levels may also be higher, allowing these actors to collect more information from printed sources. In terms of digital technology, the proximity of last-mile distributors to trading centers or more densely populated centers provides them access to mobile technology vendors and to other digital delivery channels for banking and payments, such as ATMs or POS terminals.

## LEVEL 2: SMALL TRADERS

Small traders are individuals that operate informal microenterprises on a wholly independent basis or as affiliates of larger buyers such as millers, processors, warehouses, or larger traders. These actors tend to be intermediaries between open markets and farmers or last-mile aggregators, or between entities involved in the next stage of value addition and farmers or last-mile aggregators. Some traders may work in groups or affiliated networks, but they largely operate informally.

### Drivers of DFS Needs

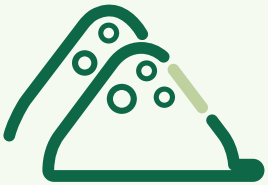
***Revenue Generation:*** Commodity trading is the dominant revenue stream for small traders and therefore will follow the production patterns of that particular crop or value chain. Many are also farmers or earn additional revenue through crop selling or the letting of vehicles, equipment, or land.

***Transaction Relationships:*** Small traders deal heavily in cash but may have occasional exposure to wire transfers if they deal with larger enterprises and have a bank account. Contracts are not the norm but do appear in some more organized value chains.

***Conventional Financial Services Usage:*** Account ownership is highly inconsistent depending on location, sector, or market. Traders in more formal value chains that are linked with international markets that deal in larger networks and with larger quantities of goods are more likely to own accounts. Traders who can use credit products are able

to buy larger quantities of commodities and therefore expand business operations, but many do not have access.

***Information Access / Digital Technology:*** Depending on size of the geographic area of operation, small traders may have similarly restricted access to information as farmers. They are more likely to have mobile phones than farmers in some cases.



## LEVEL 3: WHOLESALERS/ MILLERS/ PROCESSORS / WAREHOUSES

This level of actor is present on both the inputs and outputs side of an agri-value chain. On the inputs side, wholesalers purchase and sell agriculture supplies in bulk and maintain a single facility or network of facilities for receiving and distributing their inventory. On the outputs side, warehouses, millers, and other processors (i.e. for crops, livestock or animal by-products) source raw materials grown by farmers and add value by converting them into new products through activities that typically require a stable power supply, mechanized equipment and other infrastructure. Like wholesalers, these actors may also own or manage a network of physical locations and a fleet of vehicles for the collection and distribution of materials.

### Drivers of DFS Needs

***Revenue Generation:*** For input wholesalers, inventory sales are the dominant revenue stream. For millers, processors, and wholesalers on the outputs side, their primary income stream is from the sale of milled or processed outputs further up the value chain or by storing raw commodities for a fee. Because most farmers do not have access to on-farm or nearby storage and because it is key to avoiding massive waste and spoilage, this service is central within many crop-based value chains.

***Transaction Relationships:*** Actors at this level are dependent on a diverse network of distribution or sourcing channels to support a reliable supply of raw materials for storage or value addition and to sell these onward. They are typically well connected to actors above and below them in the value chain.

***Conventional Financial Services Usage:*** Account ownership is elevated and usage is consistent as compared with small traders and farmers. Usage is geared towards managing payments, though credit can be used for upgrading and expanding equipment or storage facilities to add higher levels of value to raw products.

***Information Access/Digital Technology:*** Digital technology access through the mobile channel is quite prevalent at this level, but even these actors may face limitations resulting from poor performance of low-cost devices and unreliable mobile network connectivity. This segment may have wider mobility to access information in larger towns but still may not visit large urban areas very frequently.

## LEVEL 4: LARGE TRADERS

Large traders are found on the outputs side of an agri-value chain and operate formal enterprises that specialize in the buying and selling of raw or processed agricultural commodities in bulk. Given their trading volumes, these actors typically own physical storage facilities and vehicle fleets to orchestrate buying, storage, and delivery activities.

### Drivers of DFS Needs

***Revenue Generation:*** Primary income stream is from trading activity, with diversification into other ventures. This group differs from small traders in that they are more organized and tend to operate as more formal businesses with multiple employees rather than as individuals or informal networks. In some very loose value chains, large traders may not exist.

***Transaction Relationships:*** Large traders have transaction relationships with lots of actors above and below them in the value chain. They differ from small traders in that they can rely on advance contracts from actors above them, such as exporters and distributors, that are frequently paid electronically via bank wire. With actors below, cash-based payments are the dominant method for sourcing commodities.

***Conventional Financial Services Usage:*** Large traders are bank account holders and frequent users of a variety of basic financial services. They are familiar with conventional financial service providers and have likely been exposed to a range of alternative service delivery channels, from ATMs and POS terminals to online or mobile banking applications.

***Information Access / Digital Technology:*** Large traders have consistent access to mobile technology and other information about commodities and pricing. They are likely to pass frequently between rural and urban or peri-urban areas and have greater information access as such.

## LEVEL 5: PRODUCERS, IMPORTERS, DISTRIBUTORS, AND EXPORTERS

Actors at this level are multinational or national corporations involved in either mass production or importation of agri-inputs (i.e. seeds, fertilizer, tools, or equipment) or mass sourcing, processing and selling of agricultural commodities. They are typically well capitalized, with sizeable investments in sourcing, storage, packaging, and distribution infrastructure.

### Drivers of DFS Needs

***Revenue Generation:*** Actors at this level are selling a product that has had as much value added to it as possible so while this is not a high-margin area, revenue is higher for these actors than for any others further below in the value chain. Products at this level are sold on to domestic and international markets for final levels of processing and value addition.

***Transaction Relationships:*** Depending on the value, these actors will have a diverse and potentially far-reaching network of transaction relationships with a variety of entities that want to buy finished or nearly finished agricultural products. These could include stores or wholesalers, international companies and buyers, and other domestic processors. They will also have a relatively large network of transaction relationships with the traders or cooperatives they buy commodities from.

***Conventional Financial Services Usage:*** Value chain actors at this level are likely using a wide variety of existing financial services with frequency, including bank accounts, credit products and perhaps certain types of insurance. When needed, credit is used for buying larger quantities of raw goods and semi-processed goods and adding value through further processing or packaging.

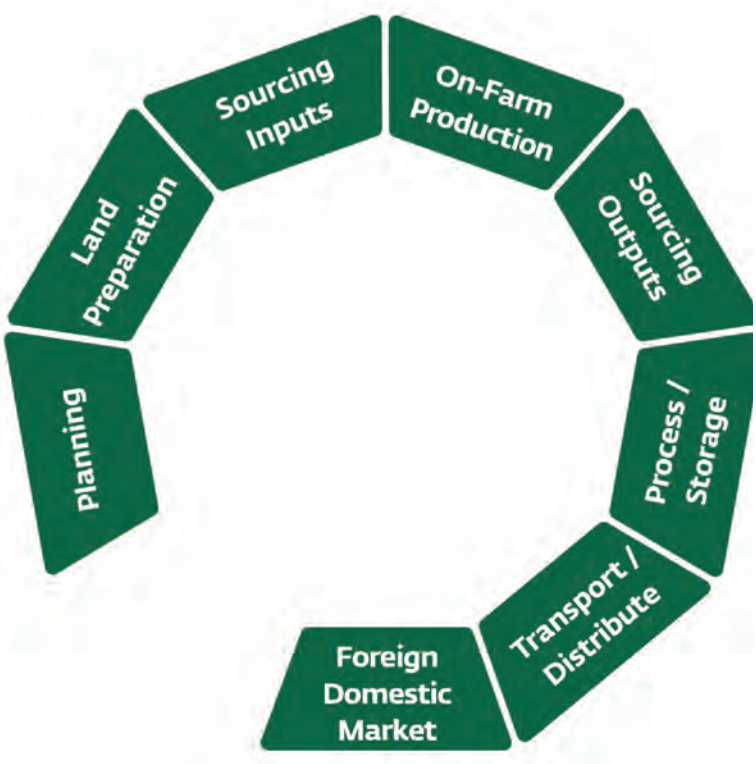
***Information Access/Digital Technology:*** As large national or multinational corporations, managers and staff at this level are much more likely to have a range of digital and mobile technologies and internet connectivity. This provides them with access to updatable information on specific topics or activities, particularly related to their traded commodities.

## Agri-Production Cycles: What Farmers Grow Lead to Different Customer Journeys

Thus far, we have explored variations in overall value chain structure and how actors within these value chains fall into distinct groupings based on their roles and activity patterns. We now turn our attention to another element relevant to agri-value chain assessments: production cycles. The reason being that what a farmer grows impacts how, when, and why they consume financial and information services. If providers can better understand these patterns in terms of sequencing and timing, they can more accurately chart the journeys of their prospective customers and more effectively design and deploy DFS offerings.

Figure 3 exhibits the several stages within a generic agri-production cycle. These stages reflect activities or decisions that occur during a) pre-farm production, b) on-farm production, and c) post-farm production.

*Figure 3: Agricultural Production Cycle: Generic*



The first three stages – **planning, land preparation and sourcing inputs** – involve farmers as they prepare for growing crops or tending livestock. Often, these stages last only a few weeks combined. Interaction between farmers and other value chain actors is limited to retailers and cooperatives if the crop or livestock to be grown has heavy input requirements (i.e. seed, fertilizer, pesticide/herbicide, feed, medications, or water) before manual labor is sourced to assist with land preparation or planting activities.

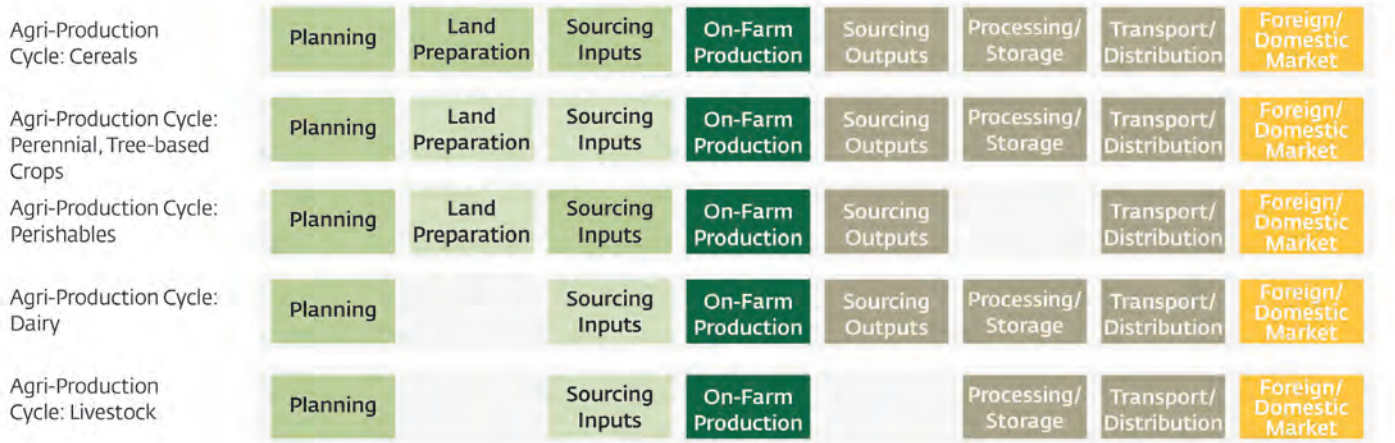
During the fourth stage, **on-farm production**, the farmer is the dominant player. It begins with planting seeds, tending trees, or buying livestock, and concludes once the farmer has sold their harvest or livestock. This is typically the longest stage for the farmer and may last several months, especially in the case of perennial crops such as coffee, tea, or cocoa. Farmers interact with hired labor, input suppliers (e.g. purchase of herbicide/pesticide), or agri-services providers (e.g. equipment rental) at specific periods, provided there is available capital and a need for such services.

The subsequent three stages – from **sourcing outputs, through process/ storage, to transportation and distribution** – correspond to activities and decisions taken by actors at different levels on the outputs side, from cooperatives and small traders to millers, large traders, and exporters. Raw commodities or livestock make their way along the value chain as they are collected, processed, stored, and distributed. The final stage, **Foreign/ Domestic Market**, completes the cycle and includes only entities that sell directly to domestic distributors for retail consumption or that export to foreign markets.

When working towards an actual design and deployment of a DFS offering in this sector, however, it is important to be aware that this production cycle will shift depending on what crops are grown or what livestock is being raised. Not all stages or actors are present, nor is the intensity of activity the same.

In the Tools 2 (page 203) five variations of the generic agri-production cycle are identified: 1) cereals, 2) perennial tree-based crops, 3) perishables, 4) dairy, and 5) livestock. The rationale for organizing production cycles in this way is two-fold. First, the number of agricultural commodities under production in most Sub-Saharan African markets is considerable and can vary widely region to region and market to market. This makes it highly impractical to estimate the appropriate number and type of commodities to consider here. Secondly, these categories allow for a degree of aggregation based on similar attributes that still supports meaningful comparisons. In the same section, additional details broken out by each variation are identified and key considerations proposed for DFS providers as they undertake preliminary service assessments and design activities for each. Below are brief summaries that highlight similarities and differences and their relevance for DFS offerings, also captured in Figure 4.

*Figure 4: Agricultural Production Cycles Comparison by Type of Output*




***Cereals:*** This type most closely follows the generic example cited above. Commonly grown crops that follow this cycle include rice, maize, soybean, millet, pulses, and wheat. Capital is required every season for a range of production and harvest-related needs, ranging from manual labor, equipment, and inputs. Multiple actors operate at different levels on both the inputs and outputs side. There is also a strong presence of actors on the output side playing roles related to processing, storing, and transporting these commodities. Harvest cycles for most cereals follow an annual pattern with the possibility of a second bumper crop dependent on weather and growing conditions.

***Perennial, tree-based:*** This type follows that of cereals, in terms of number of stages, actors present, and post-production sourcing, processing, and distribution. Common examples of crops that follow this cycle include coffee, cocoa, rubber, and tea. Unlike cereals, there is no seed requirement and, as a result, relatively lower input requirements (unless there is a replanting effort). Labor is the dominant, seasonally recurring expense requiring capital, and occurs at multiple periods during the growing stage. Harvest cycles are semi-annual and raw harvested yields have a shorter trading period compared to cereals. Depending on how organized the value chains are in terms of the reach of more formal buyers or processors, the process may be highly time and labor intensive for many farmers.

***Perishables:*** Crops that follow this cycle include vegetables and certain fruits. This type is comparable to both cereals and perennial tree-based crops in terms of the number of pre-farm production stages and the presence of actors on the inputs side. Like cereals, there is a seasonally recurring capital requirement for inputs and manual labor. However, requirements for manual labor and inputs (namely for fertilizer and pesticides) can be much higher. Harvests occur more frequently than in cereals or tree-based crops, on a bi-monthly or quarterly basis. The need to time harvest collection and market delivery is much more pronounced in perishables than in cereals due to spoilage issues. Noticeably absent from the perishables cycle in many markets are actors on the output side that play a storage or processing role.

***Dairy:*** This type is specific to the tending of livestock for the production of animal milk. The most notable differences between this variation and

earlier ones are the absence of a land preparation phase, which includes tilling and other activities related to preparing soil, and fewer inputs requirements. That said, there are recurring capital needs that involve inputs pertaining to animal health and adequate food supply. Milk production occurs on a daily basis and most dairy operations have limited on-farm storage. Also, the dairy cycle exhibits the same number of stages and actors once into post-production, and there are similar commercial imperatives vis-a-vis timely collection, proper storage, and rapid distribution of milk.

***Livestock:*** This is the most removed type from the generic cycle example. There is no land preparation stage and there is no comparable post-production stage where an actor comes to the farm gate or a designated bulking center to purchase and collect harvested crops. Instead, farmers rely on fixed or roaming markets to buy, sell, or trade livestock. As a result, they have recurring capital requirements closely tied to arranging transport and to purchasing livestock. Feed and medical supplies are additional expenses these farmers may make, which are also commonly found at these same markets. Trading activity follows the maturation process of the animals being raised, and the desired specifications of prospective buyers.

Table 1 compares agri-production cycles by harvest/production schedule, production requirements, and post-production requirements. Production requirements refer to services or products tied to crop cultivation or livestock management up to the point of harvesting, production, or sale that introduces a financing requirement for a farmer, such as labor, inputs, tools, or equipment. Post-production requirements refer to activities or services tied to sourcing, storing, processing, or transporting that introduces a financing requirement for either a farmer or another agri-value chain actor.

*Table 1: Agricultural Production Cycles Schedule, Requirements and Relevance for DFS*

| Production Cycle | | Harvest/Production Schedule | Production Requirements | Post-Production Requirements |
|---|---|---|---|---|
|  | ***Cereals*** | *1-2 per year* | *Land preparation: intensive*<br>*Inputs: intensive*<br>*Tools/Equipment: intensive* | *Harvesting: intensive*<br>*Transport: intensive*<br>*Storage/Processing: intensive* |
| | *Relevance for DFS* | • *Access to quality seeds and fertilizer impacts yields – digital financing mechanisms can enable farmers to purchase inputs at reasonable rates of interest and on more flexible terms*<br>• *Yields are also tied to weather conditions – insurance can guarantee minimum income levels*<br>• *Market information on pricing and market linkages are not well-established – remote payments and digitally linking sellers and payers can optimize trading activity* | | |
|  | ***Perennial, Tree-based*** | *1-2 per year* | *Land Preparation: Light*<br>*Inputs: Moderate*<br>*Tools/Equipment: Light* | *Harvesting: Moderate*<br>*Transport: Intensive*<br>*Storage/Processing: Intensive* |
| | *Relevance for DFS* | • *Ability to hire and pay day laborers is typically important in this value chain*<br>• *Sufficient funds for pest control tied to affordable credit mechanism*<br>• *Availability of leasing instruments for equipment can improve yields and post-harvest handling* | | |

| | | | | |
|---|---|---|---|---|
|  | ***Perishables*** | *6-8 per year* | *Land Preparation: Moderate*<br>*Inputs: Intensive*<br>*Tools/Equipment: Moderate* | *Harvesting: Moderate*<br>*Transport: Intensive*<br>*Storage/Processing: Moderate* |
| | *Relevance for DFS* | • *Produce price volatility places a premium on market information and speed of payments*<br>• *Storage mechanisms can improve produce pricing to the farmer*<br>• *Sufficient funds for pest control tied to affordable credit mechanism* | | |
|  | ***Dairy*** | *Daily* | *Land Preparation: Light*<br>*Inputs: Moderate*<br>*Tools/Equipment: Intensive* | *Production: Intensive*<br>*Transport: Intensive*<br>*Storage/Processing: Intensive* |
| | *Relevance for DFS* | • *Digital payments to farmers reduces cost of cash burdens to buying cooperatives* | | |
|  | ***Livestock*** | *Varies based on type and desired buyer demand* | *Land Preparation: Light*<br>*Inputs: Moderate*<br>*Tools/Equipment: Light* | *Trading: Light*<br>*Transport: Moderate*<br>*Storage/Processing: Moderate* |
| | *Relevance for DFS* | • *Market pricing and transportation information are key revenue drivers*<br>• *Funds for feed and new animals are often financed*<br>• *Savings mechanisms are important to smooth income flows* | | |

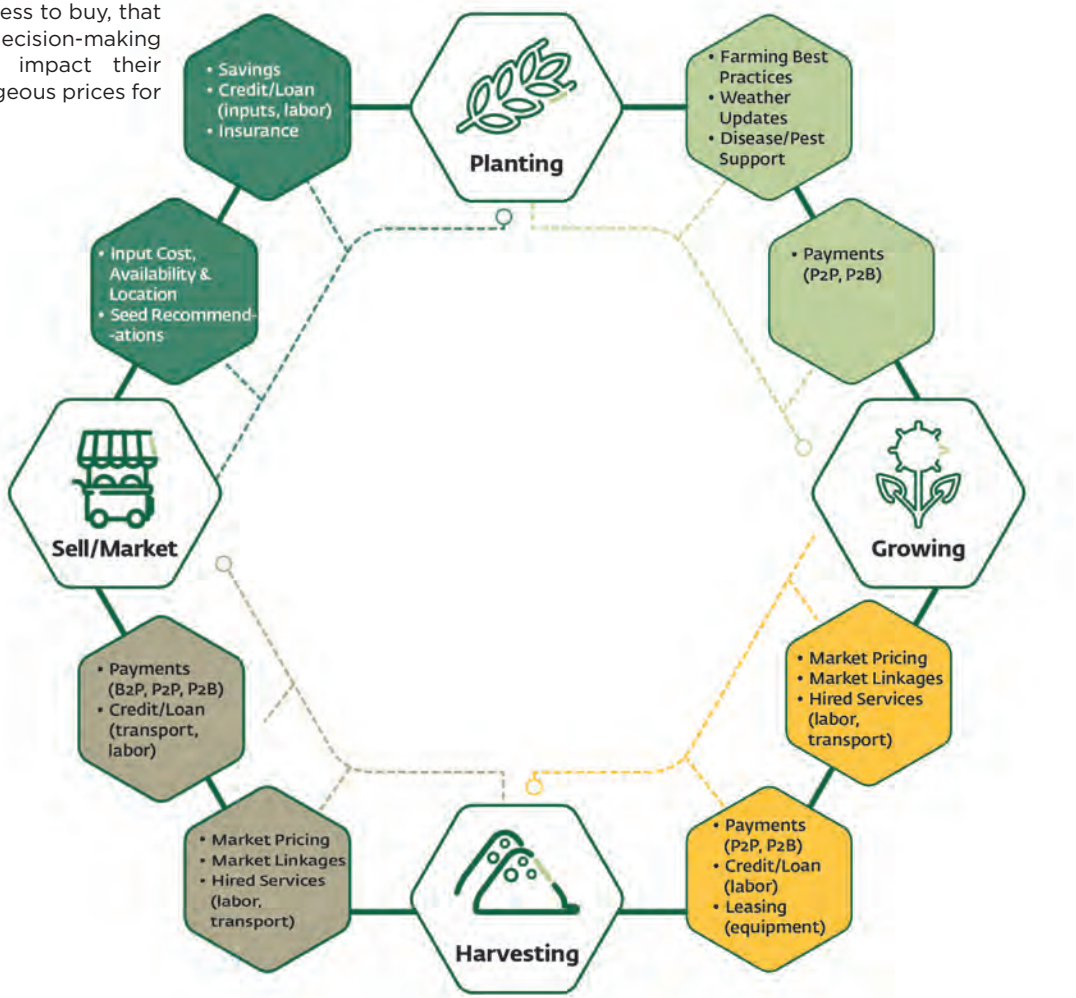
To complete the customer journey from a farmer perspective, this subsection concludes by unpacking a single stage, *On-Farm Production.* The activities and decisions during this stage account for most of a farmer's consumption of financial or information services. As Figure 5 illustrates, multiple phases comprise the on-farm production stage. It also highlights which services are likely relevant as farmers progress from one phase to the next. The information and financial services listed are indicative not exhaustive. They are meant to provide a starting point to determine what patterns can be identified and assumptions made to validate at the farmer level, through tailored market research. Further, in the Tools 2, (page 203) we provide illustrations of the on-farm production phases specific to each of the production cycles already outlined.

As farmers progress through the planting and growing phases, there are recurring but oftentimes unpredictable needs for labor or inputs. These needs trigger payments between farmers and other individuals or enterprises, as well as the potential need for finance or leasing for production-related activities. The information services that a farmer might find most relevant – such as weather updates, best practices reminders, or outbreak alerts – would support improved planning and timing of these payments. This information could also help the farmer more quickly and accurately purchase the right kind of inputs, from reliable sources, in the appropriate amounts and applied in the correct manner.

When farmers enter the harvesting phase, the need for labor and some degree of equipment rental or transportation triggers another round of payments. These payments may be made multiple ways depending on the transaction relationships linking the various parties. Payments might be made pre-harvest sale, post-harvest sale, or deducted from the harvest sale. As weather can significantly impact the quantity and even quality of a harvest, farmers would strongly benefit from advance notifications of rainfall or major shifts in temperature. This would allow them to better coordinate labor,

equipment and transport requirements to minimize crop loss. It would also strengthen decisions about when or perhaps where to sell their harvest. If this information includes awareness of market prices, the presence of certain buyers, and their willingness to buy, that would enhance this decision-making process and positively impact their ability to secure advantageous prices for their crops or livestock.

*Figure 5: Financial and Informational Needs During On-Farm Production*



## Mapping Actors in DFS Offerings for Agriculture: Capabilities, Needs and Collaboration Potential

For a mapping of key actors relevant to DFS offerings in the agriculture sector, actors can be divided into four categories. The first two categories include actors responsible for the provision and management of a DFS offering: 1) financial service providers and 2) third-party technology providers (either fintechs or agritechs). The second two categories include actors introduced above: 3) anchor agribusinesses refers to actors from multiple levels (Levels 3, 4 or 5) operating on either the inputs or outputs side of a value chain, and 4) last-mile aggregators/distributors refers to a single level of actors that also appear on either side of an agri-value chain (Level 1).

***Financial Service Providers:*** encompass actors with permission to provide or participate in the provision of financial services.[43] This includes banking, insurance, payments, money transfer, and e-money. Public or private financial institutions, non-bank financial institutions (i.e. MFIs or SACCOs), payments companies, insurance companies and MNOs are examples of financial service providers.

***Technology Providers:*** groups together actors that provide digital software or hardware solutions along with turn-key consulting services to clients at a corporate, enterprise, or retail consumer level. These clients operate either in the banking/finance, insurance, or agriculture sectors. Given this specialization, these actors are referred to in this handbook as either fintechs or agritechs. In some instances, fintechs are also licensed to operate as NBFIs and will lend off their balance sheets. Therefore, depending on the fintech, their offering may blur the line between technology provider and financial service provider.

As shown in Figure 6, fintechs and agritechs possess the ability to serve the agriculture sector at multiple stages in a production cycle, with products that are relevant for multiple customer segments.

During the early stages of planning and land preparation, these actors can provide information and other analytic tools to farmers to inform decision-making around inputs, labor, and other resource requirements. During the input sourcing stage, these actors can provide financing, market linkages, and transaction services to support farmer consumption of products and services from agricultural suppliers. Coupled with MIS and location-based services, these actors also support corporations and enterprises at different levels involved in the production, distribution, and selling of inputs and other agri-related services to improve supply chain management and visibility into product line sell-through performance.

On farm, fintechs and agritechs can provide MIS around planting, tending, or harvesting activity, weather patterns, and other patterns related to cultivation (i.e. soil or crop health). Towards harvesting and selling periods, they can provide pricing information, projected yield quantities, link farmers or last-mile aggregators with prospective buyers, coordinate transport logistics, or provide short-term trade financing to bring commodities to market. Once commodities have been sourced at the farm-gate or from last-mile aggregators, MIS and location-based services can support enterprises and corporates on the outputs side with traceability, transportation logistics, inventory management, as well as trade finance.

***Anchor Agribusinesses:*** refers to larger enterprises or corporates that operate in the agriculture sector. These actors focus on some combination of input supply and distribution, commodity sourcing and trading, or commodity distribution/export. They typically cultivate networks of smaller value chain actors involved in either agri-inputs or outputs. Examples of anchor agribusinesses on the inputs side would include large producers (i.e. Syngenta, Monsanto), distributors (e.g. Farmer's World), or wholesalers. On the outputs side, they would include millers, processors, warehouses, and large traders as well as national distributors and exporters that directly manage multiple aspects of the commodity sourcing, processing, and distribution process (i.e. Cargill, Nestle). Depending on their business and operating models, these actors may also directly engage larger farmers or groups of smaller farmers.

***Last-Mile Aggregators / Distributors:*** applies to actors that are involved in either mobilizing and bulking harvest

[43] either via formal license or letter of no objection from the financial regulator

yield or livestock for purchase or selling agri-inputs, livestock and related services. They are physically the closest to farmers and have the most direct, transactional linkages with them. On the inputs side, these actors are typically micro- or small retail enterprises selling a range of agro-inputs (i.e. seeds, fertilizer, herbicides, tools) and other commodities not easily produced on the farm (i.e. soap, sugar, cooking oil) as well as livestock traders or hired-services providers.

On the outputs side, they are typically volunteer, community-based organizations or non-profits/ NGOs such as farmer associations or cooperatives as well as local or international NGOs. These actors serve as the first touch point between farmers and the market, creating rural collection points where commodities are bulked and purchased. Many construct semi-permanent or permanent structures where farmers can bring their harvests for re-weighing, bagging, and eventual sale.

In addition to defining the various actors that make up *who* is behind an agri-DFS offering, Table 2 highlights common activities based on their structure and operations (capabilities) and what they *do not* have that would allow them to extend or deepen what they do (needs).

*Figure 6: DFS Offerings in Agriculture – Mapping of Key Ecosystem Participants*

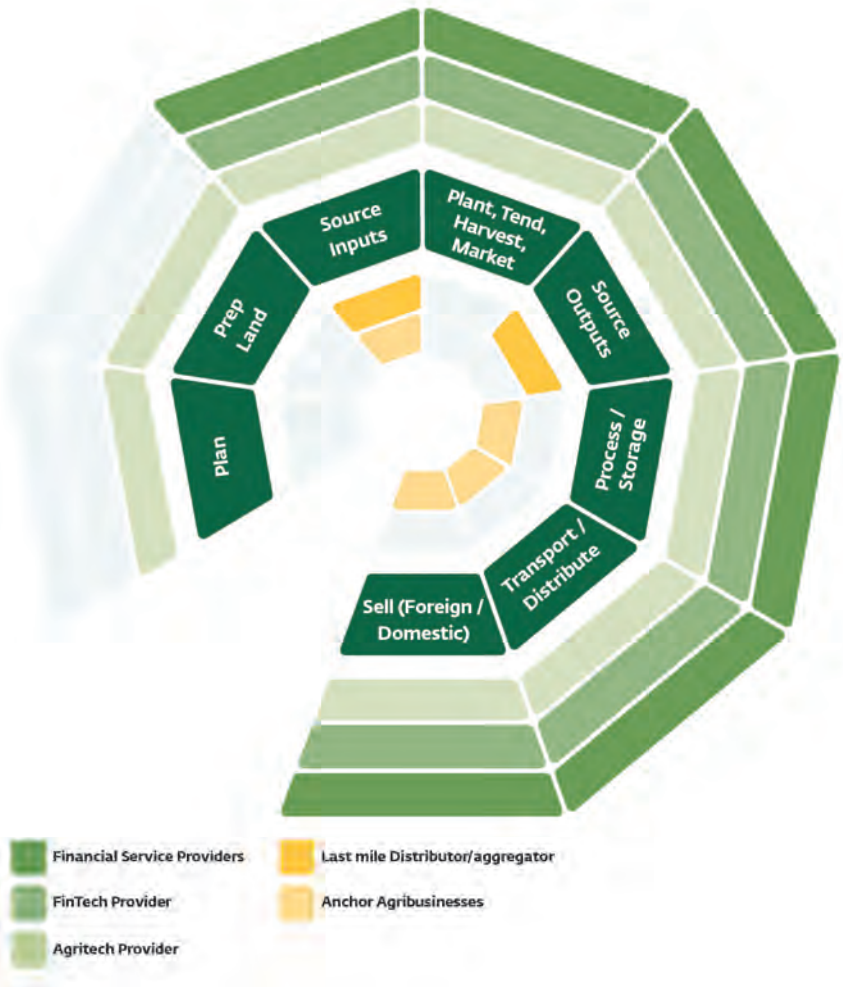


*Table 2: Capabilities and Needs of Key Participants in DFS Offerings for Agriculture*

| Actor Type | Capabilities | Needs |
|---|---|---|
| *Financial Service Providers* | • *Provide capital (investment and working)*<br>• *Evaluate and manage risk*<br>• *Design and manage products and services*<br>• *Transport and manage liquidity in urban and peri-urban areas, highly limited in rural areas*<br>• *Authenticate and verify personal or enterprise identity*<br>• *Process transactions at high volumes, velocity, and values* | • *Rural infrastructure: new sales and distribution channels that extend reach and lower cost*<br>• *Customer Information: better visibility into the production practices and economic activity of rural customer segments*<br>• *Customer acquisition: last-mile staff network with mobility to aggregate rural demand* |
| *Third-party Technology Providers* | • *Back-end platform integration linking different service providers or market players*<br>• *Source, store, or generate large quantities of digital data for risk evaluation or credit scoring;*<br>• *Digital operations processing for information content or financial transactions linking multiple market actors (suppliers, buyers, financiers) as a credible third party*<br>• *Geospatial/Location-based services for tracking collection, storage, or transportation*<br>• *Remote customer service support*<br>• *Working capital financing* | • *Financing: access to less expensive pools of capital (investment or working)*<br>• *Technical Expertise: competency and capacity to conduct financial supervision/oversight*<br>• *Rural infrastructure: existing operational footprint of agri-enterprises infrastructure to support frontline or field level sales and distributions* |
| *Anchor Agribusinesses* | • *Source, store, or process inventory*<br>• *Manage rural transport logistics*<br>• *Directly engage, organize and mobilize customer groups*<br>• *Organize, aggregate, and transport large volumes of agricultural outputs*<br>• *Organize and mobilize networks of micro-enterprises over a wide geographic area*<br>• *Provide risk reduction for farmers to expand access to financing schemes* | • *Commercial expansion: increase customer access to finance for input purchases; strengthen grower loyalty; deepen product penetration; grow market share*<br>• *Customer Information: improve visibility into grower practices; enhance source origin validation; purchase crop yield more efficiently/cost effectively*<br>• *Financing: access to cheaper pools of capital (investment or working)* |
| *Last-Mile Aggregators / Distributors* | • *Physically reach rural customer base quickly and efficiently*<br>• *Directly engage, organize and mobilize customer groups at the farmer level*<br>• *Source information from rural customers* | • *Financing: access to cheaper and more flexible pools of capital (investment or working)*<br>• *Commercial expansion: additional revenue streams with minimal overhead costs*<br>• *Technical Expertise: digital systems and tools to strengthen information collection/management; method for collecting payments; adoption of new practices (digital, other) to strengthen revenue capture opportunities* |

While the actor map looks busy, there are many ways these diverse parts might fit together. To begin with, capabilities aren't overly concentrated in one area or domain. In that sense, the sector diversity is an advantage as most actors aren't built for the same purpose. Additionally, in terms of needs, the actors mapped specialize in offerings or services that speak to needs of other actors and could provide relevant support.

Finally, the potential for overlap in roles can be viewed positively. Given how costly and operationally challenging it is to serve rural customers, especially smaller farmers, there are managerial and operational advantages to overlapping roles. This would be especially true if those roles overlapped in a way that increased resources for rural sales and distribution efforts and a stronger frontline customer engagement presence in more remote areas.

With collaboration, naturally however, comes added complexity; especially when one contrasts it with direct competition. But while the types of complexity introduced in this context may well be greater than an independent venture, they are not new. Depending on the partners and the purpose of the partnership, this complexity can manifest itself at the commercial, strategic, or operational level. And the best approach to mitigating this complexity is to develop the necessary awareness of one's prospective partners, the market opportunity, and customer base to ensure collaboration risk are adequately identified and proactively managed from service inception.

Moving into Section 3, we describe the current landscape of DFS offerings for different rural customer segments in the agriculture sector, supplemented with case studies. Key messages from this section to keep in mind as readers progress through the handbook are:

- ***Partnering across sectors in less familiar ways.*** Delivering an agri-DFS solution will likely require multiple actors from different sectors and organizational backgrounds that may not otherwise partner with each other.
- ***Clarity doesn't just emerge, it must be actively curated.*** These actors will have specific roles to play and these roles must be properly understood. Each actor will have its own incentives to join a partnership and this should be clarified and understood upfront by all parties.
- ***Serving the rural customer means serving several segments not a single segment.*** DFS solutions in agriculture apply to a range of actors along a given value chain. They are not just for apex organization or farmers.
- ***Customer journeys will be diverse.*** DFS offerings must account for variations in financing needs and transaction patterns of rural customers, especially farmers, which will differ based on value chain structure, their role in the value chain, and the production cycle they are tied to.
- ***Just getting access to more data more quickly isn't enough.*** New data for multiple rural customer segments is being generated from different sources and methods. This has implications for potential partnerships, offerings, and go-to-market strategies, and will require adequate consideration by all actors involved.

# SECTION 3

## *Digital Solutions for Expanding Access to Financial Services*

### Introduction

As the previous section highlighted, multiple actors are involved at different stages in the agri-production lifecycle from land preparation and the provision of crop seeds or livestock through to harvesting, trading and the distribution of commodities to domestic or international markets. Similarly, DFS offerings in agriculture regularly involve more than one company or organization. This is done in an effort to leverage respective strengths, from financial services experience, the penetration of mobile network service delivery channels and the ease of use of mobile VAS products, to supply chain networks of agribusinesses for the rural distribution of inputs or collection of outputs, and the proximity, trust, and knowledge of rural populations by community-based organizations. One prominent reason for the involvement of multiple players is because of the unique and often challenging nature of providing financial or informational services in agriculture.

This section describes the most commonly observed products or services at the intersection of DFS and agriculture. While their basic characteristics may be familiar to many readers, the digital features that comprise the core of these new offerings make them applicable to the sector and to different rural customer segments in ways that are more affordable, accessible or appropriate than previous non-digital offerings. It is divided into two parts, based on the solutions' primary customer segment:

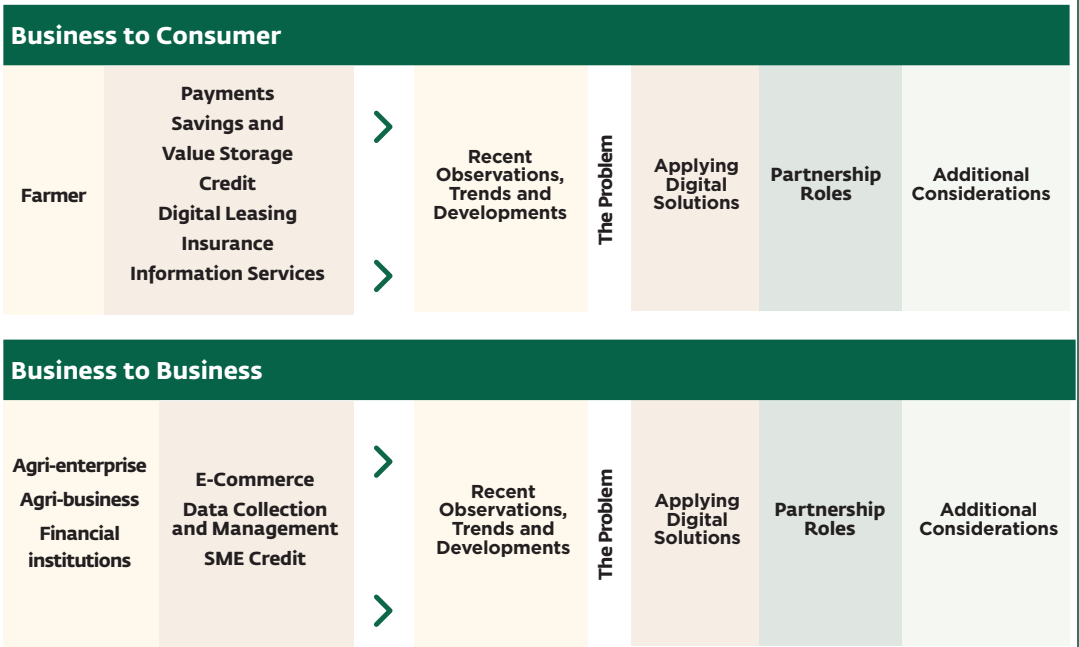
- B2P and P2B solutions aimed at rural retail customers
- B2B digital solutions aimed at enterprises, corporations, or institutions operating in the agriculture sector

Each solution description divides into five sections:

1. Recent observations, trends and developments;
2. The problem, or barriers in the marketplace that prevent farmers or agribusinesses from accessing traditional financial or informational products and services with appropriate characteristics;
3. The application of digital solutions to allow products and services to overcome barriers in the marketplace;
4. Partnership roles among service providers required to bring new digital solutions to the marketplace;
5. Ongoing challenges and considerations associated with the digital solution that necessitate additional thought, research or investment to address.

Case studies are interspersed among the descriptions to offer readers concrete market examples of current offerings.

*Figure 7: Overview of Landscape Assessment Approach for DFS in Agriculture*




## P2B and B2P solutions aimed at rural retail customers

Person-to-business (P2B) and business-to-person (B2P) DFS solutions are offered directly to smallholder farmers. These solutions are largely intended to fill a void in farmer financial service and information access where traditional services are too costly to provide and where digital technology allows providers to reach this segment with new product designs, pricing and distribution models. Products specifically for farmers have been introduced in the market by multiple partners, often including a development organization and/or donor, since there may not yet be sufficient initial market conditions or infrastructure for direct smallholder access. Some DFS products that farmers might use (such as digital credit, insurance, etc.) are offered to a mass market and are not widely tailored for agriculture although farmers can access them through their mobile phones. Others are developed with agricultural users in mind.

## Payments (P2B and B2P)

### Recent Observations, Trends and Developments

Banks and MNOs have partnered to offer digital payments since the emergence of mobile money. These offerings are positioned as stand-alone services as well as cross-cutting use cases to help drive broader usage of DFS for credit, savings, and insurance. However, the initial hypothesis that digital payments acceptance would scale organically as product exposure and familiarity deepened remain largely unsubstantiated. Rather, providers are pivoting to strategies that seek to build rural acceptance through a combination of enterprise outreach to digitize large, recurring agri-payments as well as more direct marketing/promotional campaigns aimed at farmers and smaller agribusinesses. Providers are increasingly focusing on loyalty program design and incentives management for both customers and merchants. Loyalty concepts are also surfacing the need to combine digital payments alternatives with information services that are tailored and easily accessible to digital payments users.

### The Problem

According to the 2014 Global Findex Survey, 95 percent of smallholder farmers received cash payments for what they produced during the survey year.[44] It can be inferred that a large proportion of payments in agriculture globally, including bulk payments to farmer groups and agribusiness staff, are in cash. Cash is costly and inefficient to use, yet it is often preferred by farmers over more efficient digital payments. Farmers continue to use cash even when digital payment products are available for a variety of reasons related to established practice, broad acceptance, and perceptions of trust and reliability both as a form of currency and a method of payment. The physicality of cash gives a sense of security to users who have less experience with digital technology.[45]

Merchant acceptance is not well-established in the majority of rural settings in Sub-Saharan Africa, though it is on the rise.[46] If a farmer receives money into his or her mobile wallet, its use might be limited to airtime top up or money transfers converted to cash. Switching from cash to digital payments therefore

[44] World Bank Global Findex, 2014.

[45] Lee, Julia. "Beyond marketing: building trust and the value proposition for mobile money through consumer education." 2012. GMSA,2012 (https://www.gsma.com/mobilefordevelopment/programme/mobile-money/beyond-marketing-building-trust-and-the-value-proposition-for-mobile-money-through-consumer-education/)

[46] The State of Mobile Money in Sub-Saharan Africa, GSMA, 2016. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/2016-The-State-of-Mobile-Money-in-Sub-Saharan-Africa.pdf)

requires not just behavior change on the part of one actor but rather ecosystem-level change, in order to sufficiently increase the value proposition of digital payments. There must not only be a supply of appropriate payments products, but also the presence of other commercially-driven actors with considerable cash management costs and risk exposure that can generate enough transaction use cases for digital payments to encourage smaller merchants and enterprises to engage and adopt the product.

While these limitations make clear why smallholder farmers might actively choose to receive their payments in cash rather than via digital payment[47], the persistent use of cash in agricultural value chains raises documented inefficiencies. The Better than Cash Alliance cites "cash-based value chains and inefficient markets" as one of the top three key barriers to improving agricultural productivity, noting that the large volume of transactions within these value chains magnifies the inefficiencies of using cash.[48]

The inefficiency and high costs of cash are associated with the "manual acceptance, record keeping, counting, storage, security, and transportation" of cash payments.[49] The downsides of using cash for agribusinesses include general inconvenience and time spent in cash accounting procedures, as well as the real risks of loss, theft, and fraud. Agribusiness finance managers may lack robust internal controls, which are more time consuming and difficult to consistently implement with cash. For example, "fraudulent activities by purchasing clerks who deal in cash" are a consistent issue for agribusiness who procure from smallholders, particularly in value chains where farmers can sell to more than one buyer.[50] Digital payments minimize the need for intermediate transactions in which cash can go missing, and provide a host of other benefits to the agribusiness and farmer alike. Development institutions and commercial actors are therefore interested in identifying points through which digital payments could be introduced to replace cash.

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[47] Strategic Impact Advisors. The Future of Mobile Money for Cocoa Farmers in Cote d'Ivoire and Ghana. 2016. (https://www.siaedge.com/news/2017/5/30/future-of-mobile-money-for-cocoa-farmers-in-cte-divoire-ghana)

[48] The Role of Digital Payments in Sustainable Agriculture and Food Security, APEC Finance Ministers' Process, 2017, 8. (https://www.apec.org/Publications/2017/10/The-Role-of-Digital-Payments-in-Sustainable-Agriculture-and-Food-Security)

[49] The Opportunities of Digitizing Payments, 2014, 3. (https://btca-prod.s3.amazonaws.com/documents/180/english_attachments/The_Opportunities_of_Digitizing_Payments.pdf?1461956013)

[50] Opportunities in agricultural value chain digitisation, GSMA, 2018, 10. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/01/Opportunities-in-agricultural-value-chain-digitisation-Learnings-from-Ghana.pdf)

## Applying Digital Solutions

Digital payments address the inefficiencies of cash by reducing the time and cost of having to travel to transact, increasing the speed at which payments arrive to their intended recipient, cutting the risk of theft and fraud associated with carrying cash on long journeys, increasing the ease and transparency of accounting, and providing a point of entry to broader financial services for previously underserved farmers.[51] Fifty-nine percent of the 235 million unbanked adults worldwide who "receive cash payments for the sale of agricultural products" have a mobile phone,[52] the basic requirement for mobile money registration, giving a sense of the potential for this modality to scale. While digital agricultural payments are far from a panacea for the financial access challenges smallholder farmers face, they can drive a digital distribution network from which further use cases may expand rural use of mobile money.

The intention for digital agricultural payments is that the facilitated payment to the farmer will be the start of broader and more active DFS usage. Indeed, digital payments intersect or support a number of other products discussed in this section, including digital savings, credit and insurance, which require payments mechanisms for transfers into accounts, lending and repayment, and premium and payout transfers respectively. Digital agricultural payments can also help agribusinesses overcome the inefficiencies and lack of transparency inherent in paying large numbers of farmers with cash. Digital payments "allow agribusinesses to address a range of business challenges and maximize operational efficiencies and real-time visibility in the supply chain while promoting farmer loyalty."[53]

Through the use of a digital payments product, farmers not only receive compensation for their harvest or livestock trade but can also make additional payments for goods and services with greater ease and efficiency, such as inputs, construction materials, household items, and new models of installment payments for renewable energy products such as solar lighting and pump irrigation. Digital payments can also strengthen value chain relationships; by digitally paying farmers, agribusinesses build individual profiles of farmers in their networks. Digital agricultural payment transaction records may be the first financial history such farmers possess, and agribusinesses may layer on top of this information other data from the farmers' plots and production to build a more comprehensive profile. Through these records farmers may become eligible for additional digitally-delivered products, such as credit and insurance. The combined DFS offering might, for example, allow farmers to receive weather information via text message if they sign up for digital crop payments. Shifting from cash to digital payments also allows agribusinesses to more easily and cheaply invest in the "sustainable sourcing of certified crops,"[54] which increases the value of the agribusiness' product and opens opportunities to be competitive in a rapidly expanding global market for traceable agricultural goods.

The direct revenue opportunity to DFS providers from digitizing agricultural payments from governments and agribusinesses is estimated to reach $2 billion by 2020.[55] There are at least two models that allow for "last mile digitization" of agricultural payments. In one model, MNOs offer bulk payments and collection services to agribusinesses via a mobile money platform. In another model, financial institutions or third-party technology providers leverage mobile network infrastructure and bundle this payments product with additional digital VAS for agribusinesses. MNOs are central to both models and there are strong incentives for their participation, which could "generate measurable indirect benefits … related to the acquisition of new mobile money users, increasing loyalty, increasing frequency/volume of transactions and overall activity on mobile money accounts to support a sustainable agent

[51] Ibid.

[52] World Bank Global Findex 2017

[53] Opportunities in agricultural value chain digitisation, GSMA, 2018, 6. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/01/Opportunities-in-agricultural-value-chain-digitisation-Learnings-from-Ghana.pdf)

[54] Ibid, 25.

[55] Ibid.

network."[56] MNOs stand to gain new airtime and mobile money subscribers (and therefore increased revenue from transaction fees), as well as increased customer stickiness and reduction in churn for mobile money products.

Once the digital payment infrastructure is in place, farmers who produce for agribusinesses or cooperatives are typically registered and sensitized in-person, by field agents, given the likelihood they are unfamiliar with the technology. Agribusinesses or cooperatives assist the DFS provider with sourcing or confirming farmer mobile phone numbers and proper names. Once a farmers' crop yield or livestock passes the buyer's inspection, the farmer is paid digitally either via the inspecting field agent using a mobile device or by another staff member based in an office using a desktop or laptop.

Given the number of roles involved in this arrangement, agricultural bulk payment initiatives benefit from coordinated partnerships. For example, when a tea company in Rwanda, the Wood Foundation, wanted to reduce the inefficiencies of paying tea farmers in cash, it partnered with Tigo Rwanda and a donor-funded initiative, Access to Finance Rwanda that the SACCO's farmers already belonged to, to ensure that the resulting product would be usable and useful for farmers who may not even have had mobile phones at the outset. Each partner brought separate expertise that enabled the success of the offering.

**Partnership Roles in Digital Agricultural Payments**

| | MNO | Financial Institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provide mobile connectivity*<br>• *Provide mobile money platform*<br>• *Offer distribution channel for customer or merchant payments acceptance* | • *Provide bulk payment solutions for enterprise and corporate clients*<br>• *Provide access to POS terminal networks for retail payments*<br>• *Provide accounts* | • *Act as last-mile aggregator for rural customers*<br>• *Identify payments to digitize*<br>• *May sensitize and register rural customer* | • *Software application provider*<br>• *MIS, data analytics services* |

[56] Market size and opportunity in digitising payments in agricultural value chains, GSMA, 2016, 3. (https://www.gsmaintelligence.com/research/?file=29e480e55371305d7b37fe48efb10cd6anddownload)

# CASE STUDY 1

## *Tigo Rwanda*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *MNO* |
| ***Years in Existence (Service Offering)*** |
| • *4-5 years* |
| ***Product Offering*** |
| • *Payments* |
| ***Target User(s)*** |
| • *Farmers*<br>• *Outputs Side Value Chain Actors*<br>• *Financial Institutions*<br>• *NGOs* |
| ***Digital Product Form Factors*** |
| • *Basic mobile device*<br>• *Traditional software* |
| ***Revenue Model/Pricing*** |
| • *Fee-based (per transaction)* |
| ***Target Partners*** |
| • *Financial Institutions*<br>• *Third-party Technology Partners*<br>• *Outputs Side Value Chain Actors*<br>• *Farmer Associations* |
| ***Year Founded*** |
| • *2015* |
| ***Geographic Focus*** |
| • *Rwanda* |

*Tigo Money Rwanda is a mobile money service that provides Tigo mobile subscribers with an e-wallet account, which enables access to a variety of financial services including payments, savings, credit, and other services.*

### Origin of the idea

*The Wood Foundation is a venture philanthropy group that operates several tea factories in Rwanda. The management of the tea factories, which source the majority of their tea from smallholder farmers, experienced significant cash management issues that resulted in delayed crop payments. Cash took a long time to pass through required operational procedures before it was eventually paid into each farmer's SACCO account. SACCO branches were often inconvenient for the farmers to access, requiring that they travel up to an hour to receive their payments.*

*As a result, the Wood Foundation issued a challenge for cash management solutions. Tigo Rwanda provided the Wood Foundation with two alternatives using its mobile money product, Tigo Cash. One was a mobile money bulk payment solution that would enable the tea factory management to pay farmers directly into their wallets. The second was an integration with three SACCOs, enabling farmers to draw funds into their Tigo wallets through a 'bank-to-wallet' or 'push-pull' mechanism.*

### What are the market problems this offering seeks to solve?

*As the Wood Foundation did not want to cannibalize the SACCOs that had been established to serve the smallholders by making them irrelevant, it opted for the second solution. After making this decision, the Foundation had to solve a key challenge in implementing the chosen push/pull mechanism with the three SACCOs, which was the total absence of a core banking product. Without software to manage the SACCOs' ledgers, Tigo could not use a push/pull mechanism to link into the accounts. To add to this problem, the Board of Directors for the SACCOs were hesitant to give its buy-in, was needed to move forward. The Wood Foundation had to invest in lobbying the Board, which required conducting an analysis of the potential operational cost savings to the SACCOs.*

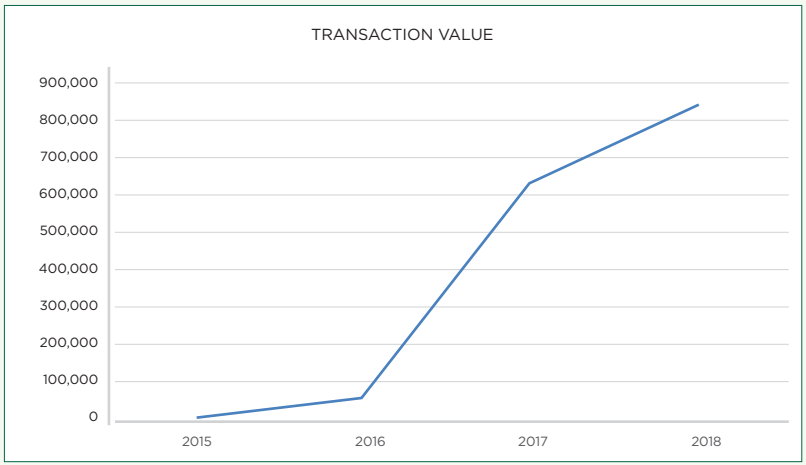
### Service implementation: the experience thus far

*In order to onboard the SACCOs to a core banking software, Tigo and the Wood Foundation sought the support of Access to Finance Rwanda, part of the UK Aid-funded Financial Sector Deepening for Africa initiative, to help facilitate procurement of an appropriate solution. After some time, a software firm that could serve the needs of each SACCO was selected, and an onboarding and training process for the SACCOs began.*

*The third challenge the Wood Foundation had to overcome was very low mobile phone penetration among the 11,000 targeted tea farmers. Only nine percent of the farmers it planned on targeting had mobile phones, which meant handset penetration was a core obstacle to any payments digitization option, regardless of whether it was a SACCO bank-to-wallet transfer or a bulk payments disbursement. Tigo decided to procure handsets at a wholesale price and distribute them to SACCOs as an advance. The SACCO then acted as the sales agent for the handsets, while also providing a payment plan that farmers could choose instead of purchasing the handset outright. SACCOS would then repay Tigo as payments came in from farmers. Over time, 7,500 phones were distributed this way.*

*An additional challenge that came with the introduction of a new piece of technology was that most of the farmers purchasing phones were first time users. Tigo deployed a team of in-house trainers to provide digital literacy instruction to farmers who had recently purchased phones. This model did not work, as the Kigali-based team found it hard to develop trust or communicate in meaningful ways with the rural farmers.*

*Tigo pivoted its strategy and asked the SACCOs and Wood Foundation to identify lead farmers within the community who could take on a training role. Tigo conducted a training of trainers and organized the lead farmers to be present when registration events were held. After four registration rounds over the initial year of implementation, 10,000 tea farmers elected to use the bank-to-wallet service offered by the SACCO, despite the fact farmers had to pay US$ 0.40 per transaction. In 2018, over US$ 800,000 was moved between mobile wallets and SACCO accounts.*



### Looking ahead: growth, opportunities and challenges

*Tigo hopes to expand the mobile money ecosystem around the smallholder farmers as the majority of transactions are agent-led cash-outs. Tigo plans on using these types of bulk payment use cases as pockets of potential demand for piloting merchant payments. Tigo also seeks to expand these services to other SACCOs but has found that many still do not have core banking products that enable integration.*

*Tigo's experience demonstrates that crop payment digitization initiatives can consume more resources than a mobile money operator may expect or be willing to take on. Therefore, it is crucial to establish strong partnerships with brokering institutions such as the Wood Foundation and Access to Finance Rwanda, to enable field-level digitization in rural contexts. Tigo sees agricultural payments as a growing line of corporate services, but it will have to find ways to cut down on the high costs that were incurred during the roll-out of this initial attempt.*

### KEY TAKEAWAYS

1. *Last mile organizations can provide a pathway to digitizing farmer transactions.*
2. *Tigo coordinated with SACCOs to issue basic handsets through payment plans.*
3. *Digital literacy training should be delivered by members of the community. Deploying sales teams from the city does not provide the desired impact.*
4. *Agricultural digital payments often require more resources and activities than a single mobile money provider is willing to offer. Therefore, partnerships with institutions that are grant funded can help broker and pay for a portion of these training and start-up costs.*

### Considerations moving forward for digital payments in agriculture

Farmers live in more remote areas where mobile network coverage is weak or non-existent and mobile money cannot yet be used to purchase goods and services from local merchants. Research shows that farmers do not prefer to receive one-off digital payments or will cash out immediately if they do receive them. But with access to additional products and services, the value proposition increases.[57] For example, the ability to pay for school fees or solar products digitally could add value. In addition, bundling a digital agricultural payment with other products and services – such as agronomic information and advice with financial services – increases the likelihood that the farmer will find enough value to adopt mobile money. Farmers make and receive many payments that involve a range of rural market actors, from small retailers to large commodity off-takers. Digital bulk payments providers should therefore consider developing a broader acceptance environment in which multiple agri-value chain actors are incentivized to adopt this method.

[57] Buruku, Buddy. Digitizing Agricultural Value Chains: How Buyers Drive Uptake. CGAP, 2016. (http://www.cgap.org/blog/digitizing-agricultural-value-chains-how-buyers-drive-uptake)

## Savings and Value Storage

### Recent Observations, Trends and Developments

Products are being developed with the needs and transaction potential not only of farmers as individual retail customers in mind, but also targeting formalized savings groups. The common practice across several SSA markets is to offer products with no running balance requirements and no fees. FSPs are increasingly viewing rural-facing financial and non-financial organizations (i.e. SACCOs, MFIs, grower cooperatives) as viable distribution channels and as aggregators of rural customer demand. They offer white-labeled account products that can be distributed through partners as well as directly to rural customers via agency banking models or mobile money platforms.

### The Problem

Saving money can be challenging for rural, agricultural individuals and households; the large majority of which do not use formal savings because they lack available funds as well as appropriate, affordable and accessible account options.[58] Survey research confirms that poorer households are less likely to report having saved with a formal account.[59] Saving requires two necessary actions, which are each associated with distinct barriers: opening an account and depositing funds. Digital solutions have the potential to address barriers around both these actions.

On the first action, 63 percent of adults in developing economies own an account (either with a financial institution or a mobile money service provider). Within SSA, however, this figure varies from 82 percent in Kenya to 16 percent in Niger.[60] Those people who do have accounts tend to be wealthier, more urban and more educated.[61] Smallholder farmers are therefore not likely to be counted among formal account owners. There are numerous barriers that prevent smallholder farmers – likely price sensitive, rural, potentially illiterate, and unfamiliar with the formal banking sector – from opening accounts. For example, lack of trust between the saver and the financial institution is one of several issues that highlights the need for more monitoring and enforcement of agreements around account opening, usage and fund withdrawal, which contributes to higher transaction costs. Trust concerns may also be around the safekeeping of funds and customer privacy. A fifth of

[58] Inflection Point: Unlocking growth in the era of farmer finance. Dalberg Global Development Advisors, 2016. (https://www.raflearning.org/sites/default/files/inflection_point_april_2016.pdf?token=OS8hc14U)

[59] World Bank Global Findex 2017

[60] Demirgüç-Kunt, Asli, Leora Klapper, Dorothy Singer, Saniya Ansar, Jake Hess. The Global Findex Database 2017. World Bank Group.

[61] Zins, Alexandra and Laurent Weill. The determinants of financial inclusion in Africa. Review of Development Finance, 2016. (https://ac.els-cdn.com/S1879933716300549/1-s2.0-S1879933716300549-main.pdf?_tid=e4d7ee47-258e-40bc-9dc1-02e9b728deefandacdnat=1524076476_a6409bd24c816e1c5e014752ec701a9f)

adults without accounts surveyed for the World Bank's Global Findex in 2017 cited "distrust in the financial system" as a reason for not opening an account.[62] They may also arise around the need for customers to prove their identity, a barrier for many smallholders who often lack formal documentation. Account opening fees and minimum balance thresholds, as well as transaction fees, reduce the attractiveness of the savings product to price sensitive consumers. Low or negligible account yields on some products lower the opportunity cost of not saving or of saving informally.[63] Finally, in many rural places there simply are no bank branches at which to open an account even if a customer was interested.

Saving also requires the decision, once account registration is complete, to actively set aside and deposit money. Thus far, the push by providers and development actors to facilitate account access has not translated into the scale of behavior change necessary to move savings rates significantly, even as the number of accounts rises. In 2017, only 31 percent of account owners in developing economies saved at a financial institution. In SSA, 19 percent of adults saved semi-formally, using a savings club or a person outside the family, and only nine percent saved formally.[64] These low formal savings rates are problematic at the macroeconomic level in many SSA markets because they restrict the amount of the available capital that can be mobilized for domestic investment. This ultimately leads to rationing investment and prioritizing lower risk borrowers, which typically excludes smaller actors in the agriculture sector.[65]

At the individual household level, savings are associated not only with income smoothing and investment in micro-enterprise but also with resilience in the face of shocks. While saving is typically conceived of as an asset-building measure, for many low-income households building up stores of funds is often more for cash management than it is for accumulating wealth. It can be expected that with low incomes farmers will face difficulty regularly setting aside funds, particularly given the "lumpy" income streams that are associated with agricultural production. Many farmers receive huge portions of their annual income just a few times throughout the year at harvest or sale of livestock. These funds must be used not only to pay down debts from the previous season but also for future expenses such as school fees and next season's inputs. The pressure to use money for urgent needs now can reduce active savings, as can power relations within households that surface conflicting preferences on how and when to spend money and to save.[66]

People with very little income are able to save money, but frequently must do so informally given the absence of formal products that meet their needs.[67] "Even when formal savings products are unavailable or unaffordable, the poor often save under mattresses, in informal groups, and/or in livestock."[68] In many rural places, savings groups have long been a trusted method and a vibrant social network. However, these groups' structures come with limitations that signal the need for additional options. For example, most savings groups do not allow for the removal of funds except at predetermined times, generating inconvenience or insecurity for the saver who may need the money in a more flexible time frame.

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[62] World Bank Global Findex 2017, 5.

[63] Karlan, Dean, Aishwarya Ratan, Jonathan Zinman. Savings by and for the poor: A research review and agenda. *The Review of Income and Wealth.* 2014. (https://onlinelibrary.wiley.com/doi/full/10.1111/roiw.12101)

[64] World Bank Global Findex 2017, 74.

[65] Karlan, Dean, Aishwarya Ratan, Jonathan Zinman. Savings by and for the poor: A research review and agenda. *The Review of Income and Wealth*. 2014. (https://onlinelibrary.wiley.com/doi/full/10.1111/roiw.12101)

[66] Ibid.

[67] Ibid.

[68] Karlan, Dean, Aishwarya Ratan, Jonathan Zinman. Savings by and for the poor: A research review and agenda. *The Review of Income and Wealth.* 2014, 3. (https://www.econstor.eu/bitstream/10419/98205/1/75551954X.pdf)

## Applying Digital Solutions

Digital technology offers solutions to both the issues of account registration and continued usage by changing the design, pricing, and distribution of savings products. Technology has encouraged the development of digital savings products that allow users to deposit cash into an account with a rural agent rather than at a bank branch. These can be accounts that link individuals to a dedicated formal bank account or mobile money wallet, commitment savings products to save for a specific purpose, and digital savings group products. CGAP distinguishes between two major types of dedicated accounts, bank-based or non-bank based, depending on which entities are authorized to issue e-money and which entity is implementing the product.[69]

Dedicated accounts have the benefit of segregating money from everyday transaction needs, no minimum deposit or running balance requirement, and – if offered as a formal savings account – yield interest. Many savings accounts or value storage mechanisms do not have any service or transaction fees associated with account registration or depositing. With no minimum balance requirements, there are also no penalty fees for low average or zero account balances, although some accounts, such as the CBA-MTN Uganda MoKash savings account, calculates interest against an average minimum running balance over a 12-month period.

Examples of bank and MNO partnerships for savings products for mobile money users include CBA's partnership with multiple MNO partners in Kenya, Tanzania, Uganda, Rwanda and Cote d'Ivoire (i.e. Safaricom's M-Shwari product in Kenya and MTN's moKash product in Uganda) and the EcoSave product of Steward Bank and Econet in Zimbabwe. In these models the bank holds the deposits while the account is accessed through the owner's mobile money account. Housing Finance Bank's mCash product in Uganda is a dedicated savings account that utilizes the bank's mobile money service.[70] In agency banking models, the FSP holds deposits and provides the distribution and agent network, allowing bank expansion into rural areas. In 2015, there were almost 10 million dedicated mobile savings accounts worldwide.[71]

These products allow rural customers to register and make deposits through a local agent. Know Your Customer (KYC) requirements are often lower for simple accounts that don't have high balance allowances. Savings accounts enabled by agency banking schemes or those linked to mobile wallets may offer a yield. For example, Tigo Wekeza in Tanzania offers subscribers of the product 7-9 percent returns on the balances of their mobile money accounts, a higher rate than many banks offer.[72]

New digital commitment savings products also address challenges farmers face in continuing to save once they have opened an account. Digitally-enabled layaway programs make it easy for farmers to save for a specific need (e.g. the purchase of an inputs package that combines seed and fertilizer) without putting money into a general account or requiring additional external financing. They may make it easier to save by making the deposit-taking process more accessible and convenient. For example, myAgro's digital layaway product allows farmers to purchase a scratch card in varying amounts from a local seller or agent. By texting the number on the scratch-card, the farmer has effectively saved a small amount of money toward a full package of fertilizer and seeds they will receive at the appropriate time in the growing cycle. Farmers do not even need their own phone to save through this model. And while layaway itself is nothing new, the digital component increases the efficiency and security of farmers' savings towards their packages.

Finally, informal savings groups in some SSA markets are now being integrated with digital tools that increase the visibility of the individual members to FSPs while bringing more formality and transparency to the group's operations, as well as greater ease in handling and managing large volumes of cash and transactions. Sophisticated, long-

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[69] Staschen, Stefan. Bank-Led Digital Finance: Who's Really Leading? CGAP, 2018. (http://www.cgap.org/blog/bank-led-digital-finance-who's-really-leading)

[70] Katakam, Arunjay. Mobile savings and credit: Riding the rails of mobile money. GSMA, 2015. (https://www.gsma.com/mobilefordevelopment/programme/mobile-money/mobile-savings-and-credit-riding-the-rails-of-mobile-money/)

[71] Ibid.

[72] McNeal, Marguerite. Mobile Money: 4 Services Tackling Wealth Inequality in Africa. (https://www.wired.com/brandlab/2015/07/mobile-money-4-services-tackling-wealth-inequality-africa/)

standing groups and the individuals within them may benefit from the opportunity to use a digital transaction history to gain access to other services, such as credit. Some FSP have already begun exploring opportunities to mobilize deposits at the group level while gaining insights into potential individual credit customers. Many of these bank initiatives have emerged through partnerships with NGOs that specialize in VSLA development such as CARE and the Aga Khan Foundation. CARE, for example, has partnered with several banks across SSA including Kenya Commerical Bank (KCB) to assess group level accounts for mature VSLAs. Barclays, along with two NGOs, has introduced the Linking for Savings Charter, which aims to secure corporate commitment to "responsibly link informal groups of savers to formal banking products and services."[73] And in Uganda, Centenary Bank is in the pilot stage of its own VSLA product. Third-party providers are also taking the lead in developing digital savings products for savings groups. For example, MaTontine is a technology platform provider dedicated to digitizing existing savings and loans circles in Senegal and linking participants with newly developed digital profiles, to additional financial services.

The reach of the mobile channel has significantly altered the ease of registering for a mobile wallet to store value and of accessing formal accounts digitally. Unique mobile subscribership rates continue to increase and are slated to increase to 71 percent of the world's population by 2025. SSA is expected to have the largest increase in mobile penetration. In 2017, mobile technology and related services generated as much as 4.7 percent of global GDP, equivalent to $3.6 trillion in economic value added.[74] Digital savings presents MNOs the opportunity to gain new and "stickier" customers while reducing churn among airtime subscribers.

Evidence of the impact of mobile money on savings can be seen in that SSA was the only region to experience growth in the number of people with bank accounts in the 2014 World Bank Findex, which arose not from formal bank account growth but rather through mobile money. SSA is still the global leader in the use of mobile money. It is the only region in the world where over 10 percent of adults have a mobile money account.[75] GSMA reports that 54.5 percent of mobile money accounts globally in 2014 had a positive balance, reflecting the use of the product not just to send money but also to store value.[76]

**Partnership Roles in Digital Savings and Value Storage**

| | MNO | Financial Institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provides mobile connectivity*<br>• *Provides mobile money platform*<br>• *Provides e-wallet for value storage (not interest-bearing)*<br>• *Provides agent network for cash in/cash out services* | • *Provides formal savings accounts*<br>• *Provides core banking platform*<br>• *Manages roaming or fixed location banking agents* | • *Identifying individual customers or customer groups*<br>• *Mobilize and sensitize rural customers*<br>• *Support account application processing* | • *Cross-platform integration software*<br>• *MIS and data analytics to optimize rural customer acquisition*<br>• *VAS product features on top of savings account*<br>• *Agent banking network manager* |

[73] https://www.home.barclays/content/dam/barclayspublic/docs/Citizenship/linking-for-change-davos-savings-charter.pdf

[74] The Mobile Economy 2018. GSMA, 5.

[75] World Bank Global Findex 2017, 21.

[76] Katakam, Arunjay. Mobile savings and credit: Riding the rails of mobile money. GSMA, 2015. (https://www.gsma.com/mobilefordevelopment/programme/mobile-money/mobile-savings-and-credit-riding-the-rails-of-mobile-money/)

# CASE STUDY 2

## *myAgro*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *5+ years* |
| ***Product Offering*** |
| • *Micro-savings/installment payments* |
| ***Target User(s)*** |
| • *Farmers*<br>• *Input Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors* |
| ***Digital Product Form Factors*** |
| • *Basic mobile device*<br>• *Tablet/smartphone*<br>• *SaaS/Cloud Services*<br>• *Traditional software* |
| ***Revenue Model/Pricing*** |
| • *Commission* |
| ***Target Partners*** |
| • *Farmer Associations*<br>• *Inputs Side Value Chain Actors*<br>• *Financial Institutions*<br>• *MNOs*<br>• *Third party technology partners*<br>• *NGOs* |
| ***Year Founded*** |
| • *2011* |
| ***Geographic Focus*** |
| • *Senegal, Mali, Tanzania (2018)* |

*As a layaway payments platform, myAgro provides farmers with agri-information and advice, a way to pay incrementally for input packages using scratch cards or mobile devices and coordinates input package delivery.*

### Origin of the idea

*It was founded in 2011 by Anushka Ratnayake, who noticed, while working at One Acre Fund, that farmers were consistently asking for a savings mechanism to help repay their loans. She also observed many smallholders transacting daily at local shops for small household needs. These observations led her to conclude that there was an opportunity to offer smallholders an alternative to credit for the purchase of agricultural inputs by leveraging these local shops, already a part of smallholders' daily lives.*

### What market problems is this offering seeking to solve?

*myAgro is a non-profit social enterprise with primary operations in Senegal and Mali that offers smallholder farmers a way to make small payments over time that add up to the cost of a high-quality inputs package. The layaway product is a way for farmers to gain access to inputs without needing a credit product, which exclude a vast majority of the smallholder farmers in Sub-Saharan Africa due to their lack of credit history and other actuarial data required to make lending decisions. This financing gap contributes to poor crop yields and lower incomes. myAgro helps farmers overcome the credit gap through a self-financing model that ensures access to quality inputs that are bundled with additional agricultural training.*

### How are digital channels used throughout the offering?

*myAgro's tailored micro-savings product allows farmers to make multiple, micro-deposits of up to $1 – $50. Farmers register through myAgro agents with smartphones that operate the myAgro mobile app. These agents collect farmer names, gender, village, and input package choices. The myAgro platform issues a unique identification number to track layaway payments back to individual farmers. As it is not a financial institution and does not provide any formal deposit-taking or lending services that accrue interest, myAgro does not require formal government ID for registration.*

*Farmers, or groups of farmers, can elect a specific amount they would like to establish as a layaway goal, which*

*translates into the total inputs requested for a plot. Once they have established their goal, farmers can purchase scratch cards at affiliated myAgro stores. After purchasing the cards, farmers load the value of the card onto their account by entering the appropriate details – a 14-digit code from scratch card plus farmer ID. The user experience is very similar to that of loading airtime value from a scratch card, which many farmers are familiar with.*

*myAgro also leverages Orange's mobile money platform and agent network to collect funds from scratch card sales. It is a two-step process. First, myAgro agents visit affiliated vendors to calculate the funds owed myAgro. Second, these agents find an Orange Money agent and conduct a cash-in transaction so that funds are credited to myAgro's Orange Money account. This process helps drive down cash collection, handling and transactional costs for myAgro. And because the myAgro platform keeps a ledger of the scratch card entries by individual farmer, it can provide running balances so farmers can track their progress toward purchasing the inputs package.*

## Implementation: the experience thus far

*myAgro has served 34,000 farmers since 2017 and sells scratch cards across a network of approximately 600 affiliated vendors. It also manages over 150 field agents equipped with smartphones. While myAgro uses a variety of digital tools to help deliver services, it has invested significantly in last-mile delivery via an agent network. These field agents are typically part of the local community, which helps build trust and communication. Field agents that help enroll farmers also conduct periodic agricultural trainings. They also provide follow-up to support farmers throughout the growing season. In addition to customer registration, these agents also support marketing activities and the delivery of agri-extension services to myAgro clients, of which over 60 percent are women.*

*To deliver the inputs packages, myAgro purchases inputs for its farmers in bulk from suppliers and repackages them according to the amounts requested by its customers. It also provides delivery drop-offs, a convenience for customers who no longer have to travel to pick up inputs from centralized locations. This value add has helped myAgro remain competitive in markets with established input subsidy programs. In addition, its ability to guarantee timely, accurate delivery of input packages is much more consistent than the distribution channels organized through most subsidy programs. These deliveries are also crucial for gathering farmers in one area to offer training on best practices for using their input packages to maximize their yields.*

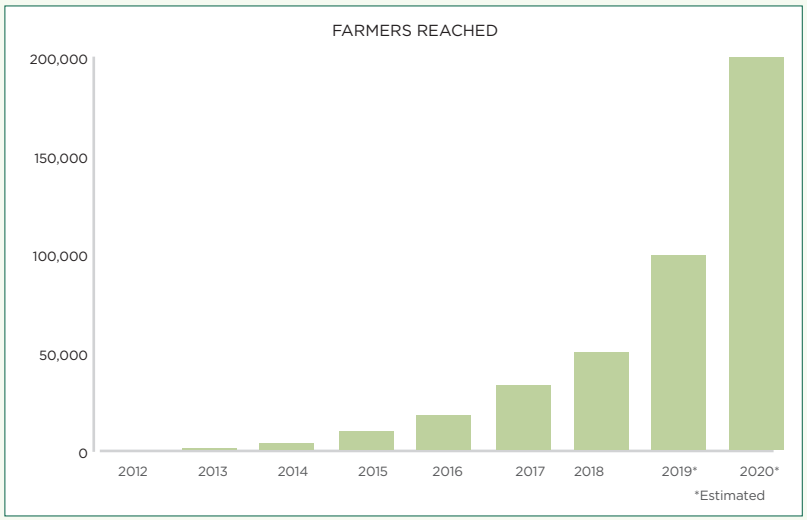
*The myAgro product has recorded increased yields of 50-100 percent by its farmers. Yield increases through savings can bring a greater impact on overall profitability for the farmer as no interest is owed. It also reports that 75 percent of its individual savers reach their goal to purchase the input package selected while 80-90 percent of group savers reach their goals.*

*If farmers do not reach their goal, their funds are refunded with a 10 percent processing fee. In 2017, myAgro served 34,000 farmers, mobilizing more than $1 million dollars in savings, with farmers saving a little over US$ 30 on average.*

## Looking ahead: growth, opportunities and challenges

*myAgro plans to expand the number of registered farmers to 50,000 in 2018. In the first three years after product launch, myAgro observed that farmers who make payments in the first two months of enrollment are more likely to reach their goal, and women tend to make payments in the evening after they have finished their work and other activities for the day. It has used this information to ensure its vendors keep hours of operation that coincide with client patterns and preferences.*

*As a non-profit social enterprise, myAgro does strive for self-sustainability and has a goal to move away from reliance on*




*philanthropic funding. At the moment, its operational costs exceed revenue, as the organization attempts to keep the total price for its services at around 20 percent of total sticker price for the input package. myAgro seeks to improve its customer acquisition through NGO partnerships and by working with savings groups to acquire a more desirable group savers. Through these partnerships, myAgro projects it can reduce customer acquisition costs by 66 percent compared to a direct sales model.*

*80-90 percent of MyAgro customers who reach their savings goals return the next year, leading to gradual increases in the amount saved by those returning customers each year. myAgro's acquisition goal is to reach 200,000 farmers by 2020, and it plans to offer its services in Tanzania in 2018. While savings mobilization will continue to be the primary product offering, myAgro understands there are other challenges farmers face in expanding agricultural ventures. As myAgro deepens its customer data set, there is the possibility to more efficiently access buyers and markets for clients' crops.*

*myAgro also plans to explore how to use its product as a catalyst for broader adoption and usage of mobile money among its clients. For example, it has developed a*

*precision planter product that speeds the sowing process so farmers can plant more crops with greater efficiency. Farmers can opt in for this product as part of a larger package. myAgro's re-packaging and delivery services have also improved, helping reduce costs even further. These business model iterations have helped reduce the field cost of service 12 percent annually since 2012.*

*During its 2018 expansion into Tanzania, myAgro plans to pilot a fully digital top-up option that replaces scratch cards and enables farmers to make layaway payments directly from their mobile money wallets. It intends to market this solution primarily to savings groups who already use mobile money to collect deposits and pay out loans. This will help reduce the cost of collecting savings deposits and enable myAgro to have more direct lines of communications with their customers. myAgro is cognizant that the use of scratch cards provides an opportunity for more interactions between farmers, vendors, and myAgro agents. Therefore, it will closely monitor these pilots to determine whether saving behaviors are impacted by the decrease in human interactions.*

## KEY TAKEAWAYS

1. *Through a piecemeal installment payment model, myAgro offers farmers access to quality inputs at competitive prices without taking on debt.*
2. *myAgro has taken a relatively "low tech" approach on the service front-end with the use of printed scratch cards for its customers, but its back-end system has a robust MIS capability that interacts with the mobile money platform of a third party (Orange).*
3. *60 percent of myAgro's clients are women, indicating that a savings product may be more appropriate for the female smallholder market segment.*
4. *myAgro has found that clients acquired through savings groups are more likely to achieve their savings goals compared with those that are acquired on an individual basis.*
5. *myAgro has built significant capacity in transport and logistics to ensure accurately, timely delivery of input packages. This positions myAgro well for being able to provide market linkage transportation services to its clients in the future.*

# CASE STUDY 3

## *Bank Asia*

### Key Attributes

***Provider Type***

- *Commercial Bank*

***Years in Existence (Service Offering)***

- *2-3 years*

***Product Offering***

- *Savings*
- *Lending/Credit*
- *Payments*
- *Money Transfer*
- *International Remittance*
- *Insurance*

***Target User(s)***

- *Farmers*
- *Input Side Value Chain Actors*
- *Outputs Side Value Chain Actors*

***Digital Product Form Factors***

- *Basic mobile device*
- *NFC-enabled card*
- *Tablet/smartphone*
- *SaaS/Cloud Services*
- *Traditional software*

***Revenue Model/Pricing***

- *Interest*
- *Fees (transaction-based)*
- *Fees (service based)*

***Target Partners***

- *Farmer Associations*
- *Inputs Side Value Chain Actors*
- *Outputs Side Value Chain Actors*
- *MNOs*
- *Third-party technology partners*
- *NGOs*

*Bank Asia offers its retail, enterprise, and corporate clients residing or operating in rural areas with a branchless banking service to their bank accounts via authorized agents to conduct the same transactions they can conduct within a banking hall.*

### Origin of the idea

*Bank Asia launched its agency banking service with the goal to include the financially excluded; particularly those citizens or enterprises located in rural areas where agriculture is a dominant revenue source. The exclusion of a large percentage of people from formal financial services is a chronic problem for many modernizing economies, including Bangladesh. Exclusion makes individuals and households vulnerable to a range of risks such as overreliance on or exploitation by informal money lenders. Exclusion also creates risks at a macroeconomic level if key sectors become saturated with unregulated financing schemes. Enhancing financial inclusion, therefore, is not only a development objective but a strategic pillar for broad, economic growth.*

### What are the market problems this offering seeks to solve?

*The primary problem Bank Asia's rural agent network addresses is proximity and accessibility. Agents are physically closer to remote populations and many operate out of pre-existing locations that are well-established and known to local communities. These locations also maintain longer hours of operation than traditional brick and mortar branches. This is particularly helpful for MSMEs that have high cash handling requirements and large cash inventories later in the day after branches close.*

*The second problem the service addresses is product availability. Unlike earlier deployments in Bangladesh that were restricted to a smaller set of offerings such as domestic money transfer, airtime purchase, and limited bill payment, Bank Asia is a regulated financial institution and its network of rural banking agents provides customers with access to the full complement of banking services and financial products. Agents offer deposits, withdrawals, savings, payments, money transfers, credit, lending and insurance.*

*Another problem Bank Asia addresses is pricing and affordability. The combination of digital solutions and reduced infrastructure costs allows Bank Asia to offer rural customers "no frills" accounts that have minimal or no balance requirements, and limited transaction or servicing fees. With respect to savings, individual and enterprise customers can open short-term, long-term or variable accounts. With respect to credit and lending, Bank Asia offers a range of financing with more flexible terms and conditions around funding limits, funding use, and repayment schedules. Agents also serve as collection points for credit, loan, or insurance payments.*

*Finally, Bank Asia addresses the need for financing and transaction services within agri-value chains. Through its digital payments and disbursement processing capabilities, Bank Asia adopts a holistic approach to lending and payments whereby farmers and other agri-value chain actors can transact digitally in person (e.g. at a rural collection point such as a cooperative) or remotely via mobile device or rural banking agent. These services improve both the availability of working capital to increase trading activity and the timeliness of payment collection, especially for farmers, so that earnings can be accessed more quickly.*

### How are digital channels used throughout the offering?

*Digital channels are an integral part of Bank Asia's branchless banking agent network offering. Agents are equipped with one of several devices depending on their on-site configuration (i.e. power supply, mobile internet connectivity). An agent might have a desktop, laptop, POS terminal, tablet, or smartphone. All devices have an NFC-enabled component or a biometric scanning capability. Bank Asia acquisition agents are similarly outfitted with hardware and software that allows them to originate applications and that functions online and offline to minimize the number of touch points required to activate an agent on their core/agent banking system. Because its target customers are rural and less affluent, Bank Asia made a conscious decision not to impose any technology (mobile or otherwise) requirements. An individual rural client can access her or his account through biometric identification along with a PIN entry.*

### Implementation: the experience thus far

*Bank Asia has issued over 550,000 accounts since the launch of its branchless banking service. Its agents average 2,000 new account enrollments per day. The typical average deposit per rural retail customer is 9,000 to 10,000 taka (about $115). Its deposit portfolio is 435 crore taka ($54.37 million) and its lending portfolio has reached 135 crore taka ($16.87 million) with a PAR at 3 per cent. Given the nascence of the service offering and the target customer segment which is accustomed to more flexible, informal repayment terms, Bank Asia is confident the PAR figure will improve. Bank Asia is also partnering with multiple MNOs in the market to provide micro-finance to rural customers with mobile subscriptions using an alternative credit scoring algorithm tied to voice and data consumption patterns. It is worthwhile to note that enrollment and deposit mobilization figures are driven by a customer segment with the highest percentage (60%) of less formally educated customers (below Grade 5) of any of Bank Asia's service delivery channels.*

*Bank Asia currently has about 2,350 registered agents. A majority of these agents currently operate as local municipal centers of the government but a growing percentage are for-profit entities or NGOs providing micro-finance services to specific rural regions. Bank Asia relies on a range of selection criteria and licensing requirements, which*

*include a minimum capital reserved, a vault for temporary case storage, a fixed location with a stable power supply, and extended operating hours (which is also a stipulation from the central bank in its recent guidance on agent banking services). Based on a blended commission structure that draws from float interest and per transaction revenues, agents have thus far demonstrated a motivation to mobilize and effectively safeguard deposits as opposed to simply drive account activation without emphasizing product comprehension and usage. Bank Asia believes that its current commission structure will offer its agents break-even potential on a monthly basis.*

### Looking ahead: growth, opportunities and challenges

*Bank Asia is engaging UN agencies and USAID around issues of digitizing social safety net stipends as well as micro-credit or micro-loan issuance to farmers for agro-inputs. With NGOs, Bank Asia is pursuing options to provide rural credit unions and VSLAs with a digital deposit mobilization capability tied to a loan disbursement and collection capability. In some cases, Bank Asia is also considering partnering with established local NGOs as potential agents, as initial platform data suggest that the commission-based revenue could provide a meaningful funding source for these NGOs and reduce reliance on development funding. In terms of private sector partnerships, Bank Asia has opened talks with companies like Unilever to integrate an enterprise payments solution that can be rolled out in stages where different payments legs are digitized or merchants are issued branchless banking accounts and migrate to a digital payments channel all at once. Finally, Bank Asia is open to partnerships with MNOs and other banks as it sees growth opportunities in extending micro-finance to qualifying mobile subscribers based on an alternative credit scoring methodology and providing other mobile banking agents with a way to deposit excess cash float following a large cash delivery.*

### KEY TAKEAWAYS

1. *Bank Asia prioritized enrollment of smaller farmers and adopted a holistic approach to serving agri-value chains by acquiring enterprises based on production activities of farmers, including those involved in input supply or output trading and processing.*
2. *Agent banking service includes 2,350 registered agents and 550,000 rural customers; 60 percent of customer base falls within the lowest segment of formal education. Rural agent network has mobilized $54.37 million and maintains a lending portfolio of $ 16.87 million.*
3. *Current lending PAR is 3 percent but leadership expects levels to further decline as the service becomes more established and customers adjust to more formal repayment processes.*
4. *Commission structure is blended to incentivize deposit mobilization, payments and money transfer services, and new product issuance. Break-even on a monthly basis is achievable at the individual agent given current commission structure.*
5. *Agents are equipped with hardware (laptop, desktop, tablet, smartphone or POS terminals) but customers have flexibility vis-à-vis account access method, including biometric, PIN, card, or mobile handset.*

### Considerations moving forward for digital savings and value storage

While the spread of mobile money has been rapid in many markets, sustained account usage has not. This points to a continued challenge for digital savings, whether they are formal, regulated products or mechanisms for non-interest-bearing value storage. Moving customers from awareness to use "requires different marketing interventions at each step" in the customer journey, necessitating understanding of the customer segment, and sometimes significant investment in customer education and trust-building for new users, typically through field agents.[77] There is variation in active customer rates among mobile money providers, so while many providers see increases in account activity, encouraging active use after registration remains a challenge. Strong distribution networks, enabling regulation, and an account-based rather than over the counter business model, all encourage active account usage.[78] These same challenges exist for models that are bank-led as well as those that are offered directly by non-banks such as MNOs.

There are also considerations ongoing around digitizing savings groups. Chief among these is how digitization changes the dynamics of the group. In most cases, groups form locally and organically, and offer members, and especially women, the opportunity to be part of a vital social network. Digitization, by automating group functions and bookkeeping traditions, can potentially change the social dynamics that provide value in members' lives. It is also an open question whether building individual profiles through the digital savings group platform will actually lead to an increase in financial services access. To date, this idea has sparked interest but not yet clearly demonstrated commercial feasibility.

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[77] Davidson, Neil and M. Yasmina McCarty. Driving Customer Usage of Mobile Money for the Unbanked. GSMA. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2011/03/Driving-Customer-Usage-Final.pdf)

[78] State of the Industry Report on Mobile Money 2017. GSMA. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/05/GSMA_2017_State_of_the_Industry_Report_on_Mobile_Money_Full_Report.pdf)

## Credit

### Recent Observations, Trends and Developments

In past decades, lenders moved from individually assessing written loan applications to automating decisions with the use of statistical models. Such models are built from credit scores determined by credit bureaus, which have access to a host of data on individuals' financial histories. The credit score itself does not predict whether the individual will default, but places the individual within a risk profile, showing the lender real rates of default among borrowers with the same score.[79] This information allows the lender to quickly and easily calculate the cost and risk of lending. In most emerging markets, however, credit bureaus do not exist or do not serve the majority of the population, and low-income individuals, especially in rural areas, do not in any case tend to generate the type of financial history data that credit bureaus rely on to determine the score. Through alternative credit scoring, lenders are generating credit scores based on new digital data sources that customers who lack traditional financial histories are more likely to be able to provide. Not unlike traditional credit scoring in developed markets, alternative credit scoring relies on sourcing data and correlating it through machine learning and algorithms to predict the likelihood of repayment. The innovation in alternative credit scoring is that much of the data being used is non-financial or does not heavily draw on past credit utilization and repayment behavior, as is the case with traditional credit bureau scoring.

The challenge, therefore, with alternative credit scoring is ensuring that this non-traditional data and the methods used to index it do indeed accurately predict repayment. Typically, the ability of the model to inform a lender of an individual's creditworthiness improves as more data is fed in, but in most cases customers of this type of credit score do not have significant longitudinal data to share. Further, not all data is equally useful to alternative credit scoring. While a number of new alternative credit scoring models utilize non-financial data such as psychometrics, airtime usage or social media connections for providing credit in agriculture, data around farm characteristics and finances are still the most useful as they are more closely correlated with the ability to repay a loan than, for example, frequency or amount of airtime top ups. Whereas data on "past farm production, purchases and sales" are relevant to predicting ability to repay, psychometric and mobile money or airtime usage patterns can potentially be indicative of willingness to repay.[80] Gathering farm-level records and financial information at reasonably low costs remains key to making alternative credit scoring work for the agriculture sector.

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[79] Carroll, Peter and Saba Rehmani. Alternative Data and the Unbanked. Oliver Wyman. (http://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2017/may/Oliver_Wyman_Alternative_Data.pdf)

[80] Caire, Dean. Digital Credit Scoring in Agriculture. Grow Asia, 13. (http://exchange.growasia.org/system/files/GA_Digital%20Scoring%20Guide_Double.pdf)

In addition to the benefits of digitally enabled credit scoring, the ability to digitally deliver credit and collect repayment rather than paying loan officers to do the same make it more efficient and cost-effective to serve a rural clientele. Some digital credit products are marketed directly to farmers, others facilitate B2B linkages, removing farmers from traditional financing schemes targeting the purchase of inputs or outputs. Most current offerings are built for mass-market consumption and their short-term repayment terms and small loan sizes do not fully match the credit needs of farmers who have seasonal income based on their crops, though some agriculture-specific models have been developed and are explored further below.

### The Problem

The demand for smallholder finance, which accounts for both agricultural and non-agricultural needs, in SSA, Latin America, and South and Southeast Asia is estimated at $210 billion.[81] Another calculation estimates that "the financial sector meets less than 3 percent of total smallholder demand for financing."[82] All types of farmers, from those in loose to tight value chains, have similar levels of need for financing for non-agricultural household expenditures.[83] In SSA, the proportion of lending by formal financial institutions versus other sources is lower than in other regions. Informal lending by value chain actors also provides more of the total supply of lending to the subcontinent than formal sources.[84]

Smallholder farmers and agribusiness SMEs have limited and inconsistent cash flow, generating a need for credit to cover farm inputs, equipment and working capital. However, credit markets are subject to friction in the marketplace that results in these customer segments being chronically under-served. These frictions limit "the extent to which financial institutions can reach out to clients and provide access to different services."[85] Two prominent examples are related to information access and to contract enforcement:

- ***Visibility of transactions and cash flow***: Lenders do not have full information about the farmer or MSME agribusiness and their capacity to repay; the less information they have, the riskier and therefore more expensive it is to lend. Farmers typically cannot provide the financial

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[81] Inflection Point: Unlocking growth in the era of farmer finance. Dalberg Global Development Advisors 2016, 7.

[82] Hong, David and Stephanie Hanson. Scaling up agricultural credit in Africa. One Acre Fund, 2016, 3.

[83] Inflection Point: Unlocking growth in the era of farmer finance. 2016, 16.

[84] Ibid, 10.

[85] Beck, Thorsten, Asli Demirguc-Kunt, Maria Soledad Martinez Peria. "Banking services for everyone? Barriers to bank access and use around the world." World Bank, 2007, 2. (http://siteresources.worldbank.org/INTFR/Resources/Beck-DemirgucKunt-MartinezPeria0207.pdf)

histories, business records, or farm production information that lenders use to determine the price of lending. The volatility of production itself contributes to additional uncertainty around future cash flows and ability to repay.

- ***Limited commitment***: It is also difficult (and therefore expensive) to enforce a lending contract once the farmer or agribusiness has received payment. The cost of credit is driven up when lenders have to travel longer distances and mobilize large teams of field staff to collect repayments in rural areas. Further, farmers with irregular incomes due to the seasonality of their cash flow and environmental volatility may face unexpected difficulties repaying loans. Low literacy as well as lack of identity documentation to definitively link a specific farmer to a loan, contribute to difficulties in enforcing lending contracts as well.

These challenges may also be exacerbated by other barriers to the financial service provider, such as "competitive pressures, regulatory framework, and the availability of physical infrastructure."[86] Additionally, farmers face several non-price barriers when seeking credit loans. These include a lack of formal identification, insufficient or non-existent financial documentation of agricultural activities, and collateral requirements, which most smallholders cannot produce. Even when farmers are organized into cooperatives, which reduces the transaction costs associated with reaching and serving individual smallholder farmers, these cooperatives experience challenges in accessing formal credit. A 2016 World Bank survey found that across cooperatives "stringent collateral requirements, submission of business plans, and the location of financial institutions" limit their access to finance.[87]

Given this context, larger formal lenders tend to overlook rural, poor customers because they are costlier to serve. Where farmers do have access to credit, it may not be of sufficient quality, flexibility and affordability. Smallholders are price-sensitive and may only have access to credit with high interest rates, given the costs of lending to the segment as described above. Additionally, the terms of available credit products may not match well with agricultural needs. Farmers may need smaller loans than more commercialized businesses and may have more difficulty making monthly payments, which require longer loan terms and create balance sheet imbalances for financial service providers. Repayment schedules need to be flexibly tied to the specific patterns of different forms of production. A 30-day repayment plan can leave farmers over-indebted if they earn income only once or twice a year or season. Repayment needs in the same region can also differ based on different crop cycles. Products and services available in a given market may vary significantly from year to year. This is especially the case if they are offered by a more informal provider,

[86] Ibid, 2.

[87] Financing Agribusiness in Sub-Saharan Africa: Opportunities, Challenges and Investment Models. World Bank, 2016, 5. (https://www.agrifinfacility.org/sites/agrifin/files/Africa_Agrifinance_%202016.pdf)

such as a small-scale input dealer, which may result in raising borrowing costs for the farmer.[88]

The MFI group model reduced some of the lending risks described above, but this model was not designed to address the full range of agricultural credit needs that many farmers possess. Farmers may want larger loans to smooth income or allocate to agricultural or non-agricultural revenue generating activities (i.e. equipment purchase or lease, land expansion, and larger inputs packages). Such amounts typically exceed what MFIs can offer. MFI repayment schedules may also not be a good fit, as farmers may require several months or multiple planting seasons to see a return. Further, some evidence shows that "joint liability" achieved in the group microfinance model is not required to achieve strong repayment rates.[89]

### Applying Digital Solutions

Digital technology is significantly impacting credit markets with the introduction of new data sources and analytics that facilitate alternatives to traditional methods of credit scoring and delivery of credit/lending capital. Proponents of digital alternative credit scoring point to newly available data sets and tailored analytical methods, which arguably reduces information gaps on the part of traditional lenders and drivers of lending costs for farmers. Whereas farmers are not typically able to provide credit histories, business records or other financial histories, many now have digital records of their phone activity, including airtime purchases, call records, contacts, web browsing, social media and mobile money transactions. The data used for alternative credit scoring falls into several primary categories, each of which has differing levels of utility for predicting repayment in agriculture, depending on how closely it is tied to farm-level financials.

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[88] Inflection Point: Unlocking growth in the era of farmer finance. Dalberg Global Development Advisors, 2016.

[89] Global Financial Development Report, Financial Inclusion. World Bank, 2014. (https://openknowledge.worldbank.org/bitstream/handle/10986/16238/9780821399859.pdf?sequence=4andisAllowed=y)

*Table 3: Digital Data for Agricultural Lending*

| Type of data | Examples | Digital collection method |
|---|---|---|
| *Agricultural transaction data provides insight into farmers' businesses* | • *Records of input purchases*<br>• *Receipts of sale to traders* | *Mobile device or tablet, at the farm gate or other transaction sites* |
| *Agronomic data can show how long particular crops have been planted and how strong yields are* | • *Annual government/extension surveys*<br>• *Surveys conducted by NGOs/international donors or by agribusinesses in tight value chains* | *Specialized digital applications such as FarmForce or Geotraceability that record agronomic information, satellite imagery* |
| *Traditional financial data shows past history of repayment* | • *Records of timeliness and completeness of past repayments*<br>• *Records of credit limit utilization and credit checks* | *Available when loans are formally conducted within a digital banking platform* |
| *Alternative data may show willingness to repay, reliability of customer* | • *Social media networks*<br>• *Airtime top up value and frequency*<br>• *Psychometric scoring* | *Available through surveys, by scraping smartphones and through datasets provided by MNOs* |

*Source: Digital Credit Scoring in Agriculture: Best Practices of Assessing Credit Risks in Value Chains; SAFIRA, GrowAisa*

Third-party technology providers, MNOs and financial service providers are able to use proprietary algorithms to determine how well the data correlates with repayment rates and to quickly predict lending risk and calculate interest rates.[90] For MNOs, these products represent an opportunity to increase customer stickiness and reduce churn by offering existing or potential airtime customers additional use cases for subscribership. Third parties and financial service providers have the opportunity to generate new customers and revenue streams.

These credit scores are being used widely in mass market microlending products. Typically, entities licensed to issue e-money (either an MNO or a financial service provider) provide the payment channel and a third-party semi-regulated lender or a financial service provider holds the loans.[91] Customers may, in many cases, directly qualify for, and instantly access, microcredit through their existing mobile money account, using the digital channel to receive the loan and to repay, or they may access a third-party product through an app. Digital delivery increases the speed with which funds are received by the customer and the ease and transparency of repayment, obviating the need for loan officers to travel to the field with paper applications that must be carried back and analyzed, and for further visits to secure repayment.

[90] For more information on how credit scores are calculated, refer to IFC's Handbook on Data Analytics and Digital Financial Services.

[91] Digitally Delivered Credit: Consumer Protection Issues and Policy Responses to New Models of Digital Lending. AFI, 2017. https://www.afi-global.org/sites/default/files/publications/2017-11/AFI_CEMC_digital%20survey_AW2_digital.pdf

Several digital lending products specifically designed for farmers have been launched but none of these offerings have been on the market for longer than five years. Therefore, it is premature to assess whether these models are commercially viable and at what scale. Digital MFI Musoni's *Kilimo Booster*, for example, offers a flexible digital loan with grace periods and repayment plans tailored to the individual farmers' production circumstances coupled with a fully digital field registration, loan disbursement and repayment experience. Musoni found that in addition to offering loans to farmers on terms that set them up for successful repayment, the digital platform allowed them to easily "deliver additional services via mobile, without having to constantly make changes to the core banking system."[92] Tulaa links key market actors on a digital platform, providing information and data management services. Through a mobile application, Tulaa staff or affiliated input retailers register farmers, allowing them to purchase input credit that is paid out and repaid using mobile money.

Apollo Agriculture, also piloting in Kenya, offers farmers a product that combines agronomic information and advice and loans disbursed and repaid using mobile money. The credit scores are determined both by a psychometric survey administered to the farmers and data collected by agents on a smartphone on the physical attributes of the farmers' property; this data is analyzed through machine learning techniques that result in a credit score that allows Apollo to lend to farmers on terms that match their unique production cycles.

**Partnership Roles in Digital Agri-Credit**

| | MNO | Financial institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Source of customer non-financial data*<br>• *Provide credit scoring through data analytics*<br>• *Provide existing customer base to evaluate creditworthiness*<br>• *Provide mobile channel for disbursement and repayment*<br>• *Provide lending capital to clients*<br>• *Provide mobile money agent network to process disbursements and collections* | • *Provide lending capital to partners*<br>• *Provide financial data to generate alternative credit scoring*<br>• *Provide and manage digital lending platform*<br>• *Provide agent banking network to process disbursements and collections* | • *Support customer identification*<br>• *Facilitate prospective customer mobilization and sensitization*<br>• *Provide non-financial data to evaluate creditworthiness*<br>• *Support with information collection and application processing* | • *Provide and manage lending platform*<br>• *Provide data analytics and MIS for alternative credit scoring*<br>• *Provide non-financing and financial data to evaluate creditworthiness*<br>• *Support customer identification*<br>• *CRM services* |

[92] The Future of Microfinance for Kenya's Smallholder Farmers. USAID, 2017, 11. (https://www.usaid.gov/sites/default/files/documents/15396/Musoni_Case_Study.pdf)

# CASE STUDY 4

## *Apollo Agriculture*

| Key Attributes |
| --- |
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *1-2 years* |
| ***Product Offering*** |
| • *Agri-Related Information*<br>• *Credit* |
| ***Target User(s)*** |
| • *Farmers* |
| ***Digital Product Form Factors*** |
| • *Basic mobile device*<br>• *Tablets/Smartphones* |
| ***Revenue Model/Pricing*** |
| • *Loan/Credit Interest* |
| ***Target Partners*** |
| • *Inputs Side Value Chain Actors* |
| ***Year Founded*** |
| • *2016* |
| ***Geographic Focus*** |
| • *Kenya* |

*Apollo Agriculture is a digital lending platform that provides farmers with access to credit based on an alternative scoring method, as well as agri-information and advice services.*

### Origin of the idea

*Apollo Agriculture, founded in August 2016, is an agricultural alternative credit model start-up that assists African farmers in maximizing their profits through a low touch, highly efficient delivery model.*

### What are the market problems this offering seeks to solve?

*Apollo is working to address the lack of access to credit and agronomic information among farmers that operate in less organized value chains. Unlike many other products and services that target more organized value chains to ease the logistical constraints and costs of service delivery, Apollo has chosen to target smallholder farmers who work in less organized value chains because they are the largest segment of commercially active farmers in Africa. Apollo's initial go-to-market product seeks to improve Kenyan maize farmers' access to quality inputs (seed and fertilizer) by offering them credit to purchase inputs and providing agronomic advice. Its loan product also comes with weather index insurance to cover the cost of the package of inputs provided. Apollo's business model is to deliver this service bundle at a low cost by leveraging multiple digital channels that reduce the cost of customer acquisition and operational expenses, while maintaining a high level of customer engagement.*

### How are digital channels used throughout the offering?

*When farmers enroll, Apollo collects data on them through a phone survey conducted by Apollo's call center. Apollo agents then use smartphones to capture the GPS boundaries of customers' farms and record additional observations about the applicant that complements satellite imagery used to assess farmers' yield, crop cycles, crop types, housing, animal/livestock ownership, and access to roads. Apollo then takes these different data sources and applies agronomic machine learning to help tailor both information services and creditworthiness scoring. Farmers repay their Apollo loans through mobile money gradually over the course of the season, with full payment due after harvest. Farmers also receive agronomic advice from Apollo through SMS and automated voice calls in multiple languages.*

### Implementation: the experience thus far

*In its first 18 months of existence, Apollo rolled out automated operations for everything from customer acquisition and enrollment to input distribution, training and repayment. Customer acquisition takes place through radio,*

*refer-a-friend incentive programs, and road shows. Once customers are registered (typically through a low-cost SMS channel) they engage with Apollo through the call center for enrollment and are visited by agents who conduct the data collection described above. In 2018, Apollo had 12 full time staff, a call center, and worked with a group of data collection agents paid per task. This approach substantially drives down customer acquisition costs. Apollo then uses the data collected as well as the satellite imagery to generate a credit score that informs a lending decision. All payments are transferred with mobile money, which further reduces transaction costs. Apollo had completed one growing season in 2018.*

*While Apollo's operations are relatively self-reliant, one key partnership is with agri-inputs dealers in target regions in Kenya, which manage last-mile distribution to Apollo customers. In the first season, Apollo tested different input order fulfillment models. In one model, farmers pick up inputs at participating agri-dealers. In the other model, Apollo delivers inputs to designated pick up areas. Both models come with advantages and challenges, and Apollo is incorporating insights from both approaches to maximize cost-effectiveness, logistical efficiency, and positive customer experience.*

*Initially, Apollo used part of its seed funding from Accion Venture Lab and OEL Venture Investments to lend off its own balance sheets as it develops a proof of concept. It has yet to partner with any banks or microfinance institutions.*

## Looking ahead: growth, opportunities and challenges

*While structuring relationships with financial institutions will present new challenges, Apollo believes these partnerships are key to its ability to scale. Some of these challenges are very similar to those faced by other financial or agricultural technology firms interested in establishing data-sharing partnerships with financial institutions. Apollo is cognizant of these challenges, and has pointed out several key questions that will require negotiation between parties: 1) Who will own the underwriting process? 2) Who will ultimately own the customer? 3) What will the commercial agreements around the use of data and credit scoring be?*

*As it continues to grow, Apollo is targeting expansion within Kenya and into some markets in East Africa. Developed mobile money ecosystems are a key criterion for Apollo's business model to scale, which means it has limited expansion options. Currently it is considering expansion into five East African markets that have a total of 29 million maize farmers. By learning from its models and digital operations Apollo hopes to prove that financial services can be delivered to the agricultural sector at reasonable cost and significant scale.*

### KEY TAKEAWAYS

1. *Apollo's model attempts to utilize remote data collection techniques and call center onboarding to solve for the high costs of service delivery in rural areas.*
2. *Apollo targets farmers who are not part of very organized value chains, as it sees this customer segment as being the largest and most underserved.*
3. *When on-the-ground agents are necessary for data capture (GIS, account enrollment), Apollo relies on a network of commission-based agents rather than paid staff.*
4. *Satellite imagery has the potential to assess yields, crop cycles, crop types, housing, and other data points that can be of interest in building out a farmer lending portfolio.*

# CASE STUDY 5
## *Tulaa*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *2-3 years* |
| ***Product Offering*** |
| • *Payments*<br>• *Credit*<br>• *Farmer/Data Management*<br>• *Insurance* |
| ***Target User(s)*** |
| • *Farmers*<br>• *Inputs Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors*<br>• *Financial Institutions* |
| ***Digital Product Form Factors*** |
| • *Basic Mobile Device*<br>• *Tablet/Smart Phone*<br>• *SaaS/Cloud Services* |
| ***Revenue Model/Pricing*** |
| • *Fee-based (service)*<br>• *Commission*<br>• *Loan/Credit Interest* |
| ***Target Partners*** |
| • *Inputs Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors*<br>• *Financial Institutions*<br>• *Insurance Providers* |
| ***Year Founded*** |
| • *2016* |
| ***Geographic Focus*** |
| • *Ghana and Kenya* |

*Tulaa is a digital lending platform that links input suppliers, farmers, and commodity off-takers. It also provides financing to farmers for agri-input purchases and coordinates their delivery through existing retail networks or paid field agents.*

### Origin of the idea

*Tulaa's founders recognize that many agri-value chains in African markets are highly fragmented and dominated by small-scale farming. While actors in these value chains have built last-mile human networks to source and distribute agri-outputs, there is a noticeable lack of financial and information services that would enable greater levels of organization. This makes it expensive and challenging for suppliers to expand their presence and diversify product offerings as well as for purchasers to source agricultural outputs from smallholder farmers.*

### What are the market problems this offering seeks to solve?

*Farmers who cultivate crops or livestock on small plots are often unable to afford inputs. Additionally, they lack access to a) credit to pay for those inputs, b) technical know-how to improve their yields when using these inputs, and c) markets to sell their produce. Tulaa's platform aims to improve the flow and organization of agri-production information and financial transactions to make it easier and cheaper for lenders to connect with agri-value chain actors on the inputs or outputs side. By linking these parties digitally, Tulaa fundamentally alters input financing and commodity off-taking schemes. Specifically, it removes the need for cash-based loan or credit disbursements.*

*It also alters the role of the farmer in collection or repayment activity related to lending or crop selling. Loans are disbursed directly from the lender to the input supplier over the Tulaa platform. Loan repayment is made by the outputs buyers in lieu of paying the farmer directly. The remaining balance is owed to the farmer, who receives this payment to a mobile money account. The value proposition to input suppliers is increased sales, better supply chain visibility, reduced counterfeit products, and customer loyalty.*

*For commodity off-takers, the value proposition of Tulaa is increased quantity and quality of outputs and less burden or cost associated with inputs provision. For lenders, the value proposition is expanded customer reach, lower KYC costs, and reduced loan diversion and portfolio monitoring costs. For farmers, the value proposition is access to credit, inputs, and technical support, as well as direct links to buying markets. Over*

*time, farmers can also build digital financial identities based on their transaction activity with these agri-enterprises, opening access to an expanded suite of financial and related agricultural services.*

### How are digital channels used throughout the offering?

*Tulaa uses digital channels at multiple levels – farmer, input supplier, commodity off-taker, and lender – to enhance and complement existing human networks working within targeted agri-value chains. As shown in the graphic on this page, these channels are used to register farmers, improve data management and customer visibility for agri-enterprise and lender clients, as well as facilitate payments. Tulaa has developed a mobile application solution that enables paid staff or affiliated input retailers to register farmers, which also allows them to purchase input supply packages on credit.*

*The platform is offered to agri-enterprise and corporate clients through an annual licensing fee. These clients and other partners (e.g. lenders) access the Tulaa platform via mobile and non-mobile channels (i.e. desktop or laptop) where account dashboards provide a range of transaction and other related information. In Tulaa's model, farmers are required to have a registered SIM card and a mobile money account to receive crop-sale payments once the loan has been paid in full by the commodity off-taker.*

## Implementation: the experience thus far

*Tulaa has raised capital from several donors and investors including CGAP, USAID, AHL Venture Partners, Acumen and Global Partnerships. After just over a year in operation, Tulaa has approximately 9,000 farmers using its platform in Ghana and Kenya. The platform has facilitated over $1 million in orders, and many of the loans Tulaa offers are also bundled with weather index insurance in partnership with Acre Africa, an insurance company spin-off of the Syngenta Foundation. By the end of 2018, Tulaa has set a target to have 35,000 total farmers registered on its platform.*

*During farmer registration, Tulaa staff collect KYC data, farmer crop data, and plot location data. Farmers also select their desired inputs packages and determine where and when they will collect them. In most cases (over 90 percent), farmers apply for a loan to cover the costs of the inputs package. When a loan is requested, the farmer is required to provide cash collateral to the lender, which can either be Tulaa directly or a lending partner such as the MFI Musoni in Kenya. Cash collateral can come in the form of a lump sum payment or piecemeal installments according to an agreed upon schedule.*

*If loans are issued through an MFI partner, there may be an additional requirement to save a percentage of the total value of the ordered inputs. In Kenya, some partners require 20 percent savings, while in Ghana the requirement is 50 percent. These collateral payments and savings transactions are completed digitally and require the farmer to have a mobile money account to initiate a bill payment transaction. All participating lenders on the Tulaa platform must also register for a corporate/biller account (M-PESA in Kenya, multiple providers in Ghana).*

*Tulaa sources its products from a variety of reputable brands, including Syngenta, OCP, Yara, and Toyota, to ensure no counterfeit products are sold. Once input suppliers receive payment, the farmers collect their packages from specified distribution points. Tulaa supplements this digital transaction capability with free advice to farmers regarding planting and farming via the mobile channel, which is designed to strengthen farming practices and increase yields.*

## Looking ahead: growth, opportunities and challenges

*Tulaa currently lends a considerable amount off its own balance sheet while it builds a proof of concept for its lending product. It initially had a small number of lending partners, primarily banks, to provide credit. However, it found that the bank loan approval process delayed input ordering. As part of its proof of concept, Tulaa is developing a credit scoring model based on its current lending portfolio activity instead. In the future, rather than avoiding banks or other financial institution providers, Tulaa wants to build its confidence that a credible business case and operating model exists to provide credit financing. This financing could be directed either to Tulaa or its agri-value chain partners with a proven track record, based on platform transaction record data.*

*Tulaa's business model focuses on tapping into existing human networks and layering technology over those networks to reduce fragmentation. Yet, standing up, its product requires initial investment in human capital, including a network of sales agents and organizing local aggregation points and logistics for order*

*fulfillment. These are costs Tulaa hopes to reduce over time through partners that can take on more registration and fulfillment responsibilities such as financial institutions and agribusinesses. As these relationships improve and costs decrease, Tulaa's unit economics will provide healthier margins with the possibility of reaching over 30 percent across both input and output operations.*

*In terms of overall customer acquisition strategy, Tulaa is aware of the need to strike an appropriate balance between staff-driven registration, agent-driven registration, and user-driven registration. In an agent-driven commission model, there is the risk that quantity rather than quality will drive customer growth. Tulaa, therefore, wants to achieve an incentive structure for field staff and agent networks that keep acquisition efforts focused on quality (e.g. paying commissions for input package sales as well as farmer credit repayment performance).*

*Tulaa is currently focused on farmer accessibility to inputs, which has led to a prioritization of agri-enterprises and corporates on the inputs side. But Tulaa expects to expand service provision to value chain actors on the outputs side (specifically offtakers or buyers) interested in purchasing crops through the Tulaa platform. This part of the service will help provide farmers with direct linkages to markets, while also aggregating supply for offtakers by reducing their logistical costs and providing access to higher quality products.*

**KEY TAKEAWAYS**

1. *Tulaa is proposing a digital alternative to financing schemes for agri-inputs and commodity offtaking by linking market actors in new ways and altering the role and behavior of the farmer.*
2. *Tulaa's platform links key market players and provides information and data management services but relies on a third party to support key financial transactions.*
3. *Tulaa's service introduces some level of mobile technology and mobile money requirement for all users, including farmers.*

### Considerations moving forward for digital lending in agriculture

Digital lending and alternative credit scoring have received significant attention in the last several years. While increasing access to credit for underserved segments, the ease of access to digital credit has caused a variety of consumer protection concerns. Smallholder farmers are a particularly vulnerable segment as they face environmental risks and low, volatile income, which negatively impacts their ability to repay on time and in full. Many smallholder farmers have limited formal education, low literacy and numeracy levels, and restricted access to formal financial services. Without in-person interaction with a loan officer or another staff trained to assess loan risk for both provider and applicant, farmers could be susceptible to signing onto loan agreements digitally, where the terms and conditions are not easily located, viewed, or understood by the farmer.In addition, there are significant privacy concerns around the collection and use of data, which have implications in an industry where data collection is an integral aspect of the service but rule enforcement around issues of personal data privacy and ownership may be scant. Awareness of these risks by financial service providers is essential in this quickly changing industry where regulation may have difficulty keeping pace as products evolve and mature. Efforts to voluntarily organize around customer protection and privacy, such as Accion's Smart Campaign which engages the microfinance industry, are welcome and needed.

It is important to note that while enthusiasm about alternative credit scoring is high, there is no quick solution that can be scaled across regions and countries. The success of alternative credit scoring lies in the quality and utility of the underlying data and algorithm models, many of which lack transparency and are therefore vulnerable to the "risks of using spurious correlations."[93] Gathering high quality farm data is becoming easier and less costly with digital data management applications developed for agriculture. But, thus far, there are few mature market implementations to draw lessons from.

Another challenge in applying digital credit to the agriculture sector is that many products in emerging markets are not designed for the sector. Credit or loans are available on a short-term repayment basis and in micro-amounts, which is more useful for cash flow smoothing than for investment purposes. A number of fintechs, such as Tala and Branch, have attracted investment capital to expand access to rapid digital credit in emerging markets. But these products will have to content with the needs of farmers whose income earning patterns from agricultural production may not be frequent enough

**The Alliance for Financial Inclusion (AFI) identifies several consumer risks posed by digital lending:**

- Markets hold a mix of regulated and unregulated credit providers, creating confusion for consumers and difficulty in enforcing what protections may exist. There are also a number of different provider types, each with different regulatory implications, creating difficulty in enforcing regulations consistently.
- Lack of competition among providers leads to limited sharing of consumer data and fewer product offerings for consumers.
- Many products are instantly accessible from mobile devices, encouraging over-indebtedness because of the ease of access and lack of communication about terms and conditions between the provider and customer. In addition, the ease of providing instant loans at scale puts providers and financial systems at risk if credit scoring algorithms are not designed well and result in large-scale lending to risky clients and high default rates.
- Repayment collection procedures favor providers and allow them to automatically remove funds due from accounts, which can quickly put low-income customers in a difficult position. [94]

[93] Dean Caire, Personal Communication, July 2018

[94] Digitally Delivered Credit: Consumer Protection Issues and Policy Responses to New Models of Digital Lending. AFI, 2017. (https://www.afi-global.org/publications/2633/Digitally-Delivered-Credit-Consumer-Protection-Issues-and-Policy-Responses-to-New-Models-of-Digital-Lending)

to meet the loan repayment terms. The digital credit score and loan delivery mechanism does increase access for farmers, but the design of the loan product and its relevance to a farmer's crop and income cycle will still strongly influence her or his ability to repay.[95] There is also the need for digital credit or lending services aimed at the agriculture sector to establish partnerships with agribusiness on both the inputs and outputs side of various agri-value chains. By linking and digitizing the payments transactions that connect input suppliers, farmers, and commodity off-takers, these partnerships can help de-risk lending to farmers. Farmers will have identified buyers for their yield, and buyers can transact with another commercial enterprise instead of directly paying farmers and managing the transaction logistics and costs.

Further, it is important to note that credit scoring models are not one-size-fits-all: "the predictive accuracy" of new data "needs to be tested with the specific loan products and target farmer population to be known."[96] The barriers to credit access in agriculture also extend beyond what the providers of a digital credit score can address. Technology and data analysis will not likely solve the "historical, socio-economic and regulatory" barriers to rural credit access.[97] Collaboration across sectors must address these factors to allow digital solutions to make the greatest impact in agriculture.

## Agri-Equipment Leasing

### Recent Observations, Trends and Developments

At present, FSPs in SSA are not aggressively promoting leasing financing for agri-equipment, regardless of the role of digital technology. This stands in contrast to an acceleration in leasing finance for agri-equipment across multiple Asian markets, where banks and other financiers perceive market conditions to be conducive to greater investment, especially the role played by digital and mobile technology solutions. Where digital technology has had an influence on leasing, there are location-based services combined with MIS platforms that allow for agriculture activity tracking at farm level, equipment performance monitoring, and equipment tracking. The same data analytics based on location-based services is altering leasing risk evaluation.

The most widely cited example of a digital leasing innovation currently on the market is Hello Tractor, a digital technology company that connects farmers with compact tractors for rent. It allows users to farm more efficiently and less expensively than hiring manual labor. It also does not require capital for asset purchase, maintenance, and repair. Through a GIS-based software and micro-sensor, tractor owners or managers can remotely monitor tractor movements and tractor operator activity. Tinga is another example of a digital leasing innovation for agriculture.

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[95] Caire, Dean. Digital Credit Scoring in Agriculture. Grow Asia. (http://exchange.growasia.org/system/files/GA_Digital%20Scoring%20Guide_Double.pdf)

[96] Ibid, 48.

[97] Ibid, 9.

Based in Kenya, the company provides a "community mechanization" product in which groups of farmers jointly access a range of farm equipment, including tractors, plows, harvesters, and sprayers, through a mobile application. Farmers create an account on the platform and can request the use of machinery for specific amounts of time, only paying for the acreage they work. The equipment is dispatched to the farm from the nearest Tinga location. Tinga provides equipment, such as the chisel plow, designed to increase productivity through conservation agriculture principles by reducing the soil erosion associated with traditional tilling.[98]

### The Problem

There are very few options in SSA for agri-equipment leasing. Whereas it is a predominant form of asset financing in developed countries, agricultural leasing faces a number of market constraints, such as a lack of leasing finance, poor market linkages between leasing companies and farmers, a lack of affordable equipment for smaller farmers (e.g. compact tractors), as well as costly and inefficient fleet management and servicing.[99] Most equipment distributors are closer to the farmers than financial service providers are and offer payment plans. But they are not well equipped to manage the risk or operational requirements of a leasing or credit portfolio. Suppliers have reportedly experienced difficulty in partnering with financial service providers because of their "slow decision times … and a tendency to work only with the very top customers."[100]

As in credit markets, leasers do not have sufficient information on smallholder farmers to easily assess the risk and determine the price of leasing to them. Enforcing the lease contract is costly due to the need for adequate equipment maintenance and the inevitability of depreciation during the lease, and because of the expense of seizing the asset in case of default. Many financial service providers lack the core banking/backend systems needed to assess leasing risk and manage leases.[101] Finally, there has been low demand for leasing by subsistence farmers and farmers in loose value chains, whose plot sizes are often too small to justify leasing large equipment.

Technology adoption among smallholders for farm activities such as tilling, irrigation and harvesting, is dependent on the availability of relevant, usable tools that are distributed rurally and offered at affordable prices. Many smallholder farmers face limitations in purchasing equipment that can significantly increase yields and income. With leasing, farmers can use needed equipment without collateral or big upfront costs. In traditional leasing models, farmers pay a sum of money

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[98] Hey, you can get a tractor without hurting your purse. The Daily Nation. March 17, 2017. https://www.nation.co.ke/business/seedsofgold/you-can-get-a-tractor-without-hurting-your-purse/2301238-3854072-11iaioy/index.html

[99] Ibid.

[100] Ibid, 19.

[101] Ibid.

up front and a monthly payment of varying size, depending on the farmer's revenue cycle. The asset can then be seized by the lender in case of default.[102] Digital technologies may enable farmers to informally find equipment to lease outside of formal financial service provider-driven models and make formal leasing arrangements easier for financial service providers to implement.

### Applying Digital Solutions

Digital technologies offer new channels through which farmers can lease equipment, and new tools to facilitate the provision of leasing by financial service providers. Direct digital leasing innovations help farmers overcome the challenge of finding equipment to borrow, given the limited formal leasing services available through equipment dealers and financial service providers. By matching equipment owners with farmers who need rental equipment, this model makes existing informal lending processes more transparent and accessible. Whereas informal lending requires farmers to have social networks that include more affluent farmers who own the needed inventory, digital platforms level the playing field to an extent by allowing farmers to seek rentals outside their social networks. This model does not explicitly require the participation of a financial service provider, if the third party can finance the assets.

Additionally, the use of the Internet of Things (IoT), wherein objects are fitted with sensors that collect and transmit data to the cloud for access through mobile devices or computers, enables remote fleet tracking and management. Remote monitoring of equipment health and the ability to shut down equipment in case of payment default could help to overcome the challenge of contract enforcement and maintenance once the equipment has been dispatched to a rural area away from the leasing office.

Finally, pay-as-you-go (PAYG) is another business model, related to leasing, that changes the requirements for farmer asset purchasing, allowing smallholders to put down small amounts of money to gain access to needed equipment without full immediate ownership. These have been popularized in SSA with PAYG solar products. Providers lease solar equipment, which can be used for agricultural purposes such as irrigation, in exchange for regular payments made through mobile money. Providers collect payments much more efficiently by using mobile money, while farmers avoid the capital outlay associated with purchasing a significant asset.

**Partnership Roles in Digital Agricultural Leasing**

| | MNO | Financial institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provides system connectivity via mobile channel*<br>• *Provides mobile application for digital leasing product* | • *Funding new digital leasing innovations*<br>• *Directly providing leasing products*<br>• *Providing capital for third-party leasing products* | • *May be involved in identifying or sensitizing rural customers*<br>• *Support leasing application processing or aggregating equipment leasing demand* | • *Design of platform to connect borrowers and owners*<br>• *Provide MIS and data analytics services to monitor fleet location and performance* |

[102] Castell, Helen. Equipment leasing: How to expand agri-leasing in Africa. CTA Spore. http://spore.cta.int/en/article/how-to-expand-agri-leasing-in-africa.html

# CASE STUDY 6

## *Hello Tractor*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *4 years* |
| ***Product Offering*** |
| • *Market Access Information*<br>• *Farmer/Data Management*<br>• *Agri-Related Information* |
| ***Target User(s)*** |
| • *Inputs Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors*<br>• *Financial Institutions* |
| ***Digital Product Form Factors*** |
| • *Basic mobile device*<br>• *Tablet/smartphone*<br>• *SaaS/Cloud Services*<br>• *Traditional software* |
| ***Revenue Model/Pricing*** |
| • *Sale of monitoring device*<br>• *Subscription*<br>• *Commission*<br>• *Fee-based (per transaction)* |
| ***Target Partners*** |
| • *Inputs Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors*<br>• *Financial Institutions* |
| ***Year Founded*** |
| • *2015* |
| ***Geographic Focus*** |
| • *Kenya, Mozambique, Nigeria, Senegal, South Africa, Tanzania* |

*Hello Tractor provides business asset management services to compact tractor owners or fleet managers as well as a remote mobile app-based booking service for farmers to lease equipment through rural booking agents, which relies on GIS-based software and sensor equipment.*

### Origin of the idea

*In many SSA markets, land cultivation by farmers on small plot sizes (2 hectares or less) is costly and not fully optimized due to a reliance on manual labor. Farmers must also pay upfront for land preparation expenses, which creates a significant misalignment between cash outflow and inflow patterns. In 2014, Hello Tractor launched in Nigeria to make compact tractors available to farmers to lower land cultivation costs and increase income by boosting on-farm production.*

### What are the market problems this offering seeks to solve?

*Hello Tractor addresses four major problems in markets where there are sizeable populations of farmers operating small plots who lack access to mechanized agri-equipment.*

*First, it addresses under-cultivation of arable land through the provision of compact tractor equipment. This is achieved through GPS-based sensor technology fitted onto compact tractors and a booking service accessible via mobile app, which is used by rural agents and tractor operators to coordinate tractor delivery. Currently, a farmer in Nigeria operating a small plot often spends $200 on manual labor during peak planting season. With Hello Tractor, farmers can access a compact tractor at 53 percent of that cost.*

*Second, it allows for equipment monitoring according to performance and other indicators that investors, ranging from private equity funds to individual equipment owners, can use to better evaluate the financial and operational risks associated with this type of investment. Hello Tractor's MIS platform provides data analytics on equipment location, cultivation practices (e.g. which types of crops), equipment activity patterns and performance.*

*Third, Hello Tractor addresses the problem of market visibility into agriculture production patterns, in terms of yield, timing, and location. The same suite of services mentioned above can provide valuable insights for agribusinesses that will impact how capital, staff, and other resources are managed. For input suppliers and distributors, better knowledge regarding production patterns on smaller plots can help inform or optimize input distribution, pricing, and availability to better*

*align with farmer demand. It also helps output traders, buyers, or processors more accurately estimate yields, and align budget projections, spending, and operational activities to source and transport harvested yield.*

*Fourth, Hello Tractor addresses overall financing risk management for larger institutional investors or smaller financiers that wish to enter the compact tractor segment. In many instances, the raw commodity output within a given agri-value chain is underwritten multiple times by different third parties involved in either inputs provision or outputs collection. Hello Tractor technology reduces these transaction costs through greater transparency and data sharing.*

### How are digital channels used throughout the offering?

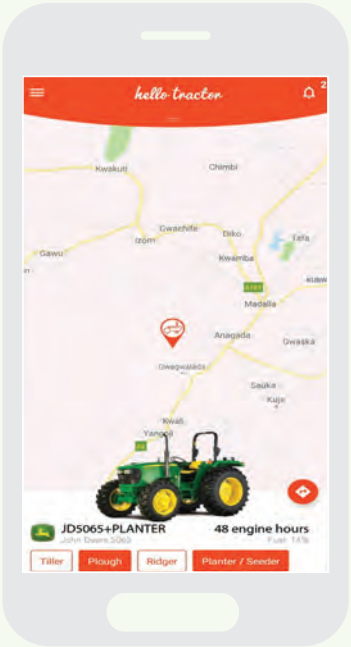
*Digital channels are used primarily to track compact tractor location and performance via GPS-enabled sensors. Additionally, investors, tractor operators, and rural booking agents interface with the Hello Tractor platform through either an online or mobile application that allows them to request a tractor or access a dashboard that provides analytics specific to an individual tractor unit or fleets of tractors. Farmers do not need to have a digital or mobile device to request a tractor, although this is rapidly evolving in some markets based on the geographic location of tractor demand and mobile technology access and usage of farmers. Currently, farmers need only to identify and contact a rural booking agent who then assumes responsibility for ensuring that a compact tractor and tractor operator arrive as requested. The booking agent, in exchange for coordinating this service is paid a commission of 10 percent on each job completed. Farmers that have mobile devices can also access a USSD short code to connect with a booking agent remotely. Hello Tractor has designed its system with careful consideration of privacy issues and restrictions. Farmers own any data generated that relates to their plot (i.e. land boundary, types of crops grown, amount of land cultivated) and tractor owners own their data (i.e. tractor location and performance).*

### Implementation: the experience thus far

*Hello Tractor's initial offering centered on production of compact tractors equipped with telematics devices. However, it recognized the need to turn away from agri-equipment manufacturing and distribution due to a combination of macro-economic factors. Hello Tractor now focuses on selling its telematics device and software technology to existing compact tractor manufacturers (e.g. John Deere) and distributors (e.g. Tata). With the shift toward sensor hardware and a Software as a Service (SaaS) model, Hello Tractor sees itself as a digital technology company capable of serving three enterprise customer segments: 1) large scale tractor manufacturers, 2) national tractor dealers/distributors, and 3) large tractor fleet owners.*

*Hello Tractor currently generates revenue from multiple sources: equipment sales, platform subscription fees, consultancy fees for more complex, turn-key solution projects, and transactional fees on services offered directly from its network of tractors. While its primary clients are compact tractor investors and fleet managers, Hello Tractor has designed its front-end application to be used by tractor equipment operators, rural booking agents, and smallholder farmers with access to mobile technology.*

*Hello Tractor seeks to have a single tractor service between 200-250 farmers per season. This past season in Nigeria, for example, it had approximately 10,000 farmers requesting tractor services in a single month. Thus far, rural booking agents typically manage a network of 100-300 smallholder farmers in their local community, which they have already identified through their operations as an agri-inputs retailer or a manager of a farming cooperative. In addition to leveraging rural booking agents, Hello Tractor works with various outgrower schemes anchored by larger agribusinesses invested in national distribution of inputs (e.g. Syngenta) or commodity processing, distribution, and selling (e.g. for domestic or international consumption).*




*Virtually all farmers currently pay for this service in cash. This payment is made on the same day the tractor arrives and two fees comprise the total amount. One fee is paid by the farmer to the rural booking agent and another fee is paid to the tractor operator. Rural booking agents receive a 10 percent commission from Hello Tractor for confirmed services delivered. Although capturing or mobilizing smallholder farmer demand is an essential component of the model, Hello Tractor has developed a range of key performance indicators (KPIs) that are not exclusively tied to total customer base or customer activity. Several Hello Tractor KPIs relate to equipment performance, which orients the company strategically towards measurements of total hectares of arable land cultivated and how productive tractors in its system are vis-a-vis total up-time in a season or average hectares cultivated per tractor.*

## Looking ahead: growth, opportunities and challenges

*Hello Tractor seeks to optimize tractor service delivery in geographic areas with a high density of arable land to optimize equipment activity and minimize transportation costs and operational downtime. It currently operates in Nigeria, Kenya, Senegal, Mozambique, South Africa and Tanzania and seeks to further expand into countries such as Uganda, Ethiopia, Bangladesh, India and Nepal.*

*Hello Tractor also recognizes the strategic value of offering a digital transaction method to farmers, tractor operators, and booking agents. There are pilots underway in East Africa to determine the feasibility of leveraging mobile money platforms to process the payments from farmers. One challenge that has to be carefully managed is the sheer size of the payment and the*

*fact that it comes in the form of a one-time lump sum. This is typically one of the largest expenses of any farming household, with internal estimates putting total farm operation costs as high as $300 in some markets. Farmers are not necessarily ready to make such large payments using digital means, especially if they are not already confident in their ability to use mobile money and its reliability as a digital payments service.*

*Hello Tractor is actively cultivating partnerships with other actors in agri-equipment manufacturing and distribution (i.e. John Deere, AGCO, Escorts, Kubota, TAFE), large agribusinesses on either the inputs or outputs side of agri-value chains, and other rural-based organizations that could accelerate the onboarding of booking agents. Earlier attempts to partner with financial institutions could not scale, even in instances where Hello Tractor brought financing facilities to prospective bank partners that included capital commitments and a clear path to product distribution and portfolio risk evaluation and monitoring.*

*In Nigeria, the view from Hello Tractor leadership was that there is too much low-hanging fruit for Nigerian banks and, coupled with the smaller-scale of these financing facilities, they could not convince banks to invest. That said, Hello Tractor remains eager to partner with banks or other investors. This is driven by a four-year track record of market deployment experience that supports the view that its platform offering can generate the kind of highly tailored data analytics needed to develop default probability scores tied to a business asset and not raw agricultural production. Further, through business relationships with multinational corporations invested in agriculture on a large scale, the prevailing inefficiencies in the finance underwriting of agri-related inputs and services can be greatly reduced. The same is true for the associated costs of administering and managing that capital, if financing needs are negotiated at this level versus at an individual or group level in a market.*

**KEY TAKEAWAYS**

1. *Hello Tractor has developed a business asset management platform for agri-equipment owners or fleet managers.*
2. *The platform sources data through a combination of GIS-based software and proprietary sensor hardware.*
3. *Farmers can book directly via mobile device (mobile app or USSD code) and fees can be paid in cash or via mobile money.*
4. *Hello Tractor measures commercial viability based on total surface area covered per tractor not against unique number of equipment bookings.*

### Considerations moving forward for digital agri-equipment leasing

Digital technology has not yet significantly altered the leasing market on the supply side in SSA, although there are some encouraging early indications that it can, and at scale. This creates space for technology providers, investors, and multinationals to explore new models and products. GPS and IoT-enabled services may well help lower the "feasibility and cost of asset recovery and the risk of asset depreciation through misuse," which are "main risks" in agricultural leasing, but there is no evidence yet that these tools will broadly impact the leasing market.[103]

There is a need for core banking and MIS systems designed intentionally to help financial service providers manage leasing products. Changes are also needed on the demand side, as leasing is currently not well understood by many smallholders in SSA, who have little exposure to the model or its benefits. There is also the issue of mandatory upfront payment in full for equipment rental, which constitutes one of the largest payments a farming household must make in a year. The outflow of such a sizeable sum of money via digital means may also trigger resistance or skepticism among farmers that have only a superficial understanding or exposure to DFS products.

[103] Agricultural Leasing Market Scoping Study for Sub-Saharan Africa. Nathan Associates, 2017, 15. (https://www.raflearning.org/sites/default/files/agri-leasing-report-small-13.03.17.pdf?token=1egFVZq1)

## Insurance

### Recent Observations, Trends and Developments

Digital insurance products are being distributed directly to farmers as well as part of a service bundle that may include seeds, inputs, and other production-related services. Through this bundling approach, some providers and interested parties (e.g. donors, national governments) have the view that this helps "crowd in credit" for farmers to increase production. In addition, third-party providers are positioning themselves not only as technology vendors but also as intermediaries between insurers and customers on issues related to policy origination and claims management. However, certain models can be problematic for providers in the implementation phase. Weather-index based models, for example, may not trigger pay-outs in a climatic or weather-based event despite farmer perception to the contrary. And without subsidies, uptake has been low in many SSA markets. Market evidence is lending credence to early concerns regarding farmer willingness to pay and represents a major barrier to scale. Finally, climate and weather baseline data relevant to providing agricultural insurance is still not well-established, despite new digital channels for sourcing and tracking.

### The Problem

It has traditionally been challenging to make agricultural insurance commercially viable, yet without insurance, farmers are highly vulnerable to shocks, given the inevitability of environmental hazards and increased unpredictability brought on by climate change. With insurance for agricultural livelihoods, smallholders invest more in their farms, education and health.[104] Without insurance, farmers adopt lower risk-and-return farming practices, eschewing investments into more productive practices or technologies.[105] Further, large-scale insurance schemes help to manage covariate risks in which informal social networks and credit sources are similarly affected by the same event.[106] Finally, insurance can help "crowd-in" credit, as in theory creditors find less risk in lending to households whose income is insured.[107] Digital data and tools introduce new ways that insurance providers can reach and serve smallholder farmers.

About half of the adults that grow crops or raise livestock as a main source of household income "experienced a bad harvest or significant livestock loss in the past five years."[108] Yet agricultural insurance penetration for smallholders in SSA is around 6 percent.[109] Of

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[104] Hernandez, Emilio. Digital Innovations in Smallholder Agricultural Insurance. CGAP, 2017. (http://www.cgap.org/blog/digital-innovations-smallholder-agricultural-insurance)

[105] Rosenzweig and Binswanger 1993; Carter 1997; Morduch 1995 as cited in Jensen and Barrett, Agricultural Index Insurance for Development. Applied Economic Perspectives and Policy, 2017.

[106] Hill, Ruth Vargas. Agricultural insurance in Sub-Saharan Africa: can it work? Africa Agricultural Markets Program, 2010.

[107] Jensen, Nathaniel and Christopher Barrett. "Agricultural Index Insurance for Development." *Applied Economic Perspectives and Policy,* 2017. https://academic.oup.com/aepp/article/39/2/199/2528218

[108] Demirgüç-Kunt, Asli, Leora Klapper, Dorothy Singer, Saniya Ansar, Jake Hess. The Global Findex Database 2017. World Bank Group, 83.

[109] Inflection Point: Unlocking growth in the era of farmer finance. Dalberg Global Development Advisors, 2016, 17.

the estimated 1.5 billion individual smallholder farmers globally, only around 198 million have agricultural insurance and the large majority of these individuals are in China and India, where government-subsidized insurance premiums are available.[110]

Insurers face many of the same constraints as lenders in serving smallholder farmers. They are unable to gather sufficient information at a low enough cost to make their business model profitable. Smallholders are hard to reach and difficult to gather information on for assessing risk and determining premium rates. Agricultural insurance products have traditionally centered on indemnity insurance, which pays farmers based on observable crop loss, introducing an element of moral hazard in which insured farmers may not work as hard to produce high yields. The price of indemnity insurance is also higher because of the field cost of determining yield loss.[111]

Furthermore, insurance is hard to understand, necessitating the development of an accessible marketing strategy and sensitizing individual farmers. Even the cost of collecting premium payments from rural farmers is quite high, given that they typically lack identification and live in remote and rural areas. All these factors drive up the cost of insurance.

### Applying Digital Solutions

Digital technology is breaking down the barriers that prevent insurance providers from serving the agricultural sector and particularly smallholder farmers by aggregating new sources of data and methods of analysis to better predict risk and determine payout needs. New data sources and methods of analysis, primarily from sensors and satellites, allow experts to analyze farm plots and weather-related risks at scale and with increasing nuance and detail. Satellite data that better predicts weather risk and "bundling insurance with other financial services" that "provide better client information" for risk analysis both reduce "uncertainty in calculating insurance premiums."[112]

Beyond these innovations around indemnity insurance, index insurance was developed as a means to reduce the cost of gathering "household-level actuarial data."[113] Baseline conditions are established, and if an independently observable indicator that is strongly

[110] Hernandez, Emilio. Digital Innovations in Smallholder Agricultural Insurance. CGAP, 2017.

[111] Jensen, Nathaniel and Christopher Barrett. Agricultural Index Insurance for Development. Applied Economic Perspectives and Policy, 2017.

[112] Global Financial Development Report, Financial Inclusion, 2014, 71. (https://openknowledge.worldbank.org/bitstream/handle/10986/16238/9780821399859.pdf?sequence=4&isAllowed=y)

[113] Jensen, Nathaniel and Christopher Barrett. Agricultural Index Insurance for Development. Applied Economic Perspectives and Policy, 2017 (https://academic.oup.com/aepp/article/39/2/199/2528218).

correlated with crop failure, such as drought, occurs, notification and payout are automatic. The index against which the payout potential or the payout size is determined can be weather or yield-based.

A new digital component allows the insurer to gather information that is used to develop the index and identify the triggers more effectively and efficiently. Sensors and satellites provide more detailed information about local conditions than previously available general weather data, generating a more nuanced and accurate index. For satellite and sensor data to be predictive of yield loss, it first needs to be correlated with actual data on the ground, necessitating an initial investment of time. Building these models may become easier over time as the industry becomes more sophisticated and experienced.

Farmers can pay their premiums through mobile money and receive their payout digitally, further reducing costs for insurers. Finally, many MNOs and third parties are starting to provide microinsurance for non-agricultural purposes, including health and funeral insurance. These are considered value added services that can increase customer stickiness around airtime subscriptions for MNOs and increase revenue streams. The products can also easily be advertised through bulk messages to existing airtime or mobile money subscribers, and customers can sign up quickly through their mobile device. Econet Wireless in Zimbabwe is one such MNO, which offers EcoFarmer, a weather-indexed insurance product in which payout is dependent on abnormal rainfall. EcoFarmer now offers farmers funeral insurance and farming tips, in addition to agricultural insurance, which they can subscribe to for as little as $2.50 per year, all delivered over the digital channel. World Cover is operating a satellite-based weather index insurance model in Ghana, enabled by local agents who visit villages to conduct farmer registration.

**Partnership Roles in Digital Agricultural Insurance**

| | MNO | Financial Institution | NGO/Development Organization/ Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provide connectivity and mobile channel for premium payments and insurance payouts*<br>• *provide mobile wallets for collecting and storing payouts and processing payments*<br>• *Provide agent network to convert digital value into physical currency* | • *Use risk indexes to determine premium and payout amounts*<br>• *Underwrite insurance* | • *Sensitize and register rural customers* | • *Design platform to connect underwriter and insurance customer*<br>• *Develop MIS platforms and data analytics services to support evaluation*<br>• *Collection of weather and/or yield data*<br>• *Data analysis to determine risk indexes* |

### Considerations moving forward for digital agri-insurance

Developing insurance schemes that balance commercial viability of a product linked to a volatile sector where risks are not easily mitigated and the need to compensate farmers when they experience agricultural losses remains a challenge. Many products, including those enabled by digital technology, have yet to exit the pilot stage. Index insurance, for example, holds strong promise in terms of allowing providers to create business and operating models that can be commercially scaled and sustained in rural geographies provided the pool of policyholders is large enough and adequately dispersed geographically to distribute risk.

To date, adoption of index-based insurance products has not been as high as desired in many implementations and a review of ten randomized evaluations of agricultural index insurance products found that uptake was very low for market price products and that subsidies were required to incentivize farmers to purchase.[114] This can be attributed in large part to low and inconsistent liquidity and lack of trust in providers among farmers.[115] There is also a need to enhance the methods used by providers to assess, validate, and calculate payouts.

While payouts based on an index of external factors rather than individual assessments of farm plots or locations considerably lowers the cost of issuing and managing policies, the model can lead to a nontrivial possibility whereby, even with a major loss, a farmer holding a policy will not be compensated. This issue of farmers not receiving compensation despite holding a policy and experiencing crop failure or reduced harvest due to nontrivial possibilities has "been identified as a significant impediment in many index insurance programs piloted around the world."[116] As the index insurance market matures during these live pilot experiences, providers will need to assess and adapt their techniques for analyzing weather events and refine policy terms to mitigate these issues in such a way that encourages policy issuance and loyalty among farmers while maintaining adequate risk management strategies .[117]

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[114] Make it Rain. ATAI Policy Bulletin, 2016. https://www.povertyactionlab.org/sites/default/files/publications/make-it-rain.pdf

[115] Global Financial Development Report, Financial Inclusion, 2014. (https://openknowledge.worldbank.org/bitstream/handle/10986/16238/9780821399859.pdf?sequence=4&isAllowed=y)

[116] Ward, Patrick. Index insurance as an instrument for managing risk and modernizing agricultural production. IFPRI, 2017. http://www.ifpri.org/blog/index-insurance-instrument-managing-risk-and-modernizing-agricultural-production

[117] Jensen, Nathaniel and Christopher Barrett. Agricultural Index Insurance for Development. Applied Economic Perspectives and Policy, 2017.

## Information Services

### Recent Observations, Trends and Developments

Digital agriculture information services are being used to supplement the work of existing government agri-extension agencies unable to reach rural populations with adequate frequency or in ratios that support knowledge transfer and retention. Providers of digital information services are either third parties or MNOs. The services tend to be subsidized either by a donor or are positioned as loss leaders by MNOs. Information services are often bundled with other offerings such as payments or e-discounts. As a result, the cost structure and business case of pure information services are unclear, particularly because of farmer price sensitivity.

Agri-information services content can be highly political in many markets in Sub-Saharan Africa, and this adds a layer of coordination, outreach, and approval that must be factored into service management and costing estimates. Content needs to be sufficiently localized, timely, and accessible for farmers, given high rates of illiteracy and innumeracy; IVR and call center-based content delivery are increasingly viewed as channels that can support the broadest rural outreach.

### The Problem

Smallholder farmers don't often have access to up-to-date information about agricultural best practices and data that can help them make decisions about and identify threats to their production activities. They also lack platforms through which to easily compare experiences and learnings with neighbors or regional farmers. The need for information and information sharing is particularly significant as climate change rapidly alters the environmental characteristics and patterns they are familiar with. The high cost for farmers of getting information is a principle barrier to their adoption of technology.[118] Information is needed at different stages of production in order for farmers to adopt new technologies that can increase yield.

Visits from extension workers may be the only way most farmers receive information and benefit from the investments of governments, academia or international donors committed to identifying best practices and learnings in agricultural development. And though there have been decades of investment in public agricultural extension programs, evidence of their impact on "agricultural knowledge, adoption and productivity" remains limited.[119] They have been criticized for problems relating to "scale, sustainability, relevance and responsiveness."[120] In many SSA

[118] Aker, Jenny. Dial "A" for Agriculture: A Review of Information and Communication Technologies for Agricultural Extension in Developing Countries. 2011. https://www.cgdev.org/publication/dial-agriculture-review-information-and-communication-technologies-agricultural.

[119] Ibid, 2.

[120] Ibid, 17.

countries, the "extension officer-to-farmer ratio is approximately 1:1000."[121] Therefore the extent to which public extension programs are successful in "overcoming information asymmetries for smallholder farmers" is unclear.[122]

Traditional models of agricultural extension based on visits by public workers continue to have value because of the importance of in-person communication and locally relevant models for learning and demonstration. But in addition to these demonstrations and trainings, farmers need more easily accessible, up to date information and advice that is tailored to their particular production and environmental factors that they can use to rapidly make decisions throughout the production cycle.

## Applying Digital Solutions

Digital channels bring the cost of information sharing down enough for new players to enter the market and also allow extension agents "to use a combination of voice, text, videos, and internet to reduce transaction costs and increase the frequency of interaction with farmers."[123] Some evidence indicates that "the marginal cost of providing market information via SMS is cheaper than providing the same information via an additional extension visit..."[124] The reduction of costs afforded by disseminating information via the mobile channel also serves to make it easier for farmers to access information, including on real-time issues such as pests and diseases, "via their private sources, such as members of their social network."[125]

These products/tools are frequently bundled with other agricultural or financial services that can be provided through the mobile channel. This may help to increase willingness to pay, which otherwise can be low. Providers are experimenting with business models that will incentivize end users to pay for information resources they are not accustomed to paying for. DigiFarm, a digital offering from Kenya's Safaricom, not only allows farmers to register for weather and price information through USSD short code, but also allows partner organizations to provide additional products on the platform, ranging from digital credit to financial literacy. These partners have technical agricultural expertise lacking at Safaricom, while DigiFarm offers these partners access to a large pool of rural users. This arrangement is typical of digital agri-information services, which often require multiple partnerships to provide all the elements of the digital offering to farmers; from registration and account access to product delivery or information content development.

***Interactive Voice Response (IVR)*** systems allow farmers to get agri-information and advice without internet connectivity or a smartphone. IVR can push information to subscribers or allow farmers to dial in to hear alerts and advisory messages on weather, pests, planting, animal care and other topics. These messages can be tailored to farmers' particular profiles. Agricultural call centers augment IVR services allowing farmers to get real-time feedback and advice.[126] IVR helps to "overcome language and literacy barriers"[127] in providing information to farmers and "can provide more nuanced information, [but] they can be complicated to develop or require

[121] Deichmann, Uwe, Aparajita Goyal, Deepak Mishra. Will Digital Technologies Transform Agriculture in Developing Countries? World Bank, 2016, 15. (http://documents.worldbank.org/curated/en/481581468194054206/pdf/WPS7669.pdf)

[122] Aker, 2011, 7.

[123] Aker, 2011, 14.

[124] Aker, 2011, 9.

[125] Aker, 2011, 8.

[126] https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/08/Guidelines-for-Agri-Call-Centres.pdf

[127] Interactive Voice Response: Its Growing Role in Agricultural Extension Services. Agrilinks. (https://www.agrilinks.org/events/interactive-voice-response-its-growing-role-agricultural-extension-services)

machines to produce natural speech."[128] Airtel Malawi collaborated with the national agricultural extension service to deliver an IVR product intended to help cover gaps in extension coverage of rural areas that had opened up due to a relatively small number of overstretched extension agents. The product, M'chikumbe, disseminates information about 15 crops at all stages of the production cycles through voice and text, to both agricultural extension workers and lead farmers. They then pass this information on to farmers in their regions. The service is seen by users as a helpful way to broaden the reach of extension content, especially at a time when farmers are interested in learning new conservation agriculture techniques.[129]

SMS platforms provide similar types of information to farmers, but rather than disseminating through voice/calling, SMS services rely on USSD and text-based information. SMS may be particularly useful for receiving information that can be summarized easily (prices, weather, etc.) as SMS "can only hold limited information and require that users have some literacy skills and technological knowledge."[130]

***Video content*** is being used to demonstrate more complex lessons to farmers in the field. Extension services bring videos on locally relevant topics to rural areas and villages. These videos can be reinforced with in-field teaching and demonstrations. Digital Green facilitates the development of locally relevant videos on agricultural topics, featuring recognizable farmers from the audience's community and demonstrating farming techniques in their own language. The videos, which are shown in villages with easily portable digital projectors, are supplemented with in-person demonstrations by extension agents. An assessment found that in India, the videos increased farmer uptake of demonstrated practices by 50 percent compared with farmers who only received traditional extension visits.[131]

**Partnership Roles in Digital Information Services**

| | MNO | Financial Institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provide connectivity and mobile channel for third parties*<br>• *Directly provide agricultural VAS to existing subscribers* | • *No explicit role in information/ advice product provision*<br>• *May be involved in a bundled offer with a payments or savings product component* | • *Advertise to customers through the IVR/agri-VAS channel*<br>• *Generate agri-extension content*<br>• *Vet agri-extension content*<br>• *Provide responses to agri-extension queries* | • *Design of SMS, video or IVR platform* |

[128] Aker, 2011, 11.

[129] https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/create-scalable-engaging-mobile-solutions-agriculture.pdf

[130] Aker, 2011, 11.

[131] http://www.digitalgreen.org/wp-content/uploads/2017/06/NEUDC2015-519.pdf

# CASE STUDY 7

## *EcoFarmer*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *MNO* |
| ***Years in Existence (Service Offering)*** |
| • *5+ years* |
| ***Product Offering*** |
| • *Information*<br>• *Market Access Services*<br>• *Insurance* |
| ***Target User(s)*** |
| • *Farmers*<br>• *Inputs Side Value Chain Actors* |
| ***Digital Product Form Factors*** |
| • *Basic Mobile device* |
| ***Revenue Model/Pricing*** |
| • *Freemium* |
| ***Target Partners*** |
| • *NGOs*<br>• *Farmer Associations*<br>• *Financial Institutions* |
| ***Year Founded*** |
| • *2013* |
| ***Geographic Focus*** |
| • *Zimbabwe* |

*EcoFarmer offers a combination of agri-information and advice as well as multiple insurance products to Econet subscribers through the mobile channel.*

### Origin of the idea

*Econet, Zimbabwe's largest MNO and mobile money provider, recognized that many of its customers work in agriculture and wanted to provide them with relevant services. Econet currently has 84 percent of the GSM (voice) market and 97 percent of the mobile money market in Zimbabwe, making it an influential player even among a rural clientele.**

### What are the market problems this offering seeks to solve?

*EcoFarmer, a mobile farming platform, was first piloted in 2013. EcoFarmer's features have evolved, but its focus has always been on addressing key information and financial service gaps that limit farmer productivity. Over time, the product developed into a bundled suite called a "Combo." The bundle of services EcoFarmer offers paying subscribers includes: funeral insurance (up to $500 in payout coverage per year), weather index insurance (up to $25 in payout coverage per year) for specific farming regions, farming tips (cattle farming and maize in specific regions), as well as an annual membership subscription to the Zimbabwe Farmers Union (ZFU).*

### How are digital channels used throughout the offering?

*EcoFarmer is offered through a "freemium" model, enabling any EcoNet customer to register for the free service through USSD short code. The only additional requirement for accessing the service is having a registered EcoNet mobile money wallet, called EcoCash. This free service provides farmers with general weather and farming information, which is not necessarily crop or location specific. If a client decides to upgrade to the full Combo package they are required to sign up through an agent and provide information on the location of their plots and crops, which enables the system to customize the information services. Farmers pay $1 per month, which is automatically deducted from their EcoCash wallet.*

### Implementation: the experience thus far

*To date, EcoFarmer has acquired over 900,000 registered clients; 200,000 of which pay for full services. Driving mass registration by offering free information and advisory services enables platforms like EcoFarmer to target their sales and marketing to bring on fully paying customers in more efficient ways. In the early iterations of the product, EcoFarmer planned to use EcoCash agents and a partnership with an input provider called Seed Co. to acquire new customers. Information on EcoFarmer was to be included in*

* https://www.dailynews.co.zw/articles/2018/03/16/econet-grows-customer-revenue-and-mobile-money-market-share

*bags of seed sold by Seed Co., but this became an expensive endeavor and the EcoCash agents were not able to perform strong sales messaging as they lacked the agricultural expertise to speak the farmers' language.*

*This drove EcoFarmer to partner with the Zimbabwe Farmer's Union (ZFU) and rebrand the product accordingly. The ZFU EcoFarmer product was launched in 2015 and offered many of the same services of the previous version. The key difference was the large network of over 2,000 ZFU branch ambassadors (who are often farmers themselves) to help onboard farmers. These agents could dedicate the time to provide relevant information to acquire over 200,000 paying customers. ZFU gets a commission for every registered customer, and it works with EcoNet to generate quality content for its information services. The EcoFarmer product tapped into ongoing marketing activities that ZFU ran through farmer mobilization activities, message blasts, road shows, and radio programs, which helped to reduce customer acquisition costs.*

## Looking ahead: growth, opportunities and challenges

*The partnership with ZFU also helped the new ZFU EcoFarmer platform to engage farmer groups as ZFU Combo Groups. ZFU EcoFarmer noticed that it is more effective to manage farmers as groups, and that onboarding a group is less expensive than onboarding many individuals, especially as ZFU EcoFarmer ran into challenges with inconsistency in individual clients' payments of the monthly subscription fee. Groups help reduce this risk, and group members often make sure other members are continuing to contribute to the subscription costs. As building digital and financial literacy among customers is key for uptake, these Combo Groups help aggregate potential customers in one place at one time to enable more efficient and less costly customer acquisition.*

*EcoNet also recognizes that not all products need to be directly related to agriculture and have developed additional relevant offerings for farmers, like funeral insurance. And while funeral insurance is a more straightforward product for farmers to understand, weather index insurance has proven complicated to explain despite its relevance to agriculture.*

*Mass market platforms such as ZFU EcoFarmer enable rapid customer registration by offering free basic services such as weather and general farming information. They then directly target registered customers to sign on to the paying service that offers more tailored services to interested clients. This model can be deployed by MNOs around the world who have mobile wallets and want to provide value-added services to their customers in the agricultural sector. The products offered through such platforms work best when they start simply and gradually build additional value-adding services for both smallholder agricultural and non-agricultural livelihoods. As ZFU EcoFarmer continues to build its product offering, its next product phase includes developing an e-commerce model for accessing inputs and providing credit from Steward Bank for the input loans. It will also incorporate climate smart farming tips, which helps to make the information services more actionable.*

### KEY TAKEAWAYS

1. *It's crucial to offer a suite of products that holistically improve smallholder households' lives, including outside of their agricultural activities, bundled under one brand as opposed to offering a single product that only has relevance to agriculture. This value addition is what farmers need to justify moving from using the freemium to the paid product.*
2. *Platforms that work well for agricultural cooperatives or other aggregators will be more effective points from which to reach farmers than acquiring farmers as individual customers.*
3. *This model has replication potential, particularly as there is evidence of farmer willingness to pay for services like information.*

# CASE STUDY 8

## *aWhere*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *5+ years* |
| ***Product Offering*** |
| • *Farmer/Data Management*<br>• *Agri-Related Information* |
| ***Target User(s)*** |
| • *Outputs Side Value Chain Actors*<br>• *Inputs Side Value Chain Actors*<br>• *Financial Institutions* |
| ***Digital Product Form Factors*** |
| • *SaaS/Cloud Services* |
| ***Revenue Model/Pricing*** |
| • *Fee-based (service type and consumption)* |
| ***Target Partners*** |
| • *Inputs Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors*<br>• *Financial Institutions* |
| ***Year Founded*** |
| • *1999* |
| ***Geographic Focus*** |
| • *Global* |

*Founded in 1999, aWhere utilizes satellite imagery to provide businesses with agronomic and weather intelligence for agricultural decision making.*

### Origin of the idea

*It is a B2B agricultural intelligence platform that analyzes over a billion global points of relevant weather and agronomic data on a daily basis. The data it utilizes are sourced from satellites, weather stations, and ground radars. It aggregates this data so that organizations and governments can use it to make informed decisions on crop management, planning, and policy. aWhere's data aggregation enables it to model "virtual weather stations," within 9x9 km blocks across the world map. These virtual weather stations provide forecasts of precipitation, temperature, humidity and soil moisture in areas where traditional weather station infrastructure does not exist. They are updated four times daily and store historical observed data going back ten years.*

### What are the market problems this offering seeks to solve?

*aWhere seeks to supplement poor weather station infrastructure in developing countries. Helping fill these gaps can improve decision making and boost agricultural outputs in areas that currently don't have access to this type of information.*

### How are digital channels used throughout the offering?

*aWhere delivers its data services through a variety of online applications that target specific users. It uses a SaaS model, which offers both an online user interface that a client can log onto, in addition to API pulls onto other platforms used by aWhere clients. Its clients range from large agribusiness firms in the US to NGOs working with smallholder farmers in Sub-Saharan Africa. Typically, the information aWhere produces is used to deliver agronomic advice at the farm level.*

### Implementation: the experience thus far

*While its primary clients are agribusinesses, aWhere has attracted the attention of the financial services sector as well. The primary financial use case for aWhere's data to date has been weather index insurance products such as Acre Africa and Econet's EcoFarmer. The aWhere product provides data that enables index insurance providers to determine whether soil moisture or other crop health indicators drop below thresholds that would trigger payouts.*


### Looking ahead: growth, opportunities and challenges

*The platform has the potential to be used on a broader scale, for other types of services such as insurance, advisory services, and credit. aWhere has deployed its data sets on weather and climate to help augment credit scoring assessments and to reduce risk through advisory services. If little else is known about a farmer than their location and crop, then climatic profiling can provide an assessment of crop suitability risk as an additional input to credit scoring models. Risk can be reduced by including agronomic advisory messaging or insurance as part of a credit package. aWhere has worked with groups such as Ricult, FarmDrive and CTA on bundles that include weather, agronomic advice, and risk assessment prior to making lending decisions. These relationships are still in the early phases of development.*

### KEY TAKEAWAYS

1. *The product aggregates various satellite and weather station data to deliver accurate current and projected information around weather, soil moisture, and other important climate related information to the agricultural sector.*
2. *It has developed virtual weather stations that divide the globe into 9x9 km plots, and provide forecasts on precipitation, temperatures, humidity and other weather-related measurements for areas where traditional weather station infrastructure is not available.*
3. *aWhere's data has primarily been used by agricultural businesses, but it has begun to serve weather index insurance providers in recent years.*
4. *A variety of agricultural alternative credit scoring products are beginning to use aWhere's data to assist in risk assessments and understand whether a crop is suitable for a specific region.*

# CASE STUDY 9

## *DigiFarm*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *MNO* |
| ***Years in Existence (Service Offering)*** |
| • *1-2 years* |
| ***Product Offering*** |
| • *Farmer/Data Management*<br>• *Credit* |
| ***Target User(s)*** |
| • *Farmers*<br>• *Inputs Side Value Chain Actors*<br>• *Outputs Side Value Chain Actors* |
| ***Digital Product Form Factors*** |
| • *Basic mobile device* |
| ***Revenue Model/Pricing*** |
| • *Fee-based, Interest* |
| ***Target Partners*** |
| • *Financial Institutions*<br>• *NGOs*<br>• *Farmer Associations*<br>• *Agribusinesses*<br>• *Third party technology providers* |
| ***Year Founded*** |
| • *2017* |
| ***Geographic Focus*** |
| • *Kenya* |

*DigiFarm provides smallholder farmers with access to agri-information, pricing and market linkage services via mobile device.*

### Origin of the idea

*Safaricom is Kenya's largest MNO with over 70 percent market share. More than 23 million Kenyan adults, or 40 percent of the population, use Safaricom's M-PESA product, making it a global leader in mobile financial services. At the same time, more than 70 percent of Kenyans engage in small-scale agriculture.* Michael Joseph, the former CEO of Safaricom, originated the concept to use the Safaricom and M-PESA platforms to drive value to smallholder farmers, where usage rates lag behind urban areas. DigiFarm is an integrated mobile platform that offers both farmers and businesses trying to serve them a one-stop market place that leverages the reach of Safaricom.*

### What are the market problems the offering seeks to solve?

*DigiFarm is offered on a USSD platform accessed by dialing *283# on a mobile device with a Safaricom SIM card (Android access is planned for 2018). DigiFarm provides farmers access to services such as weather and price information, farming best practices, quality inputs, financial services and new markets. For businesses, Digifarm enables instant access to a large number of smallholder farmers at a reduced cost, helping to both drive demand for and supply of services to farmers. Ultimately, the platform is intended to evolve into a service that helps solve key problems of logistics and that uses data to address issues of climate change and youth livelihood development.*

### Implementation: the experience thus far

*DigiFarm registered nearly 700,000 farmers in its first year of operations, with a 35 percent active rate. Farmers can register for free, and Safaricom earns revenue through M-PESA payments for inputs in addition to interest earned on DigiFarm input loans. Similar to EcoNet's experience with EcoFarm in Zimbabwe, DigiFarm initially attempted to use existing Safaricom brand ambassadors to register and onboard farmers onto the platform. Yet, this yielded low results over time, as many of the brand ambassadors did not work in agriculture and could not easily relate to farmer needs. As a result, DigiFarm decided to work more closely with one of the country's largest farmer-facing organizations, Kenya Livestock Producers Association (KLPA), to*

* https://www.dailynews.co.zw/articles/2018/03/16/econet-grows-customer-revenue-and-mobile-money-market-share

*assist with registration and onboarding activities. Formed in 2004 with over 2 million farmers in its database, KLPA holds events nationwide and conducts farmer outreach to explain the product and support registrations. Digifarm pays the KLPA for its services, setting farmer onboarding targets for each county. KLPA has been responsible for nearly 90 percent of the registered farmers on the platform.*

*Farmers are able to self-register through the USSD menu, but the face-to-face registration and onboarding through KLPA has resulted in greater long-term usage of the platform. Additionally, farmers who utilize the information services provided through Arifu (see below) were more likely to engage more with the DigiFarm menu. This points to the need to familiarize new users to the platform to encourage active use.*

*DigiFarm hopes to expand key partnerships with other agribusinesses that can improve the services offered to farmers. Safaricom is currently working with a few select partners to test partnership models and assess strengths and weaknesses. Safaricom's openness to partnership for the DigiFarm product is a testament to how difficult delivering services to smallholders can be. Safaricom recognizes it has the platform reach, but not necessarily the product sets to serve farmers. This has resulted in partnerships with the following organizations:*

***iProcure:*** *Providing inputs and input loans. iProcure is currently the primary inputs provider that helps DigiFarm deliver quality low-cost inputs to farmers who either can place orders and purchase products outright or apply for a loan for inputs through the DigiFarm platform. iProcure integrates with 26 different input manufacturers, to deliver a suite of input products to farmers within 24 hours of ordering. iProcure uses digitized inventory ordering and management tools to predict ordering patterns for farmers and stock popular goods. iProcure is able to offer a wide variety of inputs, which can meet the wide range of farmer preferences that exist on the DigiFarm platform. DigiFarm has found it is important to give farmers choices when developing a product intended to work across the entire country. One challenge with iProcure is the limited distribution of its farmer depots. Currently, farmers can only apply for loans and pick up inputs from DigiFarm by visiting an iProcure depot.*

***Arifu*** *– Providing digitized, interactive learning content for farmers to access on the DigiFarm platform related to farm skills and financial services. Arifu's platform not only provides content but can deliver targeted information to segments of the DigiFarm farmer clients at times when the information is most relevant.*

***FarmDrive:*** *Managing the DigiFarm input loan product, including applications, credit scoring, loan approval and disbursements, customer messaging and repayments. Loans on the DigiFarm platform are currently funded through FarmDrive's balance sheet as the credit scoring model is proven.*

***Kenya Livestock Producers Association:*** *Providing farmer outreach and onboarding support as the primary value chain DigiFarm targets is dairy.*

***Mercy Corps AgriFin Accelerate Program:*** *Providing support on farmer-centric product development, business modelling and partnership support.*


## Looking ahead: growth, opportunities and challenges

*Safaricom has ambitious goals and plans to reach 5 million farmers in Kenya through DigiFarm by 2023, with the potential to bring the DigiFarm model to other countries through Vodafone partners. While there are not many markets where Vodafone has a market share as large as Safaricom's in Kenya, this mass market approach to delivering services to smallholders through a curated set of partners integrated under one platform may provide a blueprint for larger super platforms like Facebook, Wechat, Jumia, and Google to follow.*

*An additional challenge at the moment is around the low number of women interacting with the platform. In partnership with the Agrifin Accelerate program, DigiFarm is examining how KLPA and other points of registration and onboarding for the DigiFarm product can be more effective in engaging women. It is also currently working to improve the platform functionality to ensure there are no aspects of the product that discourage its use by women. While DigiFarm is new, there is high hope it could be a scalable model.*

## KEY TAKEAWAYS

1. *Safaricom recognizes that partnerships are crucial in order to properly serve the smallholder market segment. With DigiFarm, Safaricom provides a mass market platform backed by the M-PESA payment solution that key agribusiness, Fintech, and information services can utilize for broader market reach.*
2. *When acquiring farmer customers, it is crucial to use farmer-facing organizations that can speak the same language as the farmer.*
3. *There are few MNOs in Africa with the market penetration Safaricom has in both voice and mobile money services. MNOs in more competitive markets may have to consider regional or county strategies for product roll out.*
4. *Partners of DigiFarm are able to scale their products more easily by leveraging the broad customer base, trust of the Safaricom brand, and its marketing and customer onboarding activities. Partners also benefit through access to Safaricom's communications and payments channels, as well as the broad M-PESA agent network that exists throughout the country.*
5. *Partners also benefit through access to Safaricom's communications and payments channels, as well as the broad M-PESA agent network that exists throughout the country.*

### Considerations moving forward for digital rural/agri-related information services

The challenge with digital information services is designing a commercial product that appeals to a segment that is not accustomed to paying for such information. As with any technology adoption process, trust in the DFS provider is key to uptake. It is particularly critical for agri-information and advice. With their livelihoods at stake, farmers need to be convinced of the authenticity and accuracy of the content to modify their behavior or decision making. In many cases, the underlying data is not fully accurate or reliable, particularly for national and regional weather data and forecasts. There are also challenges associated with aggregating and validating information from multiple sources. Additionally, these solutions might be limited from scaling because of market fragmentation by "crop type, providers, platforms, operating systems and frequency of information," which is common in less mature markets.[132] To the extent possible, information products should source content from partners with the most accurate data sources and the most reliable agronomic advice. Further, there are indications that in some places MNOs are not considered trusted sources for agricultural information.[133]

This is a challenge MNOs and other relevant third party providers can seek to overcome through partnerships with trusted sources of extension information, marketing, and also potentially the introduction of information services in rural areas through trusted field agents. Finally, donor funding is widely relied on for platform development and initial service launch, which raise questions regarding the long term commercial viability of these models.[134]

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[132] Expanding Africa's Digital Frontiers: Farmers Show the Way. (http://blogs.worldbank.org/africacan/expanding-africa-s-digital-frontier-farmers-show-way)

[133] Creating scalable, engaging mobile solutions for agriculture. GSMA, 2017. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/create-scalable-engaging-mobile-solutions-agriculture.pdf)

[134] An Assessment of Market Information Systems in East Africa. USAID, 2013. (https://d3n8a8pro7vhmx.cloudfront.net/eatradehub/pages/1134/attachments/original/1438870910/AN_ASSESSMENT_OF_MARKET_INFORMATION_SYSTEMS_IN_EAST_AFRICA_(1).pdf?1438870910)

## B2B solutions whose primary clients are agribusinesses and/or financial service providers

The following section discusses business-to-business solutions intended for agribusinesses. Serving the unmet needs of the agricultural sector can directly involve farmers and engage them either through intermediaries or through their mobile phones, as the previous section discussed. But while farmers are among the agricultural value chain actors that have traditionally been excluded from financial service access, they are not the only ones. The challenges that agribusinesses face in accessing financial services are similar to those of smallholder farmers; most are SMEs, operating in rural settings, with limited financial documentation and lacking business management tools, which combined make it more expensive for providers to offer financial products at reasonable costs. Agricultural work all along the value chain is often low-margin, further discouraging the involvement of traditional financial service providers whose knowledge of managing agricultural risk and of agricultural business is limited.[135]

Agribusinesses that are limited in their ability to operate efficiently and grow effectively has effects across the rest of the value chain and throughout the economy. Worldwide, as much as 78 percent of the "value added in the agriculture value chain" can be attributed to agribusiness.[136] However, there is an estimated $940 billion needed in investment to grow African agriculture by 2050, $78 billion of which is needed for cold and dry storage, $207 billion is needed for first-stage processing, and $159 billion is needed for rural and wholesale market facilities – all activities that involve agribusinesses.[137] New digital solutions have the potential to meet some of this demand by leveraging digital data and dissemination platforms to lower the cost of serving agribusinesses at scale.

The following products include both financial (dealing with monetary transactions, lending, insurance, etc.) and non-financial services (dealing with information and communications) that use digital data and platforms to solve long-standing agricultural value chain problems.

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[135] Financing Agribusiness in Sub-Saharan Africa: Opportunities, Challenges, and Investment Models. The World Bank, 2016. (https://www.agrifinfacility.org/sites/agrifin/files/Africa_Agrifinance_%202016.pdf)

[136] Ibid, 1.

[137] Yumkella and others 2011 as cited in Financing Agribusiness in Sub-Saharan Africa: Opportunities, Challenges, and Investment Models. The World Bank, 2016 (https://www.agrifinfacility.org/sites/agrifin/files/Africa_Agrifinance_%202016.pdf)

## E-Commerce

### Recent Observations, Trends and Developments

E-Commerce is broadly defined as commercial transactions facilitated through a digital platform. Its rise and scale have largely been driven by improved efficiencies around distribution logistics and the ability to pay securely and quickly via digital channels. For the purposes of smallholder agriculture, e-commerce has been touted as a way to deliver B2C services by linking smallholder farmers to input or output providers further up the value chain. Smallholders have traditionally relied on middle men in the form of input retailers or small traders to provide them access to the necessary inputs and markets. With e-commerce, there is potential to disintermediate the mid-tier actors and deliver smallholder farmers better pricing for their inputs and yields. While this concept has had some success in agricultural markets in China and India, many of the attempts to deliver e-commerce as defined above in SSA have not scaled.

Many e-commerce or market linkage products operating in SSA have started as a pure B2C product where smallholders are linked directly to upstream market actors, then evolved into a B2B2C product that reimagines how mid-tier actors and last mile organizations such as small traders or cooperatives are coordinated and incentivized. Instead of relying on in-person connections to be made between input/output value chain stakeholders and smallholders, these versions of e-commerce platforms use digital communication tools and digital payments to better organize small traders' and cooperatives' linkages to buyers/input retailers. This ultimately helps improve operational efficiencies and deliver value additions for mid-tier actors while also altering commercial incentives to bring more fair pricing to smallholders. While a pure B2C e-commerce play is most certainly on the horizon for the SSA agricultural sector, it's important to recognize the B2B2C business models such as TruTrade and Mastercard Farmer Network that are striving to create better market linkages for smallholders by reimagining the middle rather than disintermediating it entirely.

### The Problem

One of the characteristics of many agri-value chains in developing contexts and in SSA is inefficient linkages and connections between actors, which reduce overall value added and competitiveness both in domestic and global markets. Though income depends on selling, just 20 percent of production in SSA is sold[138]. Low selling rates may be caused by immediate consumption and by inefficiencies in pricing, storage, transport and transactions. Digital solutions are available to address some of the barriers around communication and information sharing that prevent smoother and more efficient market linkages from forming.

[138] Boyera, Stehpane, Chris Addison and Chipo Msengezi. Farmer profiling: making data work for smallholder farmers. CTA, 2017. (https://cgspace.cgiar.org/bitstream/handle/10568/89763/2014_PDF.pdf?sequence=3andisAllowed=y)

Market linkages include everything from "informal agreements with local traders to formal contracts with exporters."[139] Each value chain actor performs a specialized task that adds value to the original product before passing it on through a linkage, or transaction, to the next actor for further value addition. The more effective this link is, the lower the cost of the transaction. Trust is needed for these actors to take advantage of market opportunities to increase value at each stage as they bring an agricultural product from origin to sale.[140] Increased trust also contributes to greater specialization within the value chain and, therefore, more efficiency as there are fewer overlapping roles and redundant activities.[141]

Communication is key to developing this trust and allowing the flow of needed information to facilitate efficient market linkages in rural contexts where market interactions are complicated by a range of factors; "a willingness to exchange information also seems to be a major factor in trust development."[142] For example, "for a rural trader, selling improved seed means stocking a product for which demand is hard to judge, while for farmers the key characteristics of the seed – germination percentage and performance in their fields – are largely unknown, at least for the first time they consider buying."[143] Communication is limited by a lack of ability to document and enforce contracts, geographic or linguistic barriers that hinder pricing competition and transparency, inability to identify other relevant value chain actors to partner and do business with due to restricted social networks and mobility, and the high cost of actually transacting.

These transaction costs "include those incurred in gaining information prior to making deals, in negotiating contracts, and in monitoring and policing the implementation of contracts. High transport costs can change the ratio of benefits to costs at the farm gate: high unit costs raise the cost of inputs and depress the value of outputs when considered at the farm-gate."[144] Market linkages may also be strained between small scale producers and input suppliers or buyers because the former are less familiar with the norms and culture of doing business with larger companies, or because they purchase or produce quantities that are too small for firms to want to sell to or buy from them.[145]

### Applying Digital Solutions

A host of digital solutions is entering rural markets to facilitate linkages that were previously weak due to a lack of clear information and communication. As discussed above, some of these products directly target smallholder farmers through a B2C model while others are B2B2C models focusing on improving the flow of information, trust, and payments through upstream agribusinesses, cooperatives, and small traders. Some will provide both solutions within a given platform, with the B2B2C model traditionally having more success in SSA. These digital solutions specifically seek to improve communication and information sharing between value chain actors, to reduce frictions and inefficiencies in pricing, storage, transport and transactions.

E-commerce platforms are emerging alongside the increase in internet penetration as another means for more efficient communication and transactions among agricultural value chain actors in SSA. Most of the growth in e-commerce recently has been in India and China, but there is noted growth potential in SSA as well. Africa's largest e-commerce platform, Jumia, claims to serve 15 million SMEs and have

[139] Integrating Very Poor Producers into Value Chains. USAID, 2012, 9. (https://www.usaid.gov/sites/default/files/documents/1862/integrating_very_poor_into_value_chains.pdf)

[140] Webber, Martin and Patrick Labaste. Building Competitiveness in Africa's Agriculture. The World Bank, 2010, 16. http://siteresources.worldbank.org/INTARD/Resources/Building_Competitiveness_in_Africa_Ag.pdf.

[141] Ibid, 19.

[142] Shepherd, Andrew. Approaches to linking producers to markets. FAO, 2007, viii. (http://www.fao.org/3/a-a1123e.pdf)

[143] Wiggins, Steve and Sharada Keats. Leaping and Learning: Linking Smallholders to Markets. ODI, 2013, 27. (https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8401.pdf)

[144] Ibid, 25.

[145] Integrating Very Poor Producers into Value Chains. USAID, 2012.

50,000 active merchants in 14 African countries.[146] These models tend to either try to build a rural customer base first to attract merchants, or start with a large online platform that has the scale to invest in rural reach. However, the same transportation and infrastructure challenges that limit distribution of many goods and services to rural areas limits the feasibility of e-commerce in agriculture.

Pure B2C e-commerce products that service rural markets are also greatly limited by poor network and road infrastructure, which make it difficult for rural suppliers to both post their produce and for logistics support to reach them. In addition, an e-commerce platform user experience is best facilitated via smartphones, tablets, or desktop computers. There are product examples where smallholders can post their produce via SMS or USSD, but these products are difficult to use and do not enable the producer to share pictures of the crops or livestock they are trying to sell. The lack of access to smartphones where photos can easily be captured or restricted connectivity speeds (e.g. 2G), limits a pure B2C e-commerce product's success in SSA.

E-commerce platforms that take the B2B2C approach overcome some of these digital barriers mentioned above. Working with mid-tier actors reduces the number of people that would need a more expensive piece of technology, and increases the likelihood of smartphone ownership as small traders and cooperatives are typically more well off than the smallholders. These e-commerce platforms deliver better communication and direct sales opportunities from a broader set of buyers to the mid-stream value chain actors. Platforms like Trutrade also provide its traders, called agents, the opportunity to source the needed produce without concerning themselves about having the funds to pay the smallholder. Payment comes direct via a mobile money payment from Trutrade, and agents are paid for their services by commission on the produce they bring in, based on the price the smallholder receives. This means traders working on the Trutrade platform are not limited by the amount of funds they have in their pocket. This changes the incentive structure for Trutrade's traders from a buy-low-sell-high mentality to one that encourages them to deliver the best price to smallholders they are sourcing orders from. More details on how these types of platforms work can be found in the case studies for this section.

In addition to products that are available via mobile applications, some digital market linkage tools leverage blockchain technology to definitively track product origin, allowing for more value to be added through the value chain in cases where the provenance and/or method of growing will yield a higher price for the product. Blockchain is also beginning to be used for smart contracting, an innovation that could significantly lower the high cost of transactions that rely on informal contracts.

**Partnership Roles in E-Commerce**

| | MNO | Financial Institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provide connectivity and mobile channel*<br>• *Provide platform*<br>• *Provide payments processing*<br>• *Provide agent networks for cash-in/cash-out* | • *Provide financing for market linkages*<br>• *Provide payments processing*<br>• *Provide agent networks for cash-in/cash-out* | • *Customer mobilization*<br>• *Customer education and awareness*<br>• *Customer acquisition* | • *Design of platform to aggregate, store, and analyze transaction data*<br>• *Customer acquisition* |

[146] https://group.jumia.com/

# CASE STUDY 10

## *AgUnity*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *2-3 years* |
| ***Product Offering*** |
| • *Farmer/Data Management*<br>• *Payments*<br>• *E-Commerce* |
| ***Target User(s)*** |
| • *Farmers*<br>• *Outputs Side Value Chain Partners*<br>• *Financial Institutions* |
| ***Digital Product Form Factors*** |
| • *Tablet/Smart Phone*<br>• *Blockchain* |
| ***Revenue Model/Pricing*** |
| • *Commission* |
| ***Target Partners*** |
| • *Outputs Side Value Chain Actors*<br>• *Financial Institutions* |
| ***Year Founded*** |
| • *2017* |
| ***Geographic Focus*** |
| • *Papua New Guinea, Indonesia, Kenya* |

*AgUnity is a digital information and e-commerce platform accessible only via smartphone that provides farmers and farming cooperatives access to on-farm production advice, trading markets, a payments method as well as basic banking/financial services.*

### Origin of the idea

*The aim of AgUnity, a mobile app that uses blockchain technology, is to establish greater efficiencies between smallholder farmers and the agricultural cooperatives they interact with, by increasing trust and communication between these parties. The founders see the absence of trust as one of the primary culprits for the systematic lack of organization and coordination that exists in some agricultural value chains, including coffee and cocoa. The lack of trust and disorganization contribute to poor planning, spoilage, and corruption in record-keeping, which in turn result in large crop value losses for the smallholder. In addition, AgUnity knows farmers face a variety of other widely-discussed barriers, such as a lack of access to information, equipment, and best practices in planting and harvesting.*

### What are the market problems this offering seeks to solve?

*With the AgUnity app preloaded onto the smartphone, farmers access a variety of services. Farmers can use the AgUnity app to plan, trade, and track their transactions, opening modes for them to better cooperate with other farmers, store value, save money, and purchase or rent products and services (such as farming equipment). It is an example of a company that has identified a commercially viable business model that can bear the costs of providing basic smartphones and data credits to a predominantly rural client base (i.e farmers and cooperatives).*

### How are digital channels used throughout the offering?

*The smartphones provided by AgUnity are preloaded with the AgUnity app in addition to other basic applications such as Google Maps, YouTube, and Facebook (due to popular demand). Clients are unable to download additional apps onto these phones, but AgUnity has the ability to push updates and new apps to phones if desired.*

*The phones digitize all the different interactions and transactions that occur between the farmers and their cooperatives, and record them permanently in a way that can be easily read by all parties. This is done using QR codes, and all digital interactions are recorded on a public and immutable distributed ledger (blockchain) that both farmers and cooperatives have access to. When farmers sell to cooperatives, source equipment, or access an advance, each transaction is noted and scanned on each party's phone, and then placed onto the ledger, driving trust between parties.*

*The AgUnity product also helps resolve coordination issues that can lead to a loss of crops, bad prices, and a lack of access to farming equipment. The app enables groups of farmers in close proximity to one another to coordinate harvesting and equipment rental with their cooperatives, which enables loss-reducing inefficiencies. In the future, the app will act as an accounting mechanism that links to smallholder farmers' accounts at the cooperative. Farmers can utilize this feature to instruct cooperatives to make purchases or push funds from their cooperative account to a mobile money account.*

### Implementation: the experience thus far

*AgUnity is deployed in small pilot phases but has plans in 2018 to have 4,000 cacao and coffee farmers in Papua New Guinea and Indonesia use the application. AgUnity is also starting additional pilots in 2018 across four other countries with five different commodities.*

*Currently, customer acquisition is expensive and requires coordination with NGOs and others that work with last-mile organizations, such as cooperatives. NGOs and cooperatives are therefore key partners to AgUnity's success. The need for partnership and coordination to reduce costs of customer acquisition is largely due to the time-consuming nature of sensitizing farmers to a new technology. Farmer cooperatives may be able to do this more efficiently than agents employed by AgUnity. It estimates that the cost of customer acquisition could get down to around $100 per customer, including phone costs, with partnerships.*

*AgUnity offers a 'freemium' model. The blockchain record-keeping product will be free and costs will be recovered later through additional services, such as providing data to financial service providers for lending. Farmers and cooperatives are drawn by the offer of a free smartphone, but the primary incentive of improving coordination and collaboration through their local networks is a benefit many farmers very quickly realize.*

### Looking ahead: growth, opportunities and challenges

*AgUnity is hopeful its offering will provide a strong source of revenue in the form of a rural e-commerce platform linking farmers and sellers. These sellers could offer a range of products, including solar lanterns, portable water filters and clean cook stoves. AgUnity plans to take a 10 percent commission on sales from the marketplace, which would be a primary revenue source for the company. An additional potential revenue source*

*for AgUnity will be providing ways for off-takers to trace product origins. Blockchain solutions that enable more transparent supply chains are being tested around the world. Improved visibility into product origin can lead to better pricing for farmers and an additional stream of revenue for AgUnity through data license agreements with off-takers.*

*The concept of resolving trust issues and inefficiencies between farmer cooperatives and their membership, by providing free smartphones to all involved, builds on the notion that "full equality" within the group will strengthen cohesion and increase activities that ultimately offer AgUnity a revenue-earning opportunity. The pace, scale, and quality of user registration and activity will dictate its success. However, the AgUnity platform is positioned to capture a variety of data and information to create digital footprints for farmer and rural micro-enterprises. The right financial service providers acting as partners or financiers could make use of this data to extend new products and services to these market segments.*

## KEY TAKEAWAYS

1. *An example of a provider that believes there is a sustainable business model for providing cheap smartphones to users, which affords an opportunity to see how farmers interact with smartphones and what datasets will result that can be monetized.*
2. *Enables farmers to digitally track transactions through QR codes stored on a distributed ledger, designed to improve trust within agri-value chains, and between farmers and farmer cooperatives in particular.*
3. *The revenue model is dependent on a marketplace where farmers can purchase household items, which could also potentially evolve into a way to place orders and pay for inputs.*
4. *A general distributed ledger concept is being used to drive supply chain transparency, which AgUnity hopes will result in premium pricing for farmers in value chains such as cacao and coffee and data licensing fees.*

# CASE STUDY 11

## *TruTrade*

### Key Attributes Profile

***Provider Type***

- *Third-party digital platform provider*

***Years in Existence (Service Offering)***

- *2-3 years*

***Product Offering***

- *Market Access Services*
- *Farmer/Data Management*
- *Payments*
- *E-Commerce*

***Target User(s)***

- *Farmers*
- *Outputs Side Value Chain Actors*
- *Inputs Side Value Chain Actors*
- *Financial Institutions*

***Digital Product Form Factors***

- *Basic mobile device*
- *Traditional software*
- *Tablet/smartphone*

***Revenue Model/Pricing***

- *Fee-based (per transaction)*
- *Fee-based (service)*
- *Commission*
- *Loan/Credit interest*

***Target Partners***

- *Farmer Associations*
- *Outputs Side Value Chain Actors*
- *Inputs Side Value Chain Actors*

***Year Founded***

- *2015*

***Geographic Focus***

- *Uganda and Kenya*

*TruTrade is an online and mobile e-commerce platform that offers registered users access to digital MIS services to better manage their business activities, from sourcing crops in fragmented value chains to completing payment.*

### Origin of the idea

*TruTrade is a social enterprise that increases smallholder farmer incomes by integrating them into sustainable supply chains with strong links to village-level aggregators and buyers. TruTrade was founded on the belief that digitizing informal agricultural value chains and bringing transparency and transaction security to larger buyers (first mile sourcing) will making agricultural markets work more efficiently. TruTrade's model includes local traders who, while commonly seen as profit takers, are an essential stakeholder in providing farmers with access to markets.*

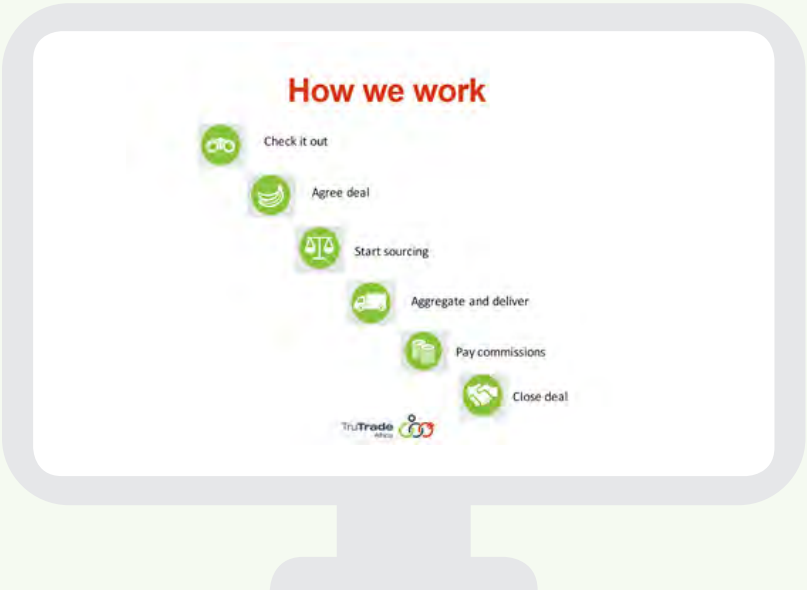
### What are the market problems this offering seeks to solve?

*TruTrade has developed a smart trading platform and a "Market Connect" service designed to create business opportunities for a new type of trader. This trader is typically younger and more adept in the use of technology. TruTrade provides an alternative to the buy-low- sell-high mentality prevalent amongst older traders, paying trader commissions based on the price the farmer gets for their crops. It also institutes a profit-sharing model with both farmers and traders. The logic behind this incentives reversal is to secure higher prices for farmers while maintaining a viable business for traders.*

*TruTrade's platform solves several problems for each stakeholder. Smallholder farmers gain better access to markets for their crops and at better prices, as well as digital trading records so they can gain control over their yield production and sales data over time. Aggregators or traders are able to expand their business offerings, earn commissions and share in additional profits. TruTrade also provides "cash on the bag" mobile money payments to farmers as they hand over the produce, which means traders are not limited by their own cash flow constraints. Buyers further up the agri-value chain – processors, wholesalers or exporters – gain access to a large and traceable supply chain of quality produce.*

### How are digital channels used throughout the offering?

*Technology is central to TruTrade's value proposition. Its online and mobile-enabled platform, weSource, is a MIS for sourcing crops in traditionally less organized, fragmented agri-value chains. The system puts digital tools in the hands of traders to facilitate greater supply chain coordination, by allowing for the capture and dissemination of key information such as relevant costs, pricing, or farmer profiles. The app empowers traders to deliver faster payments, using existing payment channels (i.e. MTN mobile money), while keeping a record of their sales. It also allows multiple value chain actors to track crop yield from source collection through distribution and delivery.*




### Implementation: the experience thus far

*During its three years of existence, TruTrade has brought over 1.7 million kilos of produce to market, totaling over $900,000 in sales. It purchases a wide variety of crops ranging from cereals to root crops. It has enabled over 7,000 farmer transactions and supported farmers earn 15 – 20 percent more on their crops. It has a growing network of over 150 agents who continue to expand service reach through registering farmers and*

*opening new collection points. TruTrade currently has presence in eight districts in Uganda, and five counties in Kenya.*

*TruTrade acquires service users through its network of affiliated traders, who have a target to source 20-30 farmers in their first season, and 50-60 when they have gained more experience. Traders register farmers onto the TruTrade platform using a bespoke smartphone agent app that has been designed for ease of use and an intuitive user experience. They are also responsible for triggering payments.*

*TruTrade has adapted its revenue model as it seeks to maximize social impact and at the same time find commercial viability. It does not directly buy or sell commodities but takes a commission for any trades made over its "Market Connect" service. The commission is set at 5 percent, but increases are being trialed up to 10 percent of the value of the produce. Any profit is split 50:50 between farmers and traders, thereby incentivizing both parties to take care of crop yield quality and ensure efficiency of collection and distribution. TruTrade also charges financing fees to affiliated traders to cover digital transaction and administration costs as well as the cost of finance. This fee is currently set at 3.5 percent for up to 30 days, increasing incrementally.*

### Looking ahead: growth, opportunities and challenges

*TruTrade's IT platform provides an opportunity for expanding the types of services it delivers to its core client segments: farmers, traders, and buyers. It is currently working on bringing further digitization to its core products, building out more digital data collection opportunities and GPS mapping around its farmers and agents. As trading grows and all players build up their digital records, these can be used for credentialing purposes as they are independently verifiable trading records. TruTrade is also keen to link farmers to digital financial services for savings, loans and insurance. It is injecting significant amounts of money into rural mobile money ecosystems, though at the moment most farmers just cash-out. TruTrade aim to work to increase farmers' appreciation of the diverse benefits of mobile money. Moreover, there are potential win-win opportunities for TruTrade to engage with a broader suite of financials services. Lending products for both its smallholder farmers and agents could possibly be facilitated through its platform, and detailed historical production data could be useful for yield index insurance products.*

### KEY TAKEAWAYS

1. *TruTrade's model seeks to embrace rather than exclude trading middlemen, provided they are willing to operate under a different mindset and adopt digital solutions.*
2. *TruTrade's incentive structure intertwines the financial livelihoods of farmers and traders rather than emphasizing a purely zero-sum approach.*
3. *The combination of information and financial transaction capabilities is a service requirement to meet the needs of different value chain actors but also a growth pillar.*
4. *By linking into DFS platforms, TruTrade can source and provide liquidity to traders with strong contacts and high buying capacity but who are restricted access to trading finance.*

# CASE STUDY 12

## *Mastercard Farmer Network*

### Key Attributes

***Provider Type***

- *Third-party digital platform provider*

***Years in Existence (Service Offering)***

- *1-2 years*

***Product Offering***

- *Market Access Services*
- *Farmer/Data Management*
- *Payments*

***Target User(s)***

- *Farmer Associations*
- *Outputs Side Value Chain Actors*
- *Inputs Side Value Chain Actors*

***Digital Product Form Factors***

- *Basic mobile device*
- *Traditional software*
- *Tablet/smartphone*

***Revenue Model/Pricing***

- *Fee-based (per transaction)*

***Target Partners***

- *Farmer Associations*
- *Financial Institutions*

***Year Founded***

- *2017*

***Geographic Focus***

- *Kenya, Uganda, Tanzania*

*Mastercard Farmer Network (MFN) provides farmers with access to a digital platform accessible via mobile device to connect with prospective buyers, sell crops, and track purchase orders and other trading activities to create profiles that can be provided to financial institutions as documentation.*

### Origin of the idea

*MFN, formerly known as 2Kuze, was developed at the Mastercard Lab for Financial Inclusion in Nairobi, which was established in 2015 through a partnership with the Bill and Melinda Gates Foundation, to develop practical and cost-effective financial tools that expand access to financial and other vital services as well as help build stable futures for more than 100 million people globally. The Lab works with entrepreneurs, governments and other stakeholders to develop local products with global scalability that will financially include millions living at the bottom of the economic pyramid. MFN links buyers, cooperatives or farmer producer organizations (FPOs), farmers, sourcing agents and banks through SMS, USSD and an online platform, facilitating improved digital market linkages for small holder farmers. MFN is currently live in Uganda, Kenya, Tanzania, and India (launching in 2018).*

### What are the market problems this offering seeks to solve?

*MFN's bundled product offering approach (see graphic on page 118) addresses a variety of barriers smallholder face throughout their farming cycles, from planting to harvest. MFN currently focuses on solving the challenges farmers or FPOs face in accessing more direct relationships with buyers while also helping buyers improve their ability to manage large numbers of smallholders and FPOs directly. Ultimately, the platform has a goal of allowing farmers to conduct the entire transaction of selling their produce and receiving payment via their mobile device, resulting in a better crop price for farmers. MFN enables farmers to develop digital profiles that are connected to proof of sales, which can be used by financial institutions for additional financial services such as credit and insurance in the future.*

### How are digital channels used throughout the product?

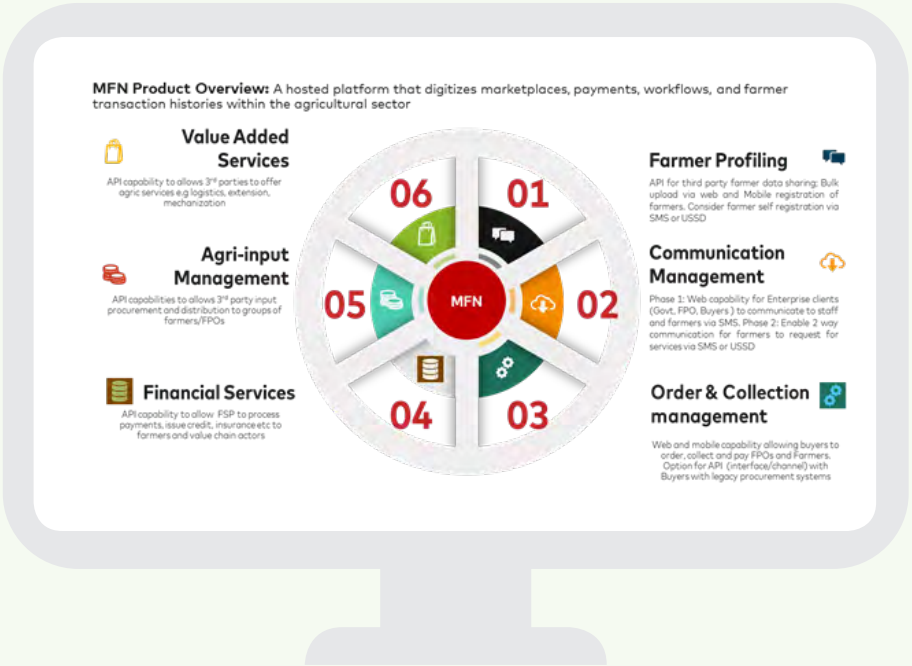
*The MFN platform can be accessed via mobile and web interface channels. MFN's primary clients are buyers, who typically have access to strong internet connection and computers within their offices. 80 percent of these buyers are SMEs working with less than 5,000 farmers, while the remaining 20 percent are larger buyers working with over 10,000 farmers. These buyers will interact with MFN through what is called the buying-side marketplace. This is a platform that enables buyers to better communicate with participating FPOs, farmers or aggregators about the type and quantity of crops they desire. The platform then facilitates the sourcing for crop orders, and the buyer then facilitate the logistics for picking up the order. The MFN platform facilitates digital payments through multiple channels (bank transfer, mobile payments) and provides incentivizes the move form cash to digital payments. The buying-side marketplace is the most popular use case of MFN, as customer acquisition for bringing on additional buyers is less burdensome than bringing in customers like individual farmers and FPOs that use what is called the supply-side marketplace. This marketplace allows suppliers to use their mobile devices to post their planned quantities and crop types to the platform either through a smartphone app or SMS.*

### Implementation: the experience thus far

*The initial pilot for MFN was launched with the non-profit Cafédirect Producers Foundation, who are using the platform to sell their produce. Since then the platform has engaged farmers across the three MFN countries in Africa. The platform acquires farmers, FPOs and buyers through a variety of partner institutions that have the option of white labeling or licensing the MFN platform. These partners include, financial institutions, governments and development organizations working in agriculture. These partners have a vested interest in digitally capturing information on smallholder farmers upon which to improve programmatic and commercial impact as well as linkages between buyers and suppliers. They work directly with last mile aggregators such as cooperatives or FPOs that do the on the ground organizing of smallholders. Transportation and logistics of produce is conducted through buyers and suppliers, and MFN currently does not support this part of the sale of produce but plans to do so in a future iteration of the platform. MFN currently partners with the International Center for Tropical Agriculture (CIAT) working on the bean value chain in East Africa, United States Africa Development Foundation, working on rolling out efficient supply chain management and market access to farmers in Uganda, and NMB Bank of Tanzania, which is partnering to rollout a white-labelled version of the MFN called ekilimo to its host of agribusiness and farmer clients.*

### Looking ahead: growth, opportunities and challenges

*MFN will continue to strengthen its operations in the markets within which it is currently operating. MFN will expand ITS services to the India and West African Markets by early 2019. MFN will also support the inputs side of the value chain, and link FPOs with better priced quality inputs purchased from the wholesale instead of retail markets. There are also plans to engage transportation and mechanization companies to help make farming equipment or produce delivery support through the platform more readily available.*




## KEY TAKEAWAYS

1. *MFN has found that delivering e-commerce services to smallholder farmers requires establishing strong relationships with buyers and last mile organizations like cooperatives or farmer producer organizations.*
2. *MFN offers payment options in a variety of form factors, and believes it is important to respect the payment preference of farmers, even if that preference is cash.*
3. *MFN partners with international NGOs and financial service providers, primarily banks, to support customer acquisition (i.e. buyers and last mile organizations).*

### Considerations moving forward regarding agri-related E-Commerce

E-commerce in agriculture is a new service and as such, there are not yet many longstanding implementations from which best practices can be gleaned. While many farmers now have mobile devices, e-commerce requires much more than digital communication. For transactions to be completed outside the online platform, complex supply chain logistics are involved. E-commerce platforms must solve the challenges associated with picking up, transporting and correctly delivering goods throughout rural areas. E-commerce is inherently easier in urban areas and the extent to which it can truly serve last-mile farmers will be determined by how successfully the payments and logistics pieces are executed. Finally, these platforms may serve to disrupt the status quo vis-à-vis the role of traders in rural economies, by reducing the need for their services if farmers can connect more directly to buyers. Identifying ways to address resistance from traders while making the value chain more efficient will be required for the success of e-commerce in agriculture.

## Data Collection and Management

### Recent Observations, Trends and Developments

There are more sources of digital data than ever before, including for geographic regions where data has been scarce in the past. As increasing numbers of individuals and businesses use digital tools, they are creating profiles of themselves built on their transaction and communication histories. These histories can be used by a variety of companies, including MNOs and FSPs, to better understand their customers. Information on individuals' preferences and habits helps providers design more relevant, targeted services and reduce the risk of extending products such as credit to new customers. Data for these individual profiles and histories come not only from regular use of digital products but also from intentional digital data collection. A number of new tools aim to transform disorganized value chains by allowing field agents to easily collect individual farm data so that off-takers and agribusinesses can aggregate and analyze the information, to predict yields, identify threats to production, and potentially extend credit. The digitization of this process increases accuracy, efficiency and analytical power.

### The Problem

Agri-value chain development is often inhibited by weak capacity among agribusinesses to collect, store and manage data on a wide range of operations and activities, as well as those of their value chain partners. In this data-light environment,

agribusinesses lack a full picture of the producers they may source from, introducing risk if agribusinesses are lending to the producers. With stronger digitally enabled data collection, management and analytical systems, agribusinesses strengthen the entire value chain. Agribusinesses are better able to serve and cooperate with smallholder farmers, attract capital from formal financial service providers with financial records and documentation, and create more value by operating with better efficiency. Agribusiness is distinctly risky. It involves operational, technology, consumer, competitive, biological and climate risks.[147] Digital data management can reduce these risks and pass on the associated savings in increased value throughout the value chain. Functioning in traditionally analog environments, many small and medium agribusinesses manually manage records of labor, quantities and sources of goods bought, sold and stored, and financial accounting. Manual record keeping is not only inefficient but is also vulnerable to errors, fraud and general mismanagement that can prove costly for many agribusiness owners.

This section below considers the relevance and potential impact of digital solutions on the topic of on-farm and off-farm data collection and management. For those who are less familiar with these new data sources that are powering many of these digital offerings in agriculture, the tools chapter presents a brief primer on the topic intended for the lay reader.

### Applying Digital Solutions

Digital solutions for enterprise management partially automate, reduce error, and speed up data collection, storage and analysis around agribusiness operations and activities. Fundamentally, digital data management helps agribusinesses reduce the inherent risks in their work. It is being developed for use in places with limited connectivity and with feature phones, smartphones or tablets, and the software is customized with fields that align with the particular operational and financial needs of specific, regional crop types. Digital data management solutions are geared toward gathering and analyzing data during on-farm activities and in post-harvest storage, processing and transport.

### Digital on-farm data management tools

There are new initiatives that aim to use digital data to develop databases of smallholder farmer profiles – including data on their farms, production and financials. The theory behind farmer profiling is that greater provision and dissemination of data on smallholder production to all value chain actors will help inform decision making and lower or mitigate biological, climate and other risks to production, which drives the rest of the value chain.[148] As discussed, most smallholder farmers do not typically have clear records of what they produce and sell, against which financial service providers or agribusinesses might be able to offer products and services, such as credit. Digitizing farmer profiles is seen as a way to shed light on the real risks and opportunities of funding and partnering with smallholders, and also a means of empowerment for farmers who can own their own data for the first time. Farmforce, for example, helps businesses gather and store data to manage smallholders in the value chain as well as characteristics of their production, to ensure compliance with global standards and better predict and track finances, harvests, and yields.

The data used for farmer profiling is a combination of data collected at the global level (including satellite images and public databases on crops, seeds, pests and diseases, etc.), at the farmer level (financial documentation, land use and ownership records, etc.), and at the field level (including data on soil, yield, and other measures of farm health and productivity, gathered from a variety of digital and IoT-enabled sensors). This data can provide the farmer both new products that help with production-related needs, and more information to improve decision making.[149] The result for agribusinesses, with access to this data, is better understanding of the customer (if they are an input supplier), the ability to pinpoint problems, threats or trends in production (if they are a farmer coop), and early identification of crop failures or harvest surpluses

[147] Growing Food, Products and Businesses: Applying Business Incubation to Agribusiness SMEs. The World Bank, 2011. https://openknowledge.worldbank.org/bitstream/handle/10986/23038/100351.pdf;sequence=4

[148] Boyera, Stehpane, Chris Addison and Chipo Msengezi. Farmer profiling: making data work for smallholder farmers. CTA, 2017.

[149] Ibid.

that might affect upstream value chain activities. Farmer profiling applications have also integrated with digital tools that allow agribusinesses to audit farmers for compliance with the rules of certification programs, such as Fairtrade and Rainforest Alliance.[150]

The mobile applications developed to gather and store data on farmers are typically implemented in the field by agribusinesses that organize farmers, farmer coops or development organizations, rather than by individual farmers who likely lack the capacity to use the applications. The implication is that getting the data is time and resource consuming because it involves mobilizing field agents, and that farmers themselves still may not have access to their own profiles or understand how to use them.

### Digital off-farm data management

For the post-harvest period, digital data management solutions lower risk for agribusinesses that store, transport and process goods. Simple mobile or tablet-based applications and IoT-enabled sensors can be used to record inventory coming in and out, and duration of storage time and temperature (a key to the huge challenge of avoiding food spoilage before it even hits markets). More advanced technologies can remotely scan and track large quantities of inventory. This information helps give the business the ability to make more nuanced, timely and informed decisions about storage and transport, especially of perishables. In SSA, 95 percent of food loss occurs before the customer buys the crop or product, indicating the need for optimizing supply chains. Storage, and the advancement of storage technologies, play a significant role in reducing loss.[151] Data on inventory and data tracking capabilities enhance many new low-tech storage technologies that do not require significant electricity use or that rely on solar.

Digitally-enabled warehouse receipt programs are solving a number of problems within agricultural value chains, including around data management. Without storage options, farmers with non-immediately perishable goods must sell their product regardless of whether they could get a higher price by waiting and selling later. With electronic warehouse receipts, farmers deposit products such as grain into a warehouse and are issued a receipt that certifies the amount and quality of the grain. The farmer can use the receipt as collateral for a loan or keep their grain, stored until they potentially receive a higher price for it. When they finally sell their grain the price of storage will be deducted. In one model, the digital platform is used to survey farmers on their production at harvest time, information which is stored in the "e-warehouse" and used by local banks as the basis for an advance payment to the farmer. Post-harvest surveys and monitoring checks verify what is in the e-warehouse and facilitate digital payment. Digital warehouse receipts offer farmers and warehouse managers a more durable and immutable record of the traditional warehouse receipt, against which warehouses or financial service providers might provide farmers advances for part of their production value.

**Partnership Roles in Digital On-Farm or Off-Farm Data Management**

| | MNO | Financial Institution | NGO/Development Organization/Agribusiness | Third-party Technology Provider |
|---|---|---|---|---|
| *Role* | • *Provide connectivity and mobile channel*<br>• *Provide information services* | • *Financing warehouse receipts and other value chain activities*<br>• *Lending to farmers or coops against farmer profiles* | • *Intermediating to collect data for farmer profiling* | • *Develop farmer profiling and other platforms*<br>• *Analyze data from farmer profiles* |

[150] Opportunities in agricultural value chain digitisation. GSMA, 2018. (https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/01/Opportunities-in-agricultural-value-chain-digitisation-Learnings-from-Ghana.pdf)

[151] Reducing Food Loss Along African Agricultural Value Chains. Deloitte. (https://www2.deloitte.com/content/dam/Deloitte/za/Documents/consumer-business/ZA_FL1_ReducingFoodLossAlongAfricanAgriculturalValueChains.pdf)

# CASE STUDY 13
## *Farmforce*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| ***Years in Existence (Service Offering)*** |
| • *5+ years* |
| ***Product Offering*** |
| • *Information*<br>• *Market Access Services*<br>• *Credit* |
| ***Target User(s)*** |
| • *Outputs side value chain actors*<br>• *Inputs Side Value Chain Actors* |
| ***Digital Product Form Factors*** |
| • *Basic mobile device*<br>• *SaaS/Cloud Services* |
| ***Revenue Model/Pricing*** |
| • *Fee based* |
| ***Target Partners*** |
| • *Farmer Associations*<br>• *Financial Institutions* |
| ***Year Founded*** |
| • *2012* |
| ***Geographic Focus*** |
| • *Global* |

*Farmforce is a cloud-based digital platform that off-takers and cooperatives can use to conveniently capture and store farmer information.*

### Origin of the idea

*Farmforce began as a project of Syngenta Foundation for Sustainable Agriculture (SFSA), which recognized the need for digital tools to formalize transactions and interactions between agribusinesses and smallholder farmers. SFSA sought to design a product to create transparency in a variety of business processes in agricultural value chains.*

### What market problems is the offering seeking to solve?

*The resulting product, Farmforce, is a cloud-based data sourcing and management solution that enables off-takers and cooperatives to digitize information on smallholder producers. Functionality includes the ability to create farmer profiles and manage a range of activities from recording planting and fertilizer applications, to transparent disbursements and repayments of input loans, to fraud-free harvest purchases. Typically, farmer profiles consist of ID, crop information, individual GPS field information, land size, crop cycles, and a picture of the farmer. This information is used to help off-takers and cooperatives work with their producers in more efficient and transparent ways, while also creating a digital footprint of farmers that can provide greater access to formal services and markets. In 2017, Farmforce was purchased by Eisblink Holding, a Norwegian company, and is now an independent organization.*

### How are digital channels used throughout the offering?

*Farmforce provides cloud-based web and mobile platform technology that works on Android smartphones and can be accessed on any internet browser. Farmforce is solely a technology provider, so it provides the platform for clients to digitize the data they would typically collect via paper methods. Field staff working for the agribusiness, cooperative or aggregator collect the farmer and crop data on the smartphone application. This results in large, reliable datasets on smallholder farmers that Farmforce clients use to source produce. Farmforce clients are able to use the data to drive strategic operational decision-making, such as choosing the optimal input package for specific geographies to help farmers improve yields and their livelihoods as well as the reliability of the agribusiness' supply. Collecting quality information enables businesses to project yields, plan logistics, facilitate value chain financing, and boost farmer production. Farmforce also partners with certification programs such as Global G.A.P. to enable farmers to become certified and access premiums and other advantages that the certification programs bring.*

## Implementation: the experience thus far

*Farmforce is currently present in over 25 countries, including twelve in Sub-Saharan Africa, with 250,000 smallholders actively managed on the platform. The platform has been applied in over 30 crop value chains and is available in 13 languages, including Swahili, Bahasa Indonesian, Amharic and Mandarin Chinese, to make it easier for data collection by field agents.*

*Farmforce is priced as a SaaS, so clients pay a one-off set-up fee and annual licensing fees per user or based on the number of farmers managed on the platform. Farmforce offers a variety of modules that each have different features and licensing fees. Farmforce is a B2B product and typically acquires customers through peer-to-peer client referrals, responding to competitive requests for proposals, and by scaling up deployments with clients who have sourcing operations in many geographies for a range of crops. Its clients are increasingly larger off-takers and exporters such as Cargill, McCormick or Kellogg's.*

*The platform has a module that is configured to support transparency in input loan dispersal and repayment for smallholder farmers. Field staff manually enter data on the loan to be dispersed, and then record how much of the loan a farmer wants to repay with the proceeds from each harvest delivery at the end of the season. Farmforce also developed an Integrated Harvest Module, which provides the ability to integrate with a mobile payments system, enabling clients*

*to pay farmers with mobile money through the Farmforce platform.*

*In addition to these services, Farmforce has had several conversations with banks and other lending institutions on how data sharing partnerships might be formed between the bank, the agribusiness client collecting data on Farmforce, and the farmer. Data ownership agreements always follow national laws, and in the standard agreements Farmforce has with clients, the client owns the transactional data collected.*

*Banks are interested in expanding rural lending portfolios, but often find it cost prohibitive to gather enough data on each smallholder farmer to accurately determine credit worthiness. The agribusiness sourcing from the smallholders often provide credit to smallholders via input loans when they cannot find funding from the formal financial sector, but this puts pressure on working capital and such lending could be better served by the formal financial sector. This is where the data the agribusinesses are already collecting in Farmforce can be of value.*

## Looking ahead: growth, opportunities and challenges

*In South East Asia, an agribusiness in the black pepper value chain and IFC are in the early stages of a pilot using data collected in Farmforce to enable better access to credit for smallholder farmers through a credit scorecard module. Some of the required data for an initial 'bankability' assessment can be pulled directly from what the agribusiness collects on Farmforce, such as a history of harvest payments, and other data could be collected by the agribusiness field officer through a custom survey. A 'credit scorecard' is then set up as a custom report in Farmforce, pulling the relevant data from throughout the system and depositing it into an Excel file with built-in scoring to generate a concise view of the relative credit worthiness for thousands of smallholder farmers so that the bank can pursue the most viable candidates. This Farmforce scorecard process is not expected to entirely replace the bank's due diligence process but is seen as providing a helpful filter that enables lenders to segment and target farmers with specific profiles. Farmforce and partners are exploring how to strengthen Farmforce's credit scorecard module and better understand key data points to access credit worthiness that would make this compelling to banks, agribusinesses and smallholder farmers, within a clear framework of data sharing.*

### KEY TAKEAWAYS

1. *New digital data sources and analytical methods are not only changing relationships and opportunities to collaborate between smallholder farmers and financial institutions, but also between agribusiness and financial institutions. Such collaborations will, in turn, allow agribusinesses to work more efficiently and effectively with smallholder farmers.*
2. *Farmforce fills a need for greater visibility and transparency at numerous levels in the value chain, which would not be possible without new data sources and digital collection methods.*
3. *Farmforce is a cloud service that does not actually own its clients' data, therefore any data partnerships with financial service providers that may occur will need to be directly with its agribusiness clients.*
4. *Offering a B2B model that indirectly touches smallholder farmers reduces the cost of customer acquisition and sensitization compared to financial service products sold directly to farmers.*

### Considerations moving forward for on-farm and off-farm data management

Whereas cloud-based MIS and business solutions in developed contexts are thought of as having real-time capabilities and functions, in the context of rural agribusinesses these products are used on a "near-real-time" basis. Given pervasive power outages and gaps in mobile and internet connectivity, successful applications in this context will have offline modalities that allow for use in the field or office even while offline. The data is uploaded later when connectivity is restored. These gaps prevent instantaneous reconciliation of transactions from occurring, but do allow for the expansion of digital tools into last-mile communities where offline capabilities are essential.

More broadly, it is important to note that the link between farmer profiles and increased access to financial services has not yet been definitively proven or even heavily piloted. There remains a need to explore how the farmer profiles can be used to accurately predict repayment and in what forms financial service providers could practically use this data. Further, there are data privacy and control issues that must be explored to maintain adequate consumer protection, especially for a segment with low literacy and little exposure to the formal financial services sector. Farmers should have access to their own profiles and understand what the data means and how it is used by any third parties or financial service providers.

## Agribusiness SME Lending

### Recent Observations, Trends and Developments

There is greater available capital and more financing models in SME lending than in smallholder farmer lending. As such, alternative credit scoring and digital delivery models are being used in SME lending and are extended to agribusiness SMEs as well. The alternative credit scoring model is more powerful and predictive when customer have smartphones (more likely among SMEs than smallholder farmers), which generate more individual data to feed into the credit scoring algorithm. Despite growth in digital SME lending, informal lending is extremely well-established so the value proposition for a formal digital SME lending model needs to account for and exploit weaknesses in informal lending (e.g. reliability and timing of post-harvest repayments).

### The Problem

Generally, the credit gap for this group is around $5.2 trillion, representing the unmet finance needs of as much as 40 percent of formal MSMEs.[152] Financial service providers have traditionally rationed credit to agribusiness SMEs, such as input retailers or value-added service providers on the outputs side involved in commodity processing, packaging, or distribution. Agribusiness SMEs tend to fall into a "missing middle" category. This is because of perceived risk within agri-value chains. Unpredictable weather, price volatility, pests and crop disease do not only jeopardize the earning ability of farmers through agricultural production, but also

[152] MSME Finance Gap, SME Finance Forum. https://www.smefinanceforum.org/data-sites/msme-finance-gap

dampen willingness to lend to SMEs with revenue streams directly tied to this uncertainty. The financing needs of agribusiness SMEs usually exceed the limits of most MFIs, but are also cost prohibitive from a due diligence perspective for traditional banks.

Yet these businesses are arguably just as critical to economic development and food security as on-farm production, which tends be the focal point of the dialogue on the credit gap in agriculture. A 2016 World Bank study found that finance for working capital is a "priority need" for the purchase of inputs and to pay for "post-harvest storage, electricity, water, logistics, and transportation to support different value chain activities."[153] Another study estimates that post-farm gate costs account for 50 to 70 percent of the total costs and value in supply chains in developing countries of Asia and Africa.[154] Credit is also used by agribusinesses as investment capital for asset financing, which includes "equipment, transportation, and industrial property (storage and warehouse facilities and processing plants)."[155]

## Applying Digital Solutions

There are four major models of digital SME lending:

1. SME marketplace lenders: non-bank digital lenders originating loans to SMEs through intermediary platforms.
2. Technology, e-commerce and payments providers: companies that already control large data sets on SMEs and have fully digital experiences that SMEs are coming to expect.
3. Supply chain platforms: companies that digitally connect buyers, sellers and financiers and provide various financing, accounting, and inventory management services depending on the accountholder. For example, Umati Capital in Kenya provides working capital finance, including invoice discounting, for agricultural SMEs in East Africa. It offers a web-based invoice management service to processing companies on its platform that typically lack digital supply chain management systems for things such as invoice preparation.
4. Mobile data-based lending models - instant small or micro loans.[156]

Financing agribusiness SMEs is recognized by some financial institutions as a "profitable growth business" because of the predicted increase in demand for food and the opportunity for portfolio diversification.[157] Even so, banks need to be able quantify the lending risk. Banks do already have deep, useful stores of data on SMEs, "including SME owners' customers' daily transaction data that provides reliable real-time visibility into SME cash flows and credit capacity," but are not yet using it due to outdated technology platforms and siloed systems that "lack the ability to create innovative SME lending models from [the data]."[158] New digital tools, including alternative credit scoring and digital banking platforms, help the banking sector and other players capitalize on existing and new data and the opportunity of lending to agribusiness SMEs by offering new ways for lenders to acquire SME customers and underwrite loans.[159] These tools offer solutions to three main challenges that must be overcome for a profitable SME finance model: "credit risk, excessive cost to serve, and lower

[153] Financing Agribusiness in Sub-Saharan Africa: Opportunities, Challenges and Investment Models. The World Bank, 2016, 2. (https://www.agrifinfacility.org/sites/agrifin/files/Africa_Agrifinance_%202016.pdf)

[154] Reardon (2014) as cited in Ibid, 3.

[155] Ibid, 3.

[156] Alternative Data Transforming SME Finance. IFC, 2017. (https://www.gpfi.org/sites/default/files/documents/GPFI%20Report%20Alternative%20Data%20Transforming%20SME%20Finance.pdf)

[157] Innovative Agricultural SME Finance Models. Global Partnership for Financial Inclusion, 2012, 9. (https://www.gpfi.org/sites/default/files/documents/G20%20Innovative%20Agricultural%20SME%20Finance%20Models.pdf)

[158] Alternative Data Transforming SME Finance. IFC, 2017, viii. (https://www.gpfi.org/sites/default/files/documents/GPFI%20Report%20Alternative%20Data%20Transforming%20SME%20Finance.pdf)

[159] Bridging the Small Business Credit Gap through Innovative Lending. Accion Venture Lab, 2016. (https://www.accion.org/sites/default/files/Bridging%20the%20Small%20Business%20Credit%20Gap%20Through%20Innovative%20Lending%20by%20Accion%20Venture%20Lab.pdf?)

revenue per account relative to large corporate clients."[160]

Credit risk can be assessed electronically through the analysis of new data sources, making the due diligence and underwriting processes more automated, faster and less expensive. Digitally-enabled SME lending relies on the collection of data including "traditional (bank, accounting, transactional, and sales data) as well as alternative data (online ranking and social media, mobile, and individual data, such as psychometric testing)."[161] Data scientists working with financial service providers and third-party technology companies develop proprietary algorithms that predict reliability and credit worthiness using the alternative data, without requiring years of traditional financial data. First Access and Cignifi partner with MFIs and other lenders in developing countries and provide them credit scores based on their clients' prepaid mobile phone data, which it acquires through agreements with MNOs. Entrepreneurial Finance Lab determines creditworthiness solely based on psychometric testing, which can be determined either for an MSME or an individual.

Digital tools allow lenders to identify and acquire SME customers faster than before, when acquisition costs included multiple visits by a loan officer and lengthy paperwork. Communication, including the application itself, over mobile platforms makes acquiring cheaper, allowing SME lenders to specialize in particular sectors, including agriculture, to increase efficiency or reach large markets quickly.[162] The specialization allows the institution to develop familiarity with the sector and products that serve its unique needs.

**Partnership Roles in Digital SME Lending**

| | MNO | Financial institution | Third-party Technology Provider |
|---|---|---|---|
| *Role* | • *Provide connectivity and mobile wallet for lending and repayment transactions*<br>• *Generate platform data for use in proxy credit score analysis* | • *Directly finance SMEs using new data analytics to assess risk profiles and digital apps*<br>• *Finance SMEs through MNOs or third party distribution channels* | • *Analyze SME data to determine credit scores and lending rates*<br>• *Directly lend to SMEs via mobile applications* |

[160] Alternative Data Transforming SME Finance. IFC, 2017, 1. (https://www.gpfi.org/sites/default/files/documents/GPFI%20Report%20Alternative%20Data%20Transforming%20SME%20Finance.pdf)

[161] Ibid, vii.

[162] Bridging the Small Business Credit Gap through Innovative Lending. Accion Venture Lab, 2016. (https://www.accion.org/sites/default/files/Bridging%20the%20Small%20Business%20Credit%20Gap%20Through%20Innovative%20Lending%20by%20Accion%20Venture%20Lab.pdf?)

# CASE STUDY 14

## *Bank of Langfang (BOLF)*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Bank* |
| **Years in Existence (Service Offering)** |
| • *1-2 years (the product itself)* |
| ***Product Offering*** |
| • *Credit* |
| ***Target User(s)*** |
| • *Inputs Side Value Chain Actors* |
| ***Digital Product Form Factors*** |
| • *Tablets/Smartphones*<br>• *SaaS/Cloud Services* |
| ***Revenue Model/Pricing*** |
| • *Loan/Credit Interest* |
| ***Target Partners*** |
| • *Inputs Side Value Chain Actors*<br>• *Financial Institutions*<br>• *Third-party technology providers* |
| ***Year Founded*** |
| • *2016* |
| ***Geographic Focus*** |
| • *Northern China* |

*Bank of Langfang (BOLF) has developed an SME lending platform for poultry cooperatives in Northern China, in partnership with fintech company Agrpal and IFC.*

### Origin of the idea

*BOLF saw a market opportunity in moving lending activities off the books of input retailers and into its own loan book. Yet, it was concerned about the credit worthiness of input retailer customers and whether they would repay the loans. Around the world, input retailers are often faced with the decision of whether or not to extend credit to farmers to enable the purchase of their products. In many cases, if input retailers did not do this, they would have very few customers, as smallholder farmers do not typically have the capital required to purchase necessary seeds and fertilizes up front, except at harvest times when other payment needs are in competition. When input retailers extend credit to farmers in the form of in-kind inputs, they create a strain on their own cash flows because they must still pay their wholesale distributors up front.*

### What are the market problems this offering seeks to solve?

*In Northern China, input retailers face liquidity pressures in providing value chain financing to their customers. In China, most farmers don't own their land and only 30 percent have records in the credit bureau, so accessing credit from banks or microfinance institutions takes time. Farmers prefer to turn to input retailers for credit as it is a faster and more flexible experience. However, retailers typically sell their inputs at a 10-15 percent mark-up to compensate for the liquidity strains these loans put on their businesses.*

### How are digital channels used throughout the offering?

*BOLF partnered with IFC and an agri-fintech company called AgrPal to develop digital credit scoring models for farmers working in crops*

*and livestock and also for agribusinesses. The model was built on IFC's experience in agricultural finance, and considers specific production cycles, cash flows and production risks in addition to nearly fifty socioeconomic, technical agricultural, and financial criteria, which help determine a farmer's ability to repay debt. Each partner within this initiative played a specific role in delivering the data sources behind the credit score:*

*AgrPal developed a front-end application for BOLF called the Agrifinance Mobile Application that enabled easier entry of the questionnaire data IFC helped design for the alternative credit model. The app enabled greater efficiency, cutting time spent on appraisal by 300 percent (from two hours to 40 minutes).*

*IFC developed a regional agricultural database that details three-year yield history, production costs, and pricing for a variety of crops. This data was used as a benchmarking mechanism that allowed BOLF to compare individual farmer data to historical information to simulate a farmer's cash flow needs and potential loan terms. IFC also provided BOLF with an Agrifinance Credit Scoring Model that helped BOLF develop the back-end loan analysis system that led to streamlined appraisal processes.*

*BOLF implemented a remote online loan disbursement system, which enables smallholders to sign loan contracts virtually through a smartphone mobile app or online. BOLF also uses the past three months of a farmer's call records (farmers must grant access for them to be able to use this information). This data is used to verify aspects of the loan application during appraisal.*


### Implementation: the experience thus far

*With these digital channels and the automation of some of the underwriting for these loans, BOLF has been able to offer same day loan processing and approval. With high confidence in the underlying data sources, BOLF has automated between 80-90 percent of its underwriting. The only time approvals pass manually through a staff member at BOLF is to ensure there are no human data entry errors.*

*These loans are not disbursements of funds directly to a farmer, but rather lines of credit at the relevant retailer from which the farmers typically purchase their inputs. Retailers are paid on the same day as the input purchase, reducing their exposure to liquidity risk and helping them increase sales as they are not limited by their own liquidity and ability to lend. BOLF began using this product in May 2017, and in just five months, it had already distributed $6 million in input credit to 186 SMEs, of which the majority are farmers or cooperatives with anywhere between 1.5-180 hectares of land. IFC plans on tracking the participating retailers' income before and after promoting the loan product, but no data is currently available.*

### Looking ahead: growth, opportunities and challenges

*BOLF's ability to reduce the underwriting time and costs of issuing loans was the result of finding trusted partners that provided necessary data and scoring models. SME financing at this scale, with average loans of $30,000, are far larger than the typical lending portfolio for smaller agricultural operations. Yet, this type of SME lending has the potential to incentivize financial service providers to take the first step into automating some of the loan appraisal processes. The lessons taken from automating these processes can potentially lead to the expansion of loan services down to the smallholder farmer market segment.*

### KEY TAKEAWAYS

1. *Input retailers who provide credit to their customers face issues around strained liquidity and cash flow, which can present an opportunity for lending institutions.*
2. *With the right partnerships, banks are willing to adjust internal loan appraisal processes to become more streamlined, which enable speedier loan approval timelines.*
3. *Digitizing the loan contracting process by enabling e-signatures also contributes to more streamlined and improved loan processing.*
4. *SME lending provides a less complicated loan portfolio with higher per customer loan amounts that can help to justify a bank's restructuring of internal procedures around loan appraisal and approval.*

# CASE STUDY 15

## *JD Finance*

| Key Attributes |
|---|
| ***Provider Type*** |
| • *Third-party digital platform provider* |
| **Years in Existence (Service Offering)** |
| • *5+ years* |
| ***Service Offering*** |
| • *Credit (SME)* |
| ***Target User(s)*** |
| • *Cooperatives*<br>• *Farmers*<br>• *Inputs Side Value Chain Actors* |
| ***Digital Product Form Factors*** |
| • *Smartphone/Tablet*<br>• *SaaS/Cloud Services* |
| ***Revenue Model/Pricing*** |
| • *Fee based* |
| ***Target Partners*** |
| • *Farmer Cooperatives*<br>• *Financial Institutions* |
| ***Year Founded*** |
| • *2015* |
| ***Geographic Focus*** |
| • *China* |

*JD Finance, the microfinance subsidiary of one of China's largest e-commerce platforms JD.com, operates a digital lending platform that targets the agricultural sector and farmers in particular.*

### Origin of Idea

*Lack of access to finance and the high cost of capital have severely hindered the development of the livestock sector in China. Some of the primary reasons are very similar to other parts of the world; a lack of documentation of collateral and credit records that make it difficult for traditional financial institutions to extend credit to the rural market, farmers and the agricultural sector. In cases where financial services are available, farmers still cannot afford the relatively high borrowing costs. These issues are compounded by the fact that farming activities are largely decentralized, not only creating difficulty for credit management, but also making it harder for FIs to profit, given the loans are small and the cycle is short.*

*JD Finance has obtained a microfinance lending license and began targeting the agricultural credit sector in 2015. Based on its initial experiences lending to SMEs along the livestock value chain, JD Finance decided to develop the digital agricultural loan product to help farmers overcome the aforementioned challenges of accessing credit to help expand their production.*

### What are the market problems this offerings seeks to solve?

*The digital agricultural loan of JD Finance improves traditional agricultural finance in at least three areas: i) the accessibility of finance, ii) the cost of borrowing, and iii) the cost benefit of loan investigation. The product works with specialized livestock cooperatives as the primary loan recipient, who in turn provides input financing to their members.*

*First, with no collateral or guarantee required, the digital agricultural loan disregards the traditional lending logic and bases its underwriting on a quantitative model of agricultural production as well as farmers' historical production data. The digital agricultural loan is designed based on the knowledge and understanding of livestock farming techniques, the parameters of which serve as the building blocks of the quantitative model. Injected with farmers' historical production data, estimations about future production will be generated in this model as the basis for underwriting and the loan structure is able to match the production cycle precisely.*

*Second, the digital agricultural loan helps farmers manage funds and reduce the cost of capital. The structure of traditional financing for livestock provides the total amount at the beginning of a loan, while many of those funds will not be used for 30 to 40 days. This leads to interest being accrued on idle funds. With the help of the quantitative model, the digital agricultural loan regularly allocates a fixed amount of funds to farmers with daily interest accrued, which cuts the cost of capital nearly by half compared to the traditional finance model. For example, a rearing period for a chicken lasts about 42 days and requires roughly 12 RMB ($1.80) of feed per animal. The digital agricultural loan changes the practice of paying chicken farmers a lump sum in the initial period. Instead it pays the upstream feed suppliers in instalments per the farmers' actual demand in each stage of the production process. The feed suppliers will provide farmers the feed upon receiving funds. In this model, chicken farmers only need to pay six cents of interest, per animal, or the feed, in one full cycle, minimizing the interest payment on idle funds and saving nearly half of the loan cost. Moreover, farmers save themselves the trouble to purchase feed and can concentrate on farm management.*

*Third, the digital agricultural loan greatly reduces the average credit review cost, and solves the cost benefit problem for FIs. Rural credit products are often small loan amounts, with high repayment frequency and customer dispersion, which makes it difficult to cover the credit review cost. With the digital agricultural loan, a fixed cost will be incurred in the initial stage for the development of the quantitative model and information system, which reduces the marginal cost of reviewing individual farmer loan profiles to almost zero in the later period, thus solving the profitability problem.*

### How are digital channels used throughout the product?

*Digitization happens in all stages of the loan cycle, including pre-lending, disbursement and post-lending. In the pre-lending stage, a quantitative model is built through industry research. Integrated with the already digitized historical livestock farming data of the farmers, the model enables quantitative analyses on production for credit extension purpose, thus digitizing the loan origination process.*

*In the disbursement stage, with the support of the information system, frequent and automatic disbursement of revolving loans is enabled. The cooperatives receive feed on credit (they never actually receive the funds themselves) and JD Finance pays the feed retailers on behalf of the cooperatives. The credit line of the digital agricultural loan is not disbursed in lump sum. Instead, a specialized and customized livestock management system will be identified for the cooperative, so that they are only taking out credit on the amount of feed they need at each stage of the chicken rearing process. The whole production process can be tracked frequently, enabling JD Finance to see when cooperatives are running low on feed, triggering additional lines of credit for feed to be dispersed based on actual production demand.*

*In the post-lending stage, the agricultural loan applies digital technology to effectively combine risk management with production management. The digital agricultural loan not only serves farmers' financing needs, but also helps them with livestock management. As part of the loan package, cooperatives receive a free farm management system, monitoring system, and logistics management system which enable the close monitoring of the livestock. This provides JD Finance a clear and transparent view into the operations of each client, enabling the release of feed on a timed basis and allowing for the closer monitoring of each portfolio's potential risk as production moves forward.*

### Service Implementation: the experience thus far

*As of May 2018, the digital agricultural loan had provided services to more than 100 cooperatives in the major livestock farming areas of Shandong, Hebei, Henan, Jiangsu and Liaoning, with cumulative lending reaching around 1 billion RMB ($150 million). It has typically acquired new customers by working with agricultural insurance companies that lend to cooperatives and also have*

*a strong understanding of the financing needs of client cooperatives. In addition to insurance companies, JD Finance has leveraged the JD.com platform to bring on new customers. There are agribusinesses selling their products on JD.com.*

*Implementation has shown that the initial stage of quantitative model development requires in-depth and systematic field research on the actual production process and the variables involved. This stage requires a large amount of time, manpower and material resources, and is where the majority of the costs occur. It is also the foundation and key to carrying out digital agricultural lending business. Once the model is successfully built, lending can be streamlined for entire agricultural sectors using the digital underwriting algorithms that are developed.*

*In the post-lending production tracking stage, the digital management online automated data collection supports improved transparency in portfolio management. The add-on digital services offered to farmers when granted credit enable real-time data collection and updates. The data collected can be formatted into relevant and useful information for the farmer, helping them manage funds and production.*

## Looking ahead: growth, opportunities and challenges

*In the future, the digital agricultural loan will introduce artificial intelligence into post-lending management, such as intelligent distribution that is capable of automatically generating the feed order based on historical feeding records. JD Finance also plans to develop a logistics module for the management system, which will enable fast and efficient fulfillment of feed orders. With the help of the already well-developed JD logistics service, feed can be regularly delivered at a set amount to each livestock shed.*

*JD finance has set up nearly 5,000 "finance stations" in China's rural and township areas. It is expected that the station number will expand to 20,000 in 2018, and the offline network will become one of the main customer-acquiring channels for the digital agricultural loan.*

## KEY TAKEAWAYS

1. *JD Finance is providing a digital agricultural lending product that can be customized for any value chain using a quantitative model based on the techniques used by farmers and historical production data, among other inputs.*
2. *JD Finance's loan product is currently live in the chicken livestock production value chain, with over 100 cooperatives participating.*
3. *The agricultural loan product services cooperatives with financing that enables them to provide chicken feed to their farmers in incremental loan installments vs. lump-sum loan installments helping to cut interest costs in half.*
4. *JD Finance's product also offers a free farm management system that improve both the farmers and cooperatives supervision of their businesses while also enabling lenders to monitor their portfolios.*

### Considerations moving forward for digital SME payments in agriculture

As with digital credit for smallholders, consumer protection for digital SME lending needs to be solidified to ensure that the proliferation of available products does not result in wide-scale over-indebtedness. This is particularly true given the large capital flows in this sector and the expansion of multiple lending models. As newly funded fintechs and other entities gain access to SME business data, data privacy regulations must keep pace with the rate of change. Lending to this segment can also have a positive effect on other agri-value chain actors. Finance provided to an agribusiness SME, for example, can in turn fund inputs and working capital for farmers if they are contractually linked to that enterprise in an outgrower scheme.[163]

[163] Financing Agribusiness in Sub-Saharan Africa : Opportunities, Challenge and Investment Models. The World Bank, 2016. (https://www.agrifinfacility.org/sites/agrifin/files/Africa_Agrifinance_%202016.pdf)

# SECTION 4

## *Building a DFS Offering: Requirements, Partnerships and Going to Market*

### Introduction

Product development or service design are already embedded in what many commercial entities do. What this section seeks to achieve is to take a familiar process and place it in a less familiar context. In so doing, it will tease out what is different and important about building a DFS offering for the agricultural sector to serve distinct rural customer segments. The section also refers to several tools, located in Section 6. Taken together, these are meant to shape and support preliminary thinking around how to proceed and which considerations or topics to address. Organizations can use these tools at multiple levels or within different units to advance discussions at various phases, but especially during the assess and design phase.

In the overview of the DFS offering landscape in agriculture from the previous section, two important trends emerged: bundled services and partnerships. In most of the examples profiled, multiple services were offered simultaneously or are envisioned as part of the broader service road map. There was also at least one partnership that enabled each DFS offering; whether from a purely back-office, technology systems perspective or from a front-office marketing or sales and distribution perspective. Sometimes, offerings combined a range of partnerships. The roles partners play can cover a wide range of issues and responsibilities from systems infrastructure, investment and maintenance, risk management, supervisory policies and procedures, to marketing and promotion, client/user acquisition, after-sales support, and service network management. And while these partnerships are an essential ingredient in DFS offering deployments in agriculture, they can introduce complexity that must be actively managed.

### Justifying New Approaches: Putting the Farmer at the Center

The chronic problems farmers face in terms of production quantity and quality, access to markets, price negotiation positions, and incomes are interconnected with problems facing other agri-value chain actors at multiple levels. Farmer-centric problems are also a function of the overall composition and organization of the agri-value chains to which they are connected. While ample evidence existed prior to the 2011 release of the World Bank's Global Findex, the weak formal

account ownership and highly restricted usage observed among rural respondent segments from Africa, and SSA in particular, is a powerful reminder that a considerable disconnect exists in these markets between product supply and demand.

With respect to demand-side issues at the farmer level, customer trust, financial or digital literacy, and overall capability to understand and use certain products, often pose challenges for FSPs seeking to market or expand service offerings for rural market segments. Historically, these challenges may not have been seriously considered when launching service offerings in agriculture. Recently, however, research from the World Bank[164] highlights the need for providers to improve their understanding of these issues and recognize the need to invest resources for public awareness and customer education activities. Further, the design and development of these offerings should incorporate customer privacy and protection features to demonstrate to individuals and enterprises that private institutions are committed to these issues in a very practical way.

Different approaches to serving rural customer segments at the retail, enterprise, or even corporate level are justified as a number of models and offerings have progressed in a range of markets over the last decade that warrant closer attention. These models emphasize developing a more nuanced understanding of customer needs, patterns, preferences, and perceptions – specifically as they relate to farmers. When providers more effectively target the problems of this segment, their offerings will also address the problems of other rural customer segments adjacent to or above them. This approach also enables DFS providers to invest in offerings with a compelling value proposition for a much larger percentage of a market for financial services that is sizeable but unsaturated.

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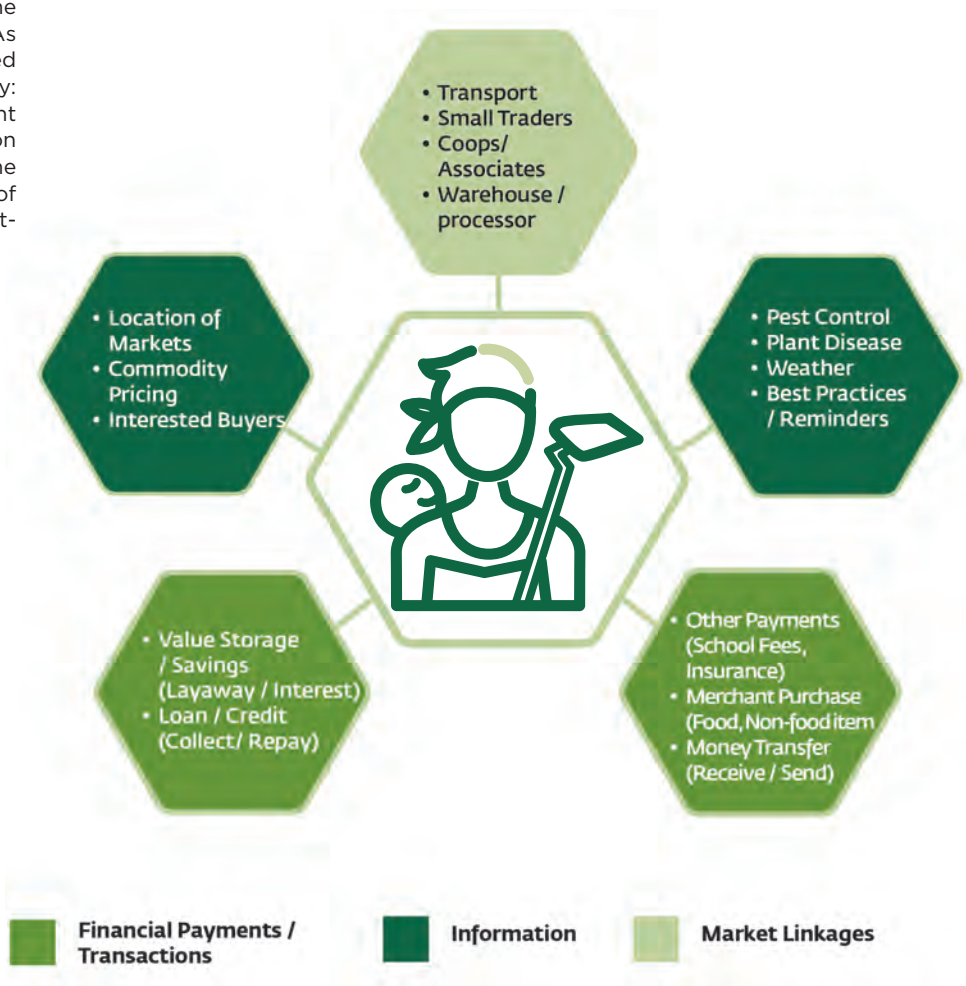
[164] De Bruijn, M.E., I.C. Butter, A.S. Fall. An ethnographic study on mobile money attitudes, perceptions and usages in Cameroon, Congo DRC, Senegal and Zambia. IFC, 2017. (https://www.ifc.org/wps/wcm/connect/98d5d3a6-a2a9-4c35-88fa-770d9ec5bc87/Final+Report+Ethnographic+Study+on+Mobile+Money_December+2017.pdf?MOD=AJPERES)

## Common 'Access To' Problems Facing Farmers

This subsection introduces problems facing farmers across production cycles and value chain composition and organization. One common theme – insufficient access – unites them. As Figure 8 illustrates, they can be grouped into specific categories, namely: information, financial or payment instruments, inputs/agri-production services, and market linkages. The exact number, nature, and cause of these problems are, of course, context-dependent and can vary.

*Figure 8: Illustrative "Access To" Problems among Smallholder Farmers*



***Information:*** This includes content related to weather, soil, crops, or the application of inputs such as fertilizer, pesticides, or herbicides. Reliable sources are often limited, or the market is saturated with less credible sources that create confusion. Current distribution methods (i.e. agri-extension officers, local cooperatives and associations, radio) may not provide for delivery of information to enough people, often enough, or with sufficient detail. Farmer sensitivity around timing is also quite high as they often need to take quick action. Finally, many requests are highly context-specific and often require adequate time to process the need and provide guidance.

***Financial or Payment Instruments:*** This includes working and investment capital, with funds allocated to a range of uses, including: production, storage, on-farm processing, transport, and trade. Qualifying is arduous relative to willingness to comply and ability to afford. Financing terms are not well-aligned to many smallholder farmers' ability to pay given the unpredictability of agri-production cycles. As a result, many farmers rely on informal sources of credit or lending to cover capital shortfalls – be it family, input suppliers, buyers/traders, or money lender. Receiving and using cash disbursements from formal channels to make payments can come with considerable risk to the recipient given the physical collection and movement requirements that is done either on foot or via public transportation.

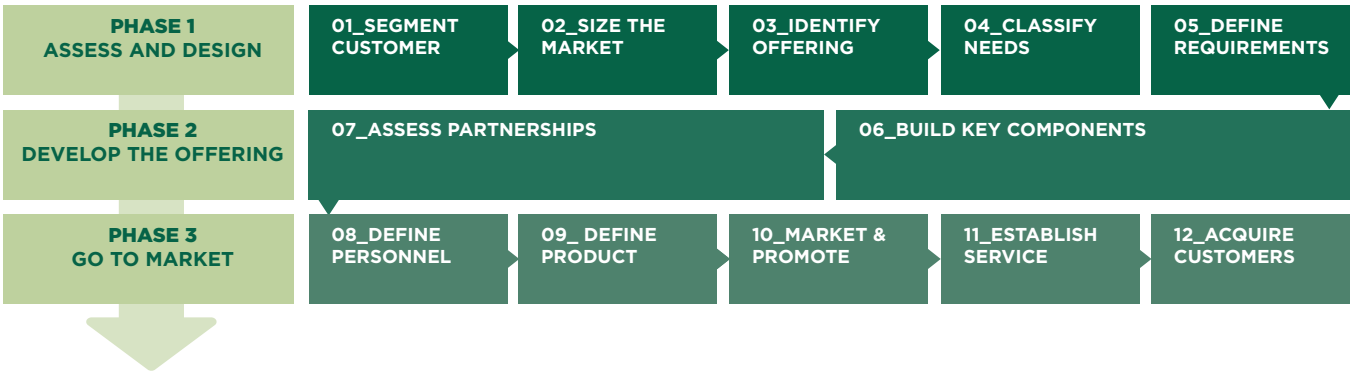
***Inputs/Agri-Production Services:*** This includes a range of inputs and services from seeds and fertilizers to pesticides, herbicides, tools, or mechanized equipment. Farmers typically lack an awareness of which inputs to buy, how much to buy, and where to reliably source them. They similarly lack an awareness or ability to afford agri-production services such as tilling, planting, irrigation, or reaping equipment. These dynamics combine to heavily restrict access to quality inputs, the appropriate amounts, or equipment that could enhance production capacity and quality.

***Market Linkages:*** This includes the locations of different trading centers, knowledge of specific buyers, and available transportation to move commodities and people to and from these markets. Farmers have low awareness of the number and location of trading centers in their immediate geographic area. They typically interact with markets through a single intermediary and have poor to non-existent contacts with larger, formal buyers. Farmers also face difficulties securing adequate and timely transport for their harvest.

## Building a DFS offerring

The following section approaches the topic of building a DFS offering for agriculture in three phases: 1) Assess and Design, 2) Develop the Offering, and 3) Go To Market. It adopts a problem-solving orientation focused on farmers to provide adequate context to discuss development offering. From the farmer level, the section then moves out to consider other agri-value chain actors as well as broader issues of overall value chain structure and organization.

*Figure 9: DFS Offering for Agriculture Development Phases and Steps*




PHASE 1

## Assess and Design

This initial stage should result in a set of preliminary service requirements based on a market sizing activity that results in a target market estimate. This should be followed by tailored market research that seeks to better understand perceptions, preferences, and patterns of behavior of total available market (TAM) segments, as they relate to the consumption of information, energy, mobile technology, financial services, agricultural production, and other revenue generating activities. It can be supplemented with other business intelligence gathering to put these patterns into a broader context and identify where the dominant market linkages and key transaction relationships exist. It is recommended to use a hybrid approach when collecting market information that combines qualitative human-centered design (HCD) techniques focused on extended customer observation with quantitative techniques such as survey questionnaires administered to a much larger population sample. HCD techniques are effective at generating depth of insight but, because fewer customers are engaged, the added use of surveys lends greater statistical weight to the market research. This can strengthen the direction and focus of the design process by helping to guard against making broad assumptions about target customer segments from a narrow yet detailed set of qualitative insights.

Together, these activities should surface a suite of viable service offerings that address identifiable market problems or gaps, clearly defined customer segments, an outline of basic technology needs, and viable channels to distribute and promote the offering.

# STEP 1:
*Segmenting Customers*

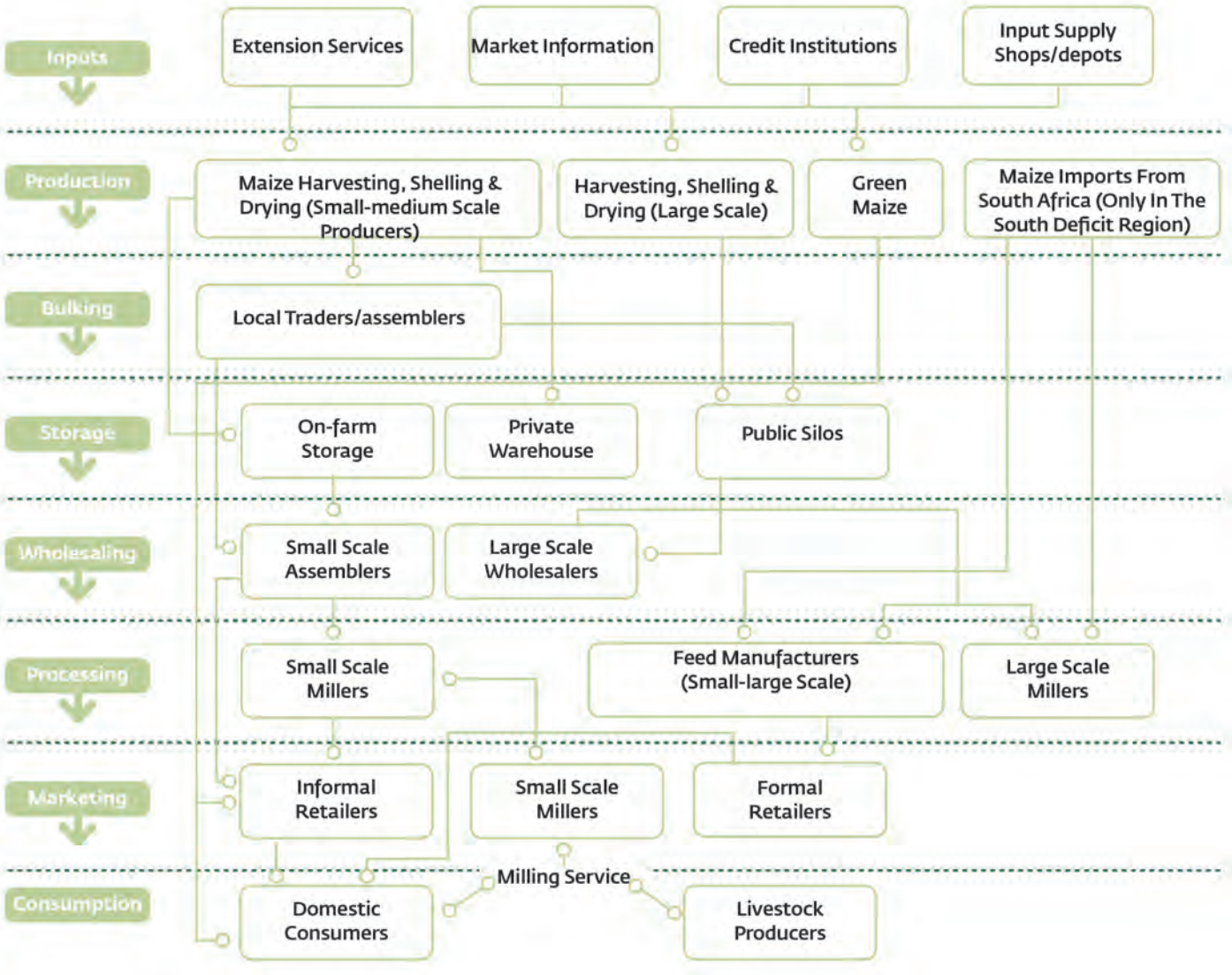
## Segmentation in an Agri-Value Chain Context

Customer segmentation is a well-established practice of dividing customers into groups based on similar characteristics. Customers can be segmented by age, income and gender, or by economic, psychometric, or behavioral patterns. Effective segmentation is relevant at each stage of the DFS offering development process. With a deeper, more accurate understanding of potential customers, providers can make design decisions around product features and functionality that are more aligned with market needs. Providers can also better assess the feasibility of different pricing options and more effectively validate marketing, acquisition, and promotional tactics. Segmentation is also relevant for service network design as it can inform where and how many locations are needed and whether or not the use of intermediaries would be acceptable to target customers.

The process of segmentation through desk review can be difficult depending on the availability and quality of secondary information, especially in emerging markets and particularly within the agriculture sector. To develop more accurate segments, primary research may be necessary. This can and should take the form of a mixed-method approach that combines quantitative and qualitative collection tools. Specific activities would include surveys, focus groups, in-depth interviews, and market observations. Additionally, providers should engage government ministries, NGOs, or other apex associations within the agriculture sector. For offerings focused on agriculture, market sizing begins with a preliminary value chain assessment whereby players, activities, and relationships are identified – from the production and distribution of agri-inputs and related services, to commodity production to bringing commodities to market. The process of value chain mapping in agriculture is well established and further reading can be found in the Tool 1 (page 191).

Figure 10 is a value chain diagram for maize in Zimbabwe. On the left-hand side, the downward arrows correspond to relevant stages in the production cycle for maize, which begins with the provision and purchasing of inputs and continues through on-farm production and into post-production activities related to sourcing, processing, and distributing maize. Moving to the right, the boxes identify key actors (i.e. credit institutions, producers, millers) or activities (i.e. extension services, harvesting, shelling, and drying), which are located on the map according to when they happen along the production cycle.

*Figure 10: Agri-Value Chain Mapping Maize in Zimbabwe*




*Source: research gate*

*Table 4: Key Criteria in Defining Smallholder Households*

| Key Criteria | Considerations |
|---|---|
| *Market orientation* | *Subsistence vs. market-oriented vs. hybrid* |
| *Landholding size* | *Threshold* |
| *Labor input* | *Family vs. hired* |
| *Income* | *Shared income from farming, multiple sources* |
| *Farming system* | *Technology, irrigation* |
| *Farm management responsibility* | *Owner, influence over how to farm* |
| *Capacity* | *Storage, management, administration* |
| *Legal aspect* | *Formal vs. informal* |
| *Level of organization* | *Member of group–producer, supply chain, services provider* |

*Source: Segmentation of Smallholder Households, CGAP 2013*

With respect to segmenting farmers, CGAP has proposed a set of criteria for defining smallholder farming households as 'households that farm on plot sizes of less than 1 hectare'. As shown in Table 4, this framework includes a range of financial, production, and transactional criteria and it has become widely accepted approach.

However, this framework is best suited to broad, sector-wide assessments. DFS providers must instead respond to needs, patterns, and capabilities tied to actors within specific value chains. Different types of segmentation can be used in different contexts. Through initial research and analysis, DFS providers can better understand which characteristics are most useful in developing a segmentation approach based on the agri-value chains that are prioritized. Note that finding full information on the number of farmers or actors in each segment may be difficult. Multiple data sources may be required, as well as making some initial assumptions to be tested later in the offering development phase.43

Farmer customer segments can be built on a range of descriptive characteristics, such as: size of population, gender, size of land holding, income, source of inputs, use of other inputs (labor, machinery), use of irrigation, access to markets and any other relevant information about farm activity. Farmers in each segment will also use financial services in different ways and have different needs and constraints to access.

In the Tools 4 (page 215) we identify 17 characteristics to support farmer segmentation. Further, we include a matrix for populating information gleaned from market intelligence to assist with the value chain assessment. Developing an analysis of the current usage and barriers access will prepare the building blocks for future product development. It will also help ensure that new products address existing constraints and turn pain points into value propositions. Using Zimbabwe as an example, Table 5 below provides an illustrative segmentation of farmers in the maize value chain to demonstrate differences in attributes, patterns, and needs that draws on many of the characteristics defined in the Tools section.

*Table 5: Illustrative Farmer Segmentation Maize Value Chain / Zimbabwe*

| Type of Farmer | Subsistence growing / less organized | More Cash Crops than Staple / In Transition | Commercial growing / highly organized |
|---|---|---|---|
| ***Population Estimate*** | *500,000* | *4,000,000* | *100,000* |
| ***Gender*** | *Mostly female* | *Mix of male / female, but majority male* | *Mostly male* |
| ***Landholding*** | *< 1 ha* | *1 – 7 ha* | *>7 ha* |
| ***Yield expectations*** | *1mt/ha* | *1-3 mt/ha* | *Up to 5mt/ha* |
| ***Crop/Livestock mix*** | *Mix of plants (cereals and vegetables) and livestock, any excess is sold at local markets; may also have a small number of trees (coffee, cocoa, fruit)* | *At least one or two cash crops exclusively for selling, other plants (cereals, and vegetables) and livestock for subsistence* | *One or multiple plants or livestock exclusively for selling; limited or no subsistence production* |
| ***Use of inputs, (seeds, fertilizer, irrigation)*** | *Non-irrigated. Recycles seeds and applies minimum chemical fertilizers* | *Non-irrigated land. Purchases some inputs, although not optimal amounts of fertilizer* | *Irrigated land, uses optimal mix of fertilizers for maximum yield*<br>*Owns own transportation and drying and milling facilities* |
| ***Labor*** | *Family labor only* | *Light use of paid local labor* | *Consistent use of hired labor (seasonal or full-time staff)* |
| ***Farming Practices*** | *Manual only* | *Manual, some tool use to till, plant, irrigate, harvest* | *Consistent use of tools and equipment to till, plant, irrigate, harvest* |
| ***Farm Management*** | *No on-site storage or record-keeping* | *Some on-site storage and record-keeping, storage capacity is small* | *Larger on-site storage and formal record-keeping standards are applied* |
| ***Income Sources*** | *Crops or livestock sales only if there is excess, hiring out labor, limited micro-enterprise activities* | *Consistent harvest selling, trading/other micro-enterprise activities, hiring out of labor* | *Agri-production is the dominant if not sole source of income* |
| ***Memberships in Local Organizations*** | *Limited to non-existent* | *Participation rates may be high but organizations may lack continuity, maturity, etc.* | *Provided membership is more advantageous than direct contracting with buyers, participation rates are high* |
| ***Access to markets*** | *Do not access formal markets, limited side-selling at local markets (open-air)* | *Sells maize to government aggregators for fixed price* | *Aggregates from smallholders and processes and sells to large scale food processors* |
| ***Access to finance*** | *Do not access formal financial institutions.*<br>*Do not have a bank account*<br>*Do not have a mobile wallet* | *Borrow informally for inputs.*<br>*Do not have a bank account and do not qualify for credit facilities.*<br>*Use mobile wallet for merchant payments, money transfer, and cashing-out at agents* | *Borrow from banks*<br>*Pay buyers and receives payments through formal channels*<br>*No constraints to access* |
| ***Access to digital technology (mobile, TV, POS terminal, ATM computer)*** | *Restricted and exclusively via mobile.*<br>*Handset usage primarily for voice services.*<br>*Small percent of direct handset ownership or registered SIMs* | *Prevalent and exclusively via mobile.*<br>*Mix of voice and data service consumption*<br>*Greater percent of device ownership and SIM registration* | *Higher incidence of more sophisticated feature phones and smartphones.*<br>*Strong data usage, mostly via mobile internet* |

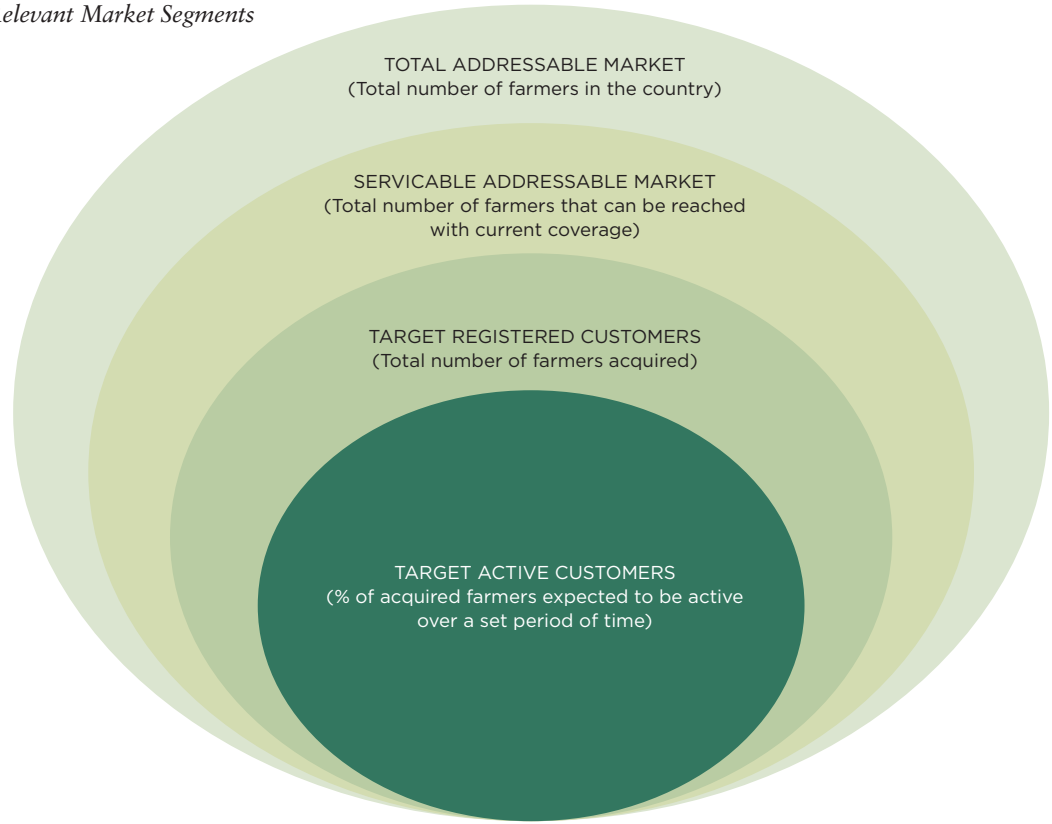
This segmentation approach should then be applied to other actors identified in the value chain assessment. Those actors could include traders, warehouse managers, millers or processors.

# STEP 2:
*Sizing the Market*

## Calculating Values Associated with a Farmer-Customer Segment

At this stage, enough information has been collected to generate preliminary estimates regarding the potential demand for a specific service or product. Four estimates are typically calculated: 1) The Total Addressable Market, 2) Serviceable Addressable Market (SAM), 3) Target Registered Users and 4) Target Active Users.

*Figure 11: Calculating Relevant Market Segments*



As Figure 11 illustrates, each calculation is based on a defined population size. The TAM relies on an estimate of the total number of farmers in a given country and provides a quantitative valuation of potential revenue and return on investment for a specific product or service. This calculation also supports the development of different business cases and helps providers prioritize when considering a range of potentially feasible services or products.

The SAM is a subset of the TAM. It is dependent on the current competitive environment as well as the distribution and reach of the provider that wants to launch a DFS offering. This calculation relies on an estimate of the total number of farmers the provider could reach given its current service coverage. The SAM represents a best-case scenario for market penetration for a particular service or product. The SAM too may change over time as the provider expands its service coverage through proprietary service points or partnerships with intermediaries that have an operational footprint in geographies where the provider is absent.

Two smaller subsets within the SAM are target registered customers and target active customers. These calculations rely on estimates of realistic penetration and usage rates, which are expected to grow over time towards the SAM. These additional calculations are done, in part, so that KPIs are identified and defined with sufficient precision to drive the acquisition of quality customers or users, which are more likely to exhibit greater total lifetime value to the provider. Scenario analysis and projection planning can be used to model out different growth trajectories, and their impact on revenue.

TAM is calculated by multiplying the total population of farmers by a second figure tied to values associated with a specific product, such as payments, credit, and insurance. Given that farmers produce more than plant-based crops, we have also included three types of agricultural commodities in the Tool 1 (page 191) 1) plant-based (i.e. cereals, perennial tree-based, and perishables), 2) dairy, and 3) livestock. The calculations that appear below are specific to the maize value chain in Zimbabwe.

To estimate the TAM for different products, there are several linear calculations that could be made. Payments are typically the easiest to find quality data and to calculate size for. From this estimate, additional estimates can be extrapolated for credit and insurance. Estimates for savings are more difficult to quantify as there are fewer data sets from which to draw. Depending on findings from desk and market research into farmer consumption patterns and sales of agri-related products and services, the TAM for input payments or credit could serve as appropriate proxies.

### Payments

TAM calculations can be made for four major types of payments:

1. Farmers buying inputs
2. Last-mile aggregators buying outputs
3. Wholesalers buying outputs
4. Consumers buying outputs from retailers or distributors

1

***Farmers buying inputs:***

These are P2B payments that include farmers purchasing inputs from input suppliers, such as seed and fertilizer in the case of maize. For other value chains, it may also include veterinary services and supplies, seedlings, pesticides and other required inputs, depending on what's appropriate for the value chain. The case of maize is fairly straight forward as it is just two inputs, seed and fertilizer, typically purchased from the same input dealer or stockist. In this example, the TAM can be calculated using the following calculation:

- Total payments size from farmers to input suppliers =
- Number of bags of seed per hectare X average cost of seed bags +
- Number of bags of fertilizer per hectare X
- Average number of bags of fertilizer X
- Total number of hectares under production

2

***Last-mile aggregators buying outputs:***

These are B2P payments that occur at the farm gate or designated rural collection points. Depending on the value chain, these buyers may include cooperatives, associations, farmer groups, or independent traders. In this example, we have assumed a simple model of last-mile aggregators that purchase wet maize from farmers at the farmgate:

- Total payments size from buyers to farmers =
- Average price of maize per ton X
- Number of hectares under production

3

***Wholesalers buying outputs:***

These B2B payments can be made by processors, millers, transporters, traders, wholesalers and others that purchase and add value at various stages of the value chain. Depending on the commodity, these value-added activities may include drying, storing, processing, exporting, and retail distribution. These value-adding roles can also be done by a variety of actors from independent businesspersons and large or small companies, to agri-cooperatives, farmer associations or NGOs. Furthermore, there may be multiple layers of wholesale buying, selling, and value additions that farm outputs go through before they reach the retail consumer.

In the context of the maize example it is usually sold by the bulkers to larger traders or directly to millers, who then process and package for retail sales. The amount of payments is the total sum of all of these payments, even if the same ton of maize changes hand through multiple actors.

- Total size of B2B payments =
- Number of wholesalers X
- Price per ton paid by wholesalers + number of processors X
- Price per ton paid by processors + number of grocers X
- Price per ton paid by grocers

4

***Consumers buying from grocers/ retailers:***

These are P2B payments and the last and final time the goods are bought and sold before they are consumed. At this point, outputs are packaged and sold in smaller quantities at grocers or small food shops in rural areas.

- The total size of consumer payments =
- Total number of kg sold X
- retail price per kg

To arrive at the aggregated TAM for payments, add the totals from 1 to 4.

## Credit

There are two types of demand for credit. There is demand from farmers to borrow for inputs, and there may also be business demand for working capital. The payments calculations above can be used in the same manner to estimate the demand for credit. For example, the size of payments from farmers to input suppliers is also equally representative of the potential demand for farmer credit. Similarly, the size of payments from buyers, bulkists, traders, wholesalers and processors is also representative of the maximum demand for farm business working capital.

1

***Farmer credit:***

The total demand for credit is equal to the total P2B payments from farmers to input suppliers:

- Total farmer credit demand = Total size payments from farmers to input suppliers =
- Number of bags of seed per hectare X
- Average cost of seed bags + the number of bags of fertilizer per hectare X
- Average number of bags of fertilizer X
- Total number of hectares under production

2

***Buyer/trader credit:***

The total demand for credit is equal to all of the payments to the farmers (B2P), and between businesses (B2B) within the value chain:

- Total buyer working capital =
- Total size payments by buyers to farmers + the total size of B2B payments =
- Average price of maize per ton X the number of hectares under production +
- Number of wholesalers X price per ton paid by wholesalers +
- Number of processors X price per ton paid by processors +
- Number of grocers X price per ton paid by grocers

To estimate the total demand for credit, farmer credit for inputs and business credit for working capital can be added together to achieve the TAM for Credit.

### Insurance

Insurance products are typically structured to insure either the cost of inputs invested or future potential losses from low (or no) crop outputs. Insurance products covering only the cost of inputs are much smaller in size, although typically more affordable. Insurance products that cover potential losses tend to be much larger policies, which carry greater risk and higher premiums.

Similar to credit calculations, the initial payments calculations can also be used to estimate the size of the TAM for insurance.

1

***Input insurance:***

The total cost of inputs invested by farmers

- Total input insurance demand = Total size of payments from farmers to input suppliers =
- Number of bags of seed per hectare X average cost of seed bags +
- Number of bags of fertilizer per hectare X the average number of bags of fertilizer X
- Total number of hectares under production

2

***Output insurance:***

The total potential revenue for farmers

- Total output insurance demand = Total size of payments by buyers to farmers =
- Average price of maize per ton X the number of hectares under production

Since farmers are unlikely to buy both input and output insurance, the two are not added together in the same way for payments and credit market estimates. The TAM for insurance is the larger of the two, which will be the total output insurance demand.

# 3 STEP 3: *Identify Offering*

*Figure 12: Farmer Information or Financial Services Needs During On-Farm Production*


## Building Out from Production Cycles and Farmer Journeys

This subsection presents a methodology for selecting services and defining customer segments that employs a holistic, value chain approach. The financial and non-financial needs and activity patterns of farmers are shaped by the production cycles of the commodities most valuable to them. By understanding the different types of activities along with a sense of sequencing and frequency, DFS providers can more easily identify relevant services to include in a potential bundled offering. Identifying and documenting these patterns can also inform initial design conversations around basic parameters for the terms, conditions, and features of specific products.

As first introduced in Section 2, Figure 12 illustrates the production cycle for cereal crops. It also proposes specific farmer needs or activities related to the consumption of information or financial services during the on-farm production stage. In the Tools section, there is a tool for readers to help jump start the process of defining production cycles using the five categories presented earlier in the handbook.

In some markets in Sub-Saharan Africa, certain information regarding specific production cycles may already exist. Provided the content can be vetted for quality of sources, methods, and analysis, several secondary sources may be utilized, such as: government ministries or departments (i.e. agriculture, national statistics office, trade and development), sector associations, donor or multilateral organizations (e.g. UN's Food and Agriculture Organization or FAO), and NGOs. In many cases, these sources will serve as useful starting points and help narrow the gaps that providers would have to fill through primary source collection. Additional collection can then take the form of quantitative surveys or more user-centered, qualitative methods such as in-depth interviews, focus groups, market observation, or customer "shadowing".

It is worth noting here that the design of primary source collection exercises should support the development of customer segment profiles that provide visibility into patterns related not only to agri-production but also to other activities where there is a financial or transaction element, such as education, health, energy, housing, transportation, or basic consumption (food, household items). This will enhance overall market intelligence regarding the nature of a farmer's transaction relationships outside of agriculture and may make certain services more or less relevant.

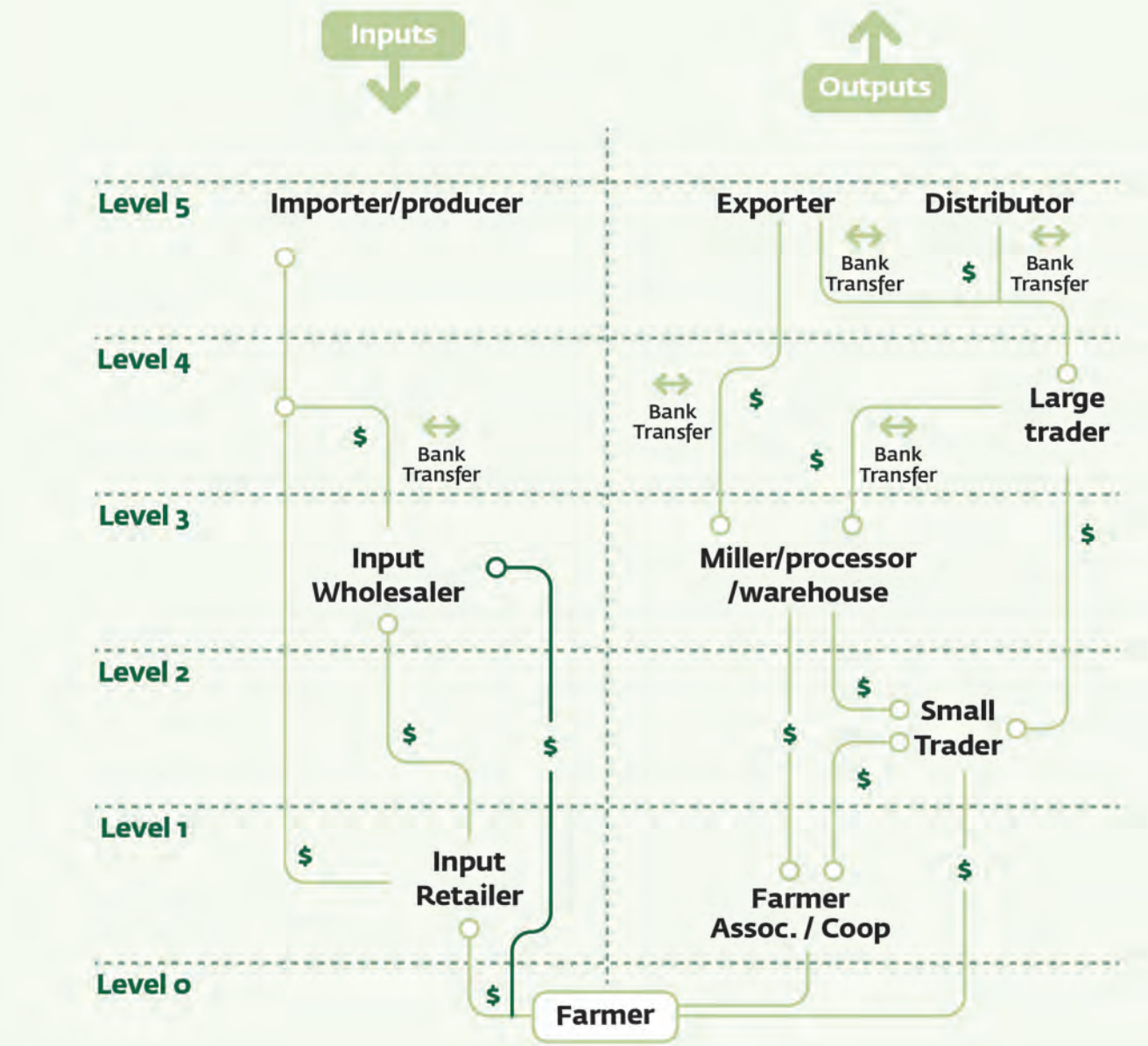
# 4 STEP 4: *Classifying DFS Needs:*

## Seeing the Entire Value Chain

Moving beyond an initial assessment of production cycles with a farmer-centric view of relevant activity patterns, providers will need to account for additional agri-value chain actors that may exhibit overlapping or divergent needs vis-a-vis a DFS offering. Incorporating the interplay of needs and transaction patterns among different actors will further aid the service bundle selection process. It may also impact what parameters a provider chooses to apply when calculating its addressable and target markets. Finally, this kind of holistic approach can help providers refine their go-to-market strategies and tactics as they will have more information regarding how to acquire customers, how to position and promote their offerings, and which distribution channels leverage existing relationships and established transaction dynamics.

Drawing on another visual originally introduced in Section 2 that focused on identifying different drivers that likely influence DFS needs within an indicative agri-value chain, Figure 13 presents categories of DFS needs. It also proposes specific examples of what those needs might be, depending on where an actor fits within the broader value chain.

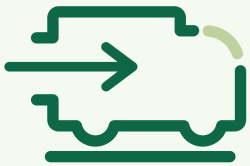
*Figure 13: Illustrative DFS Needs According to Actors at Different Agri-Value Chain Levels*



| | *Savings* | *Finance* | *Insurance* | *Payments* | *Transfer* |
|---|---|---|---|---|---|
| **Level 5** | • *Adequately served by market* | • *Adequately served by market* | • *Adequately served by market* | • *Bulk payment (B2B)*<br>• *Bulk payment collection (B2B)*<br>• *Bill payment (B2G)* | *Send/Receive (large amounts)* |
| **Level 4** | • *Adequately served by market* | • *Inventory*<br>• *Transport* | • *Adequately served by market* | • *Bulk payment (P2B/B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | *Send/Receive (large amounts)* |
| **Level 3** | • *Interest* | • *Transport*<br>• *Inventory*<br>• *Equipment* | • *Equipment*<br>• *Inventory*<br>• *Health*<br>• *Funeral* | • *Bulk payment (B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | *Send/Receive (large amounts)* |
| **Level 2** | • *Interest* | • *Transport*<br>• *Inventory* | • *Inventory*<br>• *Health*<br>• *Funeral* | • *Bulk payment (B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | *Send/Receive (smaller amounts, personal use)* |
| **Level 1** | • *Interest Group* | • *Inventory* | • *Equipment*<br>• *Transport*<br>• *Inventory*<br>• *Health*<br>• *Funeral* | • *Bulk payment (B2P)*<br>• *Bulk payment collection (B2B)*<br>• *Bill payment (D2G/P2G/B2G)* | *Send/Receive (smaller amounts, personal use)* |
| **Level 0** | • *Layaway Interest Group* | • *Harvest* | • *Crop*<br>• *Weather*<br>• *Health*<br>• *Funeral* | • *Micro-payment (P2B)*<br>• *Payment collection (B2C)*<br>• *Bill payment (P2B)* | *Send/Receive (smaller amounts, personal use)* |

## LEVEL 0: FARMERS

This group will likely exhibit the broadest spectrum of needs, spanning financing, savings, insurance, as well as payments and money transfer. One of the strongest needs may be timely access to capital for productive use, which translates into payments for seasonal labor, inputs, some tool or equipment rental depending on production capacity, and perhaps other resource needs (e.g. water). Farmers may also lack reliable, cost-effective methods for storing, transferring, or moving with their funds. Movement with funds is likely to pose a physical security concern or risk, especially for women. Farmers are usually confronted with situations where they have physical cash that they need to move via public transport or in some other exposed way to reach home. Their interactions with other value chain actors are often restricted to those that either directly sell to or buy from them. Cash-based transactions are also likely the norm, unless an informal credit arrangement is agreed to. They may also have little visibility up the value chain and may have difficulty accessing information from multiple sources that would help inform their purchasing and selling decisions. In many cases, access to digital technology is made possible only via mobile devices, which are usually low-cost basic or feature phones.



## LEVEL 1: LAST-MILE AGGREGATORS / DISTRIBUTORS

These actors are likely to have the most direct, recurring contact with farmers. They typically operate as informal enterprises or not-for-profit organizations. In either case, their DFS needs may be more oriented toward working capital financing for equipment, inventory storage, or transport financing. Of the retailers or last-mile aggregators that are sole proprietorships, their needs may be similar to farmers in the areas of savings, payments, transfer, and insurance. For retailers especially, the presence of extended family or social networks in remote rural areas fuels an informal credit system that often disadvantages the retailer. One of the chronic challenges it poses for retailers is tracking indebted customers and collecting payments, which requires transport and typically a face-to-face transaction.

With respect to last-mile aggregators that commonly source crops from a wide geographic area, these actors may have a particular sensitivity around value storage as they must handle large volumes of cash while on the road, far from home, and often late at night. At present, most lack ways to deposit these funds in one place and recover them next day. Retailers and last-mile aggregators both transact with more formal, larger enterprises above them, where cash-based transactions dominate. Exposure to digital technology may be limited and made possible only via mobile, as with farmers. Handsets may be more sophisticated due to better access to product markets and greater disposable income. Usage may also be more consistent and diverse.

## LEVEL 2: SMALL TRADERS

Actors at this level may have a strong financing need centered on working capital to expand trading activities, often involving transport logistics. Informal sources of financing are likely well-established, widely used, and in many ways satisfactory to this group relative

to formal alternatives. Awareness of formal offerings is likely present, but the processes and conditions attached represent considerable barriers even though a much higher percentage of them may be formally registered and consistently using a range of account products for personal or professional purposes.

## LEVEL 3: MILLERS, PROCESSORS, WAREHOUSES AND INPUT WHOLESALERS

Within this group, there may be larger and more diversified financing needs that include equipment, inventory, and trade. Informal enterprises may be increasingly rare at this level, with the exception in some markets of small, highly mobile milling stations in more remote locations. Many of these actors may operate from a single, fixed location, and oversee transport logistics to ensure inventory shipments or collections are functioning smoothly. Their role in the value chain gives them visibility into actors and dynamics below and, to a certain degree, above them. This may also provide exposure to local, regional and sometimes national market trends. Transactions at this level increasingly become a mix of cash and digital. Cash is likely the only viable payment method for actors below them and for any permanent or temporary labor they employ. Wire transfers may be commonplace or a requirement for larger suppliers or buyers. Their physical location also places them in proximity to bank branch networks and are typically well-informed, consistent users of formal financial services.

## LEVEL 4: LARGE TRADERS

The strongest needs at this level may surface around financing to support infrastructure maintenance or growth, and operational expenditures associated with inventory storage and transportation. These actors are usually larger, corporate enterprises relative to those at levels 2 or 3, and many manage networks of physical sites (i.e., warehouses, processing plants). Formal banking channels are likely to be well-utilized and understood, as is exposure to and usage of digital channels (e.g. online banking, wire transfers, ATMs). Needs around payments may also be present as current options requiring cash disbursements or wire transfers during banking hours can carry considerable management costs and risks or a restricted operating window.

## LEVEL 5: IMPORTERS, PRODUCERS, EXPORTERS, DISTRIBUTORS

The majority of their needs are met by existing financial services offerings. Payments and financing are two areas where current products or services may not provide adequate coverage. With respect to payments, these needs usually involve distribution or collection in bulk from a large and geographically diverse group of farmers or enterprises. Regarding financing, their visibility into inventory, processing, or transportation coupled with enhanced methods of data collection and analytics may also create a need for a more diverse set of credit products that can be better tailored based on their operational and information capabilities.

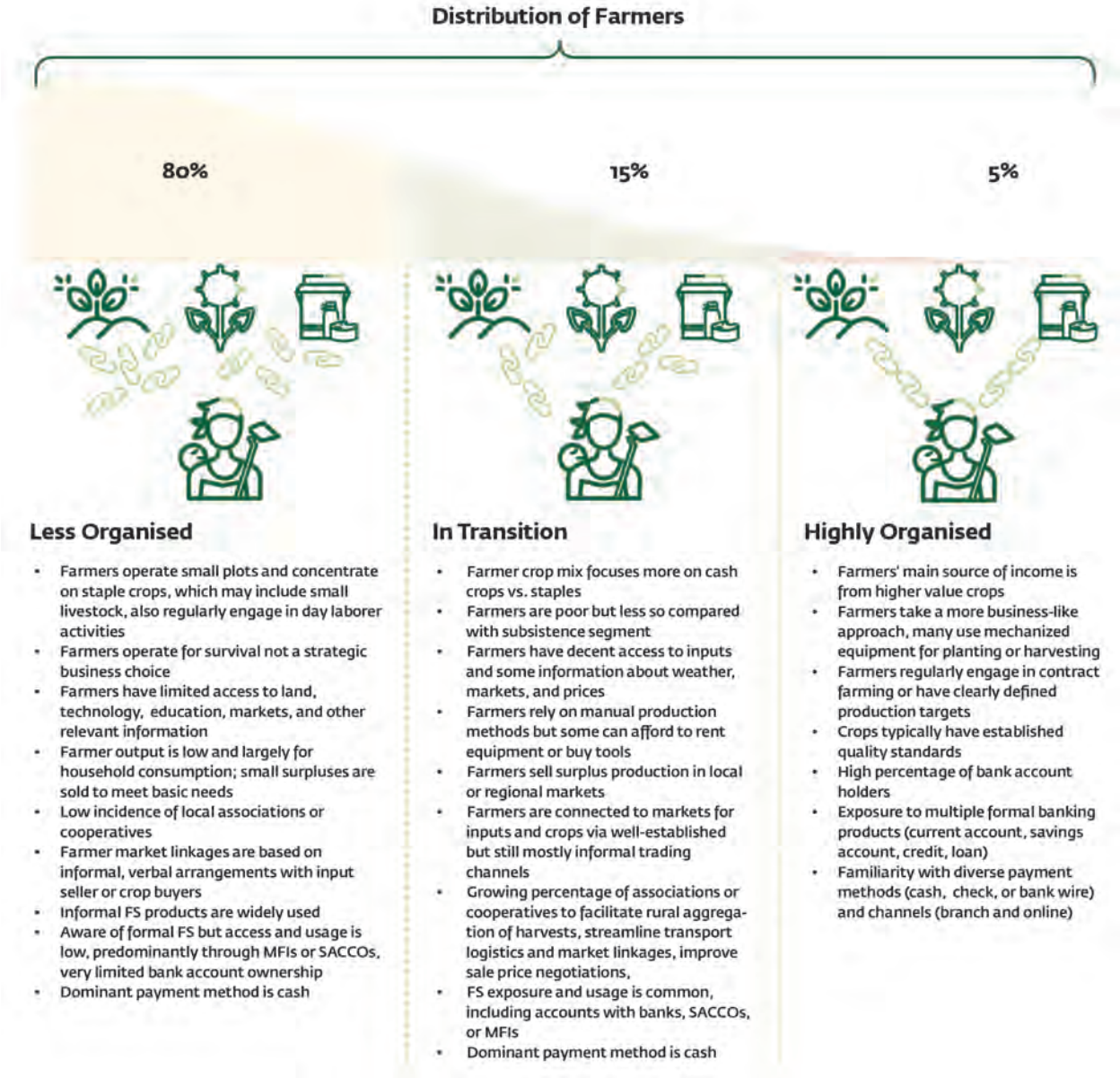
If we take a vertical view of DFS needs across actors as opposed to a horizontal view focused on specific actor levels, it is possible to tease out some preliminary observations about the concentration of DFS needs within the value chain that would require validation through additional market research. These include:

- Insurance and financing needs vary the most within the value chain.
- Savings needs are consistent across all levels, except perhaps for large corporates. But this need may be more aligned with a value storage mechanism that is discrete, secure, and reliable than it is with the need to earn interest.
- Payments needs are also consistent throughout, with a likely major difference being the requirements of specific actors around transaction volumes and velocity.
- Transfer needs, like savings needs, are broadly relevant for all non-corporate levels. And like payments, the major differentiators would likely be where, how often, and how much money is being transferred, as well as whether a given actor is predominantly sending or receiving money.

### The Relevance of Agri-Value Chain Structure on Profiles and Concentrations of Customer Demand

When applying a holistic, value-chain approach to DFS offering design and assessment in agriculture, providers should consider the chain's overall structure and degree of organization. Looking at agri-value chains this way, especially less organized chains under-served by traditional financial offerings, providers can better determine where potential customer concentration will likely be greatest. As a reminder, Figure 14 summarizes key attributes of agri-value chains organized into three categories: less organized, in transition, and highly organized.

*Figure 14: Spectrum of Smallholder Farmers Distributed According to Segments*



It is important to note that the designation "less organized" does not mean a lack of viable opportunities to deploy a DFS offering. The difficulties to date and the gaps present in less organized value chains may actually create stronger needs and more opportunities for DFS. Weak or volatile production capacity can be solved in large part with appropriate, adequate financing facilities and better, timely information. Credible, informal intermediaries may exist in many value chains and could make strong partners for service distribution and customer acquisition. In fact, it may often be the case that the largest addressable market for a DFS offering will be farmers operating within less organized value chains. Here, we put forward some potential implications for farmers and other agri-value chain actors in less organized value chains should they gain access to new DFS offerings based on agri-value chain structure:

- Opportunity to boost farmer production quantity and quality through a) financing facilities and payments mechanisms to purchase better inputs and b) reliable, timely, and new information that is localized and context-specific to improve farming practices.
- Opportunity to boost a) farmer income through financing facilities to organize transportation to reach competitive markets and b) broader information access to strengthen price awareness and more linkages to prospective buyers.
- Opportunity to affiliate input or output actors as rural distribution channels and demand aggregators through an incentive scheme tied to the use of new digital payments and financing facilities.
- Opportunities for farmers, smaller traders or processors to access micro-insurance products to better secure financing and investment facilities.


## Defining DFS Offering Requirements

Once customer segments have been identified using this value chain approach, providers can begin to put definition around specific requirements for a potential DFS offering. This subsection presents guidance around how to approach three categories of requirements: products, technology, and distribution channels.

### Selecting Products Based on Overlapping Needs and Patterns of Distinct Customer Segments

Tables 6 and 7 present a structure for organizing potential types of products by service category and customer segment. These tables are meant to function as an example and reference point to support providers as they undertake their own requirements definition. Color-coding is used to identify categories where products are likely relevant (green), where products may not be applicable (orange), and where existing products are likely being used (red). Additionally, two shades of green are used, with darker shading indicating a greater likelihood of product relevance for that customer segment. The first table relates to retail customers, specifically three sub-segments of farmers.

The second table relates to enterprise or corporate customers, which are distinguished according to the same agri-value chain levels introduced in Section 2.

*Table 6: DFS Products Relevant for Retail Customer Segments*

| Segment | Savings | Payments | Transfer | Financing | Insurance |
|---|---|---|---|---|---|
| ***Level 0 – Farmers*** | | | | | |
| ***Subsistence/Less Organized***  | • *Ad hoc value storage*<br>• *Layaway* | • *Micro-payment (P2B)*<br>• *Payment collection (B2C)*<br>• *Bill payment (P2B)* | • *Receive (micro-amounts)* | • *Yield-based micro-credit/ micro-loan* | • *Crop*<br>• *Weather*<br>• *Health*<br>• *Funeral* |
| ***More Cash than Staple Crops/in Transition***  | • *Ad hoc value storage*<br>• *Layaway; Interest-bearing* | • *Micro-payment (P2B)*<br>• *Payment collection (B2P)*<br>• *Bill payment (P2B)* | • *Receive and send* | • *Yield-based credit/loan*<br>• *Asset leasing* | • *Crop*<br>• *Weather*<br>• *Health*<br>• *Funeral* |
| ***Commercial/Highly Organized***  | • *Likely served via current formal products* | • *Payment (B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B)* | • *Receive and send (larger amounts)* | • *Yield-based credit/loan*<br>• *Asset leasing or purchase* | • *Crop*<br>• *Weather*<br>• *Health*<br>• *Funeral* |

*Table 7: DFS Products Relevant for Enterprise Customer Segments*

| Segment | Savings | Payments | Transfer | Financing | Insurance |
|---|---|---|---|---|---|
| ***Level 1 - Last- Mile Aggregators / Distributors*** | | | | | |
| ***Retailer*** | • *Ad hoc value storage*<br>• *Layaway; Interest-bearing* | • *Payment (B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | • *Receive and send* | • *Purchase order-based micro-credit/micro-loan* | • *Inventory*<br>• *Health*<br>• *Funeral* |
| ***Farmer Association/ Cooperative*** | • *Layaway*<br>• *Interest-bearing* | • *Bulk payment (B2P)*<br>• *Payment collection (B2B)*<br>• *Bill payment (B2G)* | • *Likely not applicable* | • *Yield collection- based micro-credit/micro-loan*<br>• *Asset leasing* | • *Equipment*<br>• *Transport logistics* |
| ***Level 2 - Small Traders*** | | | | | |
| *Small Trader* | • *Ad hoc value storage*<br>• *Layaway; Interest-bearing* | • *Bulk payment (P2B/ B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | • *Receive and send (larger amounts)* | • *Purchase order-based micro- credit/micro-loan*<br>• *Asset leasing*<br>• *Transport finance* | • *Inventory*<br>• *Health*<br>• *Funeral* |
| ***Level 3: Wholesalers / Millers / Processors / Warehouses*** | | | | | |
| *Wholesaler* | • *Interest-bearing* | • *Payment collection (B2B)*<br>• *Bill payment (B2B/B2G)* | • *Receive and send (larger amounts)* | • *Purchase order-based credit/loan*<br>• *Asset financing* | • *Inventory*<br>• *Health*<br>• *Funeral* |
| *Miller/Processor/ Warehouse* | • *Likely served via current formal products* | • *Bulk payment (B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | • *Receive and send (larger amounts)* | • *Purchase order-based credit/loan*<br>• *Equipment credit/loan*<br>• *Inventory credit/loan* | • *Inventory*<br>• *Equipment*<br>• *Health*<br>• *Funeral* |
| ***Level 4: Large Traders*** | | | | | |
| *Large Trader* | • *Likely served via current formal products* | • *Bulk payment (P2B/ B2B)*<br>• *Payment collection (B2B)*<br>• *Bill payment (P2B/B2G)* | • *Receive and send (larger amounts)* | • *Purchase order-based credit/loan;*<br>• *Inventory-based credit/ loan* | • *Likely served via current formal products* |
| ***Level 5: Producers, Importers, Distributors, and Exporters*** | | | | | |
| *Producer/Importer* | • *Likely served via current formal products* | • *Bulk payment collection (B2B)*<br>• *Bill payment (B2G)* | • *Likely not applicable* | • *Likely served via current formal products* | • *Likely served via current formal products* |
| *National Distributor* | • *Likely served via current formal products* | • *Bulk payment collection (B2B)*<br>• *Bill payment (B2B/B2G)* | • *Receive and send (larger amounts)* | • *Purchase order-based credit/loan*<br>• *Asset financing* | • *Inventory*<br>• *Transport*<br>• *logistics* |
| *Distributor/Exporter* | • *Likely served via current formal products* | • *Bulk payment (B2B)*<br>• *Bill payment (B2G)* | • *Likely not applicable* | • *Likely served via current formal products* | • *Likely served via current formal products* |

At this point, providers will have identified a set of product requirements based on a value chain approach that emphasizes detailed customer segmentation and thorough understanding of needs and activity patterns. To complete this first phase, providers will need to determine what technology solutions are most appropriate and which distribution channels are likely to be viable and most effective.

### Selecting the Right Technology to Deliver DFS Offerings in Agriculture

Delivering services to rural customer segments means operating in remote areas where basic infrastructure is lacking or unreliable. Finding the right technology solution "fit" requires creativity and commitment. Multiple recently published IFC handbooks should be consulted for additional detail and guidance around topics such as data management, risk management, and technology. Rather than retrace those steps, this subsection surfaces issues and topics specific to rural customer segments heavily tied to agri-value chain related activities as their primary means of earning income.

A number of DFS offerings profiled in Section 2 rely on DFS solutions that blend features and functionality that are "high-tech" with respect to back-end operations and "low-tech" with respect to front-end operations that involve the customer. On the back-end, to ensure adequate security, supervision, and monitoring capabilities, technology solutions need sophisticated functionality to aggregate, process, store, share, and display data and information to different trusted parties at different levels of authority. On the front-end, to effectively acquire, engage and serve rural customers, technology solutions have to support different ways for customers to interface with their accounts, authenticate their identities, and authorize specific operations. The user experience must also account for a more challenging environment where service disruption or interruption is more likely, and where loss of service access can translate quickly into negative perceptions and weaken trust. Additionally, overall exposure and usage of technology is likely low or restricted and human error is likely high, intended or unintended. Therefore, deploying technologies that support customer service interactions that are accessible and approachable, yet commercially and operationally viable, must be a priority for providers.

From a customer-facing perspective, any technology solution that powers a DFS offering must be configured to deliver the following functional elements:

- Account Registration
- Account Activation
- Account Access
- Account Operations
- Customer Service/Dispute Resolution

Given that DFS offerings for the agriculture sector will likely target multiple customer segments, providers will want to account for how differences in capabilities, needs, and activity patterns impact technology requirements. Table 8 proposes a schema to support discussion and documentation of services requirements based on specific technical considerations and distinct rural customer segments.

*Table 8: Illustrative Table of Technology Requirements Grouped by Customer Segment*

| Consideration | Farmer/Individual | Agri-Enterprise | Corporate |
|---|---|---|---|
| ***Mobile Network Connectivity***  | • *Operates in areas with weak or intermittent mobile signal*<br>• *Regular movements to areas with stable signal (e.g. town center)* | • *Signal reliability issues are present but not as acute as for farmers*<br>• *Activity patterns put areas with solid signal strength within easy reach* | • *Majority of operational footprint is in stable signal range* |
| ***Power Supply***  | • *Largely off-grid with limited stand-alone sources*<br>• *Some personal use of solar energy products may be present* | • *Fixed locations may be on-grid or off-grid; if off-grid, external power sources are common but not guaranteed*<br>• *If frequently on the move, power supply issues worsen* | • *Site locations are likely on-grid or adequately powered via external sources* |
| ***User-Facing Hardware***  | • *Mobile handset is dominant access point to digital technology*<br>• *Limited exposure to ATMs or payments terminals depending on mobility and location* | • *Mobile is also the dominant access point to digital technology but handsets may be more sophisticated and support mobile apps and wifi* | • *Among staff, likely presence and familiarity with a range of digital technology from mobile phones to tablets and desk/ laptops* |
| ***Software UI/UX***  | • *Literacy and numeracy rates are low; incidence of poor eyesight may be higher*<br>• *Dominant method of communicating is oral, limited requirement for visually processing text-based content* | • *Formal education rates are likely higher than among farmers*<br>• *Visual reading and comprehension requirements are also higher* | • *Formal educations rates are elevated but can vary based on staffing level*<br>• *Exposure to other digital systems and software packages, higher comfort level with text-based content* |

Given the degree of variation likely to be observed across target rural customer segments, providers will want to make sure that technical requirements have adequately addressed the following:

- ***Mobile Network Connectivity:*** The need for offline/online functionality given the location and activity patterns of different users (customers, agents, affiliated enterprises/corporates).
- ***Power Supply:*** The ability of partners, affiliates, or other key service ecosystem actors to afford and operationally manage basic power needs to ensure adequate service access.
- ***User-Facing Hardware:*** Device types and models will support efficient service delivery that are also sufficiently user-friendly.[165]
- ***Software User Interface/User Experience (UI/UX):*** How to a) balance the use of text-based and non-text content (i.e. use of visual icons or IVR), b) design intuitive account and transaction processes to streamline navigation and use, and c) maintain system security with session timeouts that do not deter or frustrate users that require prolonged account access to authenticate operations.

## Selecting Distribution Channels Appropriate for Rural Customer Segments

Agricultural communities rely heavily on informal, often face-to-face methods of accessing, sharing, and validating information – especially as it relates to new products or services. The ability to see a product in action or to speak with someone in their social network who has used it places a premium on customer outreach that engages rural customers in familiar settings or via trusted sources. This dynamic poses a number of strategic and operational challenges since it can be cost prohibitive to manage traditional brick and mortar networks in rural areas.

An earlier IFC handbook dedicated to technology takes up this topic of service distribution in detail and is a valuable resource that should be consulted. With the appropriate use of digital solutions based on well-designed technical requirements, providers can leverage new distribution channels to acquire as well as serve and respond to customers. Within the context of agricultural communities living in rural areas, the combination of digital solutions and new distribution channels creates opportunities for DFS offerings that are hi-touch yet low-tech for customers, and cost-effective, agile, and easier to operationally scale for providers.

- ***Acquire:*** Digital solutions can enable a range of agency models to support product distribution. They can range from direct employment contracts to an outsourcing model where a third party oversees agent recruitment, training and certain monitoring functions. Agents can be equipped with hardware and authorized to undertake a narrow or broad set of acquisition operations, from information collection and partial application processing to full KYC verification and account registration.
- ***Serve and Respond:*** In a rural operating environment, digital solutions and creative distribution strategies can enable providers to serve rural customers in multiple venues not only at an established rural merchant location affiliated as an agent. Other organizations with established relationships that have built trust within specific regions, such as community-based organizations (e.g. farmer cooperatives), NGOs, as well as MFIs, credit unions, and perhaps village savings and loans associations, can support with demand aggregation, customer outreach, and act as service points for selected transactions (i.e. digital deposit/withdraw, payments, or lending/repayment). This same combination of technological innovation and distribution creativity permits providers to deploy and manage more accessible and responsive customer support channels. These channels can leverage call centers, text messaging, IVR, as well as field level representatives equipped with the necessary digital tools to provide tailored in-person support content.

[165] Mobile handsets are often a default choice. However, providers are experimenting with offerings that minimize hardware requirements for the customer but also looking at a range of devices at points of service (i.e. terminal, tablet, laptop)

PHASE 2

## Develop the Offering

In this phase, providers will develop their DFS offering based on the requirements drafted during Phase 1. Much of this activity will focus on technology or back-office issues (i.e. systems configuration, software application development, hardware deployment, and other processes). There will also be a need to modify or create policies, procedures, and staffing manuals as well as to train staff with roles related to back-office, front-office or field level operations and management (i.e. Sales, Marketing, Customer Service, Finance, and Compliance).

At the end of this stage, providers should have a minimal viable product (MVP) ready for internal testing and an implementation plan for an external pilot. Providers will also have to assess whether partnerships are relevant given their resources and core competencies, which partners are needed, as well as what roles are appropriate and aligned with partner strengths.

## STEP 6:
*Build Components*

### Building Key Offering Components

To reach a level of technical and operational readiness to undertake a preliminary internal test of the DFS offering, a provider will have to develop or bring together several key components. The table below organizes relevant MVP components into four categories: 1) Product, 2) Back Office, 3) Front Office, and 4) Field Level. Each key component is further broken down into sub-components and includes a description.

*Table 9: Illustrative Table of MVP Components for DFS Offerings in Agriculture*

| Key Component | | Description |
|---|---|---|
| ***Product*** | | |
|  | ***User Interface (UI)*** | *How service content and information is visually displayed* |
|  | ***User Experience (UX)*** | *How users physically access and navigate within an account* |
|  | ***Account Parameters*** | *Activity or status limits (i.e. balance min / max, transaction value min / max, transaction frequency max) set by business rules engine* |
|  | ***Terms of Use*** | *Specifies legal obligations of relevant parties and identifies financial costs associated with product usage* |
|  | ***Primary Use Cases*** | *Operations or transactions that an ordinary user is most likely to make (i.e. balance check, money transfer, airtime purchase)* |
|  | ***Secondary Use Cases*** | *Operations or transactions that an active user is likely to make (i.e. micro-loan disbursement/ repayment, merchant purchase)* |
|  | ***Tertiary Use Cases*** | *Operations or transactions that a committed user is likely to make (i.e. bill payment for utilities, school, solar; insurance account registration and premium payments or collection)* |

| Key Component | Description |
|---|---|
| ***Back Office*** | |
| ***Financial Supervision*** | *Monitor and oversee account activity and generate reports that comply with relevant regulations and laws* |
| ***Risk Monitoring*** | *Analyze account performance for irregularities and other negative trends that might jeopardize the service* |
| ***IT/Systems Development and Management*** | *Develop, manage, and maintain all the technical components of the service* |
| ***Front Office*** | |
| ***Sales and Distribution*** | *Coordinate overall implementation and evaluation of sales performance and service expansion against defined KPIs* |
| ***Above the Line Marketing and Promotion*** | *Develop, manage, and evaluate campaigns (radio, TV, and print media)* |
| ***After-Sales Support*** | *Manage all feedback channels for customers and other service users, including content collection, storage, and analysis as well as provider response content* |
| ***Field Level*** | |
| ***Sales and Distribution*** | *Manage and lead marketing, promotion, and user acquisition activities within a specified geographic area* |
| ***Below the Line Marketing and Promotion*** | *Develop and implement campaigns predicated on direct contact with customers or other users (road shows, on-site promotions, attendance at prominent local events)* |
| ***Customer Acquisition and Service Support*** | *Conduct information collection and other application processing activities to support account registration as well as disseminate basic troubleshooting tips or respond to FAQs* |

# STEP 7:
*Assess Partnerships*

## Assessing the Need for Partnerships

Depending on the organization, external partnerships may not seem like an obvious or necessary choice. Each provider must decide whether the identified service requirements can be met in-house (either by building them directly or renting them) or through partnerships. A two-step process – the first internally facing, the second externally facing – is helpful when making this kind of assessment.

***Internal Assessment:*** A provider must first take stock of its commercial orientation, core competencies, operational footprint, and available resources to determine whether these are adequate to deliver each MVP component. Using the table of MVP components from above, providers should pose the following two key questions of its relevant departments and units:

1. Do we have the capability to deliver this component on our own?
2. What would it take for us to get this capability?

Answering these questions requires a clear understanding of current budget priorities or additional capital needs, whether existing systems and staffing are adequate, and what the timeline for independently achieving and deploying these new capabilities would be.

***External Assessment:*** Once providers have completed this first step and generated answers around what gaps exist vis-a-vis developing their MVP, these insights will help guide them through the external assessment. Providers will want to look at several criteria that span a range of topics, including but not limited to: a) leadership, b) financial solvency, c) core competencies, d) technical capacity and operational footprint, e) reputation, and f) brand alignment. There should be a compelling case for partnering externally that extends beyond filling a purely technical, operational, or management gap identified during the internal assessment.

Having completed the two-step assessment to validate the need for partnerships, providers will want to focus on role optimization so that the appropriate entity assumes responsibility for those MVP components it is best suited to develop, deliver, and manage. At a minimum, providers will want to consider the following factors:

- Cost
- Control
- Management
- Speed
- Reach
- Flexibility

Table 10 reintroduces a matrix from Section 2 that highlighted potential capabilities and needs of key actors relevant to DFS offerings in agriculture. An additional column has been added, drawing on the same offering components from above, to illustrate the roles that each of these actors might play.

*Table 10: Capabilities, Needs and Potential Roles within a DFS Offering by Actor Type*

| Actor Type | Capabilities | Needs | Potential Roles |
|---|---|---|---|
| ***Financial Service Providers*** | • *Evaluate and manage financial risk*<br>• *Provide capital (investment or working)*<br>• *Product development and delivery*<br>• *Transport and manage liquidity in urban and peri-urban areas*<br>• *Authenticate and verify personal or enterprise identity*<br>• *Process transactions at high volumes, velocity, and values* | • *New sales and distribution channels that extend reach and lower cost*<br>• *Better visibility into the production practices and economic activity of rural customer segments* | • *Back-office Financial Supervision*<br>• *Back-office Risk Monitoring*<br>• *Back-Office IT/Systems Development and Management*<br>• *Front-Office Sales and Distribution*<br>• *Front-Office After-Sales Support*<br>• *Front-Office ATL Marketing and Promotion* |
| ***Third-party Technology Providers*** | • *Source, store, or generate large quantities of digital data*<br>• *Digital operations processing for information content or financial transactions*<br>• *Remote customer service support*<br>• *Digital VAS product development and delivery* | • *Access to capital (investment or working)*<br>• *Capacity to conduct financial supervision/ oversight*<br>• *Access to existing agri-enterprise infrastructure to provide frontline sales and distributionsupport* | • *Back-office Risk Monitoring*<br>• *Back-Office IT/Systems Development and Management*<br>• *Front-Office Sales and Distribution*<br>• *Front-Office After-Sales Support*<br>• *Field-level Sales and Distribution*<br>• *Field-level Customer Acquisition and Service* |
| ***Anchor Agribusinesses*** | • *Source, store, or process inventory*<br>• *Manage rural transport logistics*<br>• *Directly engage, organize and mobilize customer groups* | • *Strengthen grower loyalty*<br>• *Grow market share*<br>• *Deepen product penetration*<br>• *Improve visibility into grower practices*<br>• *Enhance source origin validation*<br>• *Purchase crop yield more efficiently/ cost effectively* | • *Field-level Sales and Distribution*<br>• *Field-level BTL Marketing and Promotion*<br>• *Enterprise Customer* |
| ***Last-Mile Aggregators / Distributors*** | • *Physically reach rural customer base quickly and efficiently*<br>• *Directly engage, organize and mobilize customer groups*<br>• *Source information from rural customers* | • *Access to capital (investment or working)*<br>• *Digital systems and tools to strengthen information collection/management;*<br>• *Method for collecting payments;*<br>• *Technical support to adopt new practices (digital or otherwise)* | • *Field-level Sales and Distribution*<br>• *Field level Customer Acquisition and Service*<br>• *Enterprise Customer* |

Drawing in large part on observations gleaned from case study research, this handbook takes the view that partnerships are necessary and add value. However, they can introduce complexity and dilute operational or managerial control. This puts a premium on running an assessment process that yields alignment between partners around questions of why, how, and to what end the partnership exists.

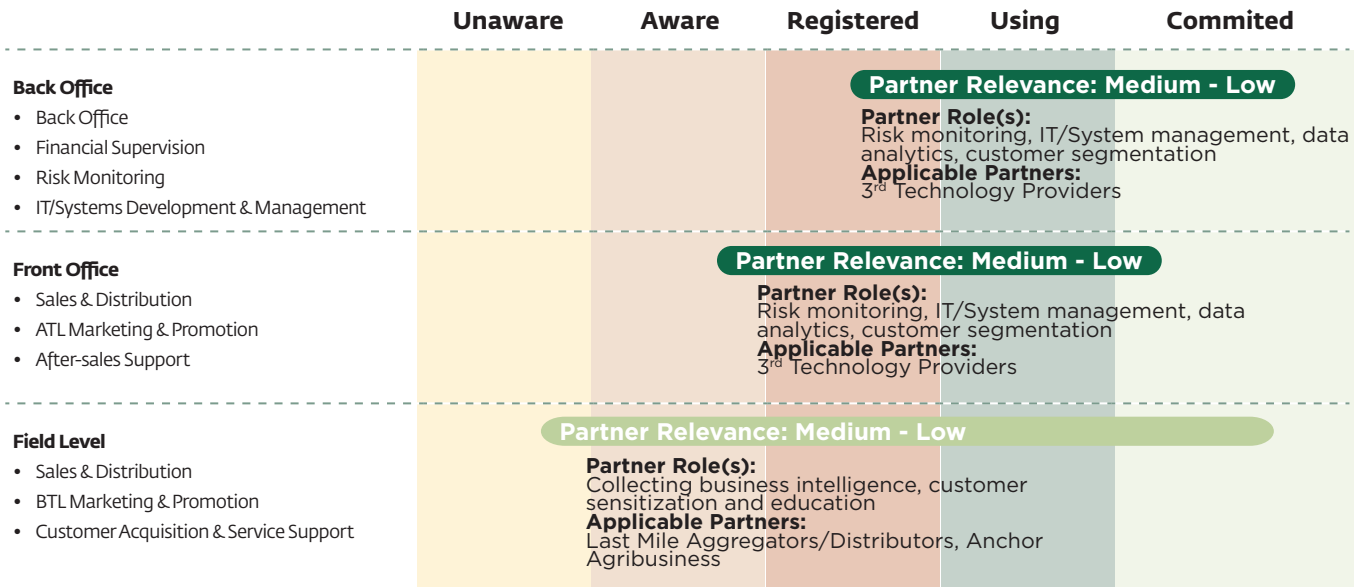
PHASE 3

## Go To Market

### Overview

With an alpha version of the DFS offering developed and a decision taken regarding partnerships, providers must now devise a strategy to commercially launch the service and acquire customers. In particular, providers will want to maintain awareness of how the roles identified above fit within the context of market launch and roll-out. To facilitate this awareness, Figure 15 arrays all the DFS offering components against a customer progression that includes the following stages: a) unaware, b) aware, c) registered, d) using, and e) committed. It also depicts when these components are most relevant along the progression and what the specific roles of the provider or partner might be. The Tool 5 (page 218) also provides a table that identifies key go to market components profiled below, i.e. personnel, product, marketing, and customer acquisition, and a check list specifically designed to support providers with training and on-going support activities for acquired agents and merchants.

*Figure 15: DFS Offering Components and External Partners Along the Customer Journey*



***Unaware:*** Customer has never heard of or seen, let alone used, a DFS offering. There may also be negative perceptions or preferences against DFS given past experiences with comparable offerings (i.e. account with a bank or unreliable mobile network coverage restricting voice service).

- » Relevant Offering Components: Field Level
- » Provider Role(s): Providing resources to design, develop, and implement ATL and BTL campaigns
- » Partner Role(s): Collecting market intelligence, identifying venues for BTL activities, developing profiles of target customer segments based on relevant activity patterns

***Aware:*** Customer may have been exposed to an ATL or BTL campaign, can recognize the DFS offering logo but has only a vague sense of the offering's value proposition or how it functions in practice.

- » Relevant Offering Components: Field Level, Front Office
- » Provider Role(s): Providing resources and managing marketing, promotional, and sales activities
- » Partner Role(s): Mobilizing/ aggregating rural demand, assigning staff to attend campaign events or activities as local ambassadors, developing profiles of target customer segments based on relevant activity patterns

***Registered:*** Customer has successfully completed the application process and s/he now has an account on the system. The account is technically active but the customer may lack either adequate knowledge or confidence to begin using the service.

- » Relevant Offering Components: Field Level, Front Office, Back Office
- » Provider Role(s): Managing staffing, systems and other resources to process and enroll customers and other service users
- » Partner Role(s): Supporting application origination and data collection, assigning staff to attend campaign events or activities as local ambassadors, mobilizing/ aggregating rural demand

***Using:*** Customer has experimented with the service, successfully accessed their account, and initiated at least one transaction or operation. Their usage pattern, however, may be weak or unpredictable and often centered on a single type of transaction (e.g. withdrawal/cash-out).

- » Relevant Offering Components: Field Level, Front Office, Back Office
- » Provider Role(s): Managing staffing, systems and other resources to stimulate service usage, monitor and supervise account activity and measure risk
- » Partner Role(s): Supporting field level after-sales engagement and outreach, assigning staff to attend campaign events or activities as local ambassadors, mobilizing/ aggregating rural demand, providing data analytics and insights on customer service usage and other activity patterns

***Committed:*** Customer usage pattern is stronger and more predictable. The type of transactions have diversified and the values or volumes may have increased.

- » Relevant Offering Components: Field Level, Front Office, Back Office
- » Provider Role(s): Managing staffing, systems and other resources to deepen and broaden service usage as well look for cross-selling opportunities
- » Partner Role(s): Provide data analysis to strengthen pattern insights as well as continue to provide frontline presence for customers at the field level

## STEP 8:
*Define Personnel*

The staffing needs required to launch and manage a DFS offering for agriculture will depend on existing investments and the capacity of relevant personnel within a given provider. If there has been no investment in DFS, a resource staffing plan should be developed that reflects the needs of a service offering with a growth mandate in peri-urban and rural areas not just urban areas. Providers will likely need to consider training and capacity building for existing personnel in key departments or units (i.e. sales and distribution, marketing/promotion, call center) and levels (i.e. head office and local/branch level). See the Tool 5 (page 218) for additional details and description.

They may also need to make new hires that bring relevant experience and skills. These could include:

- agronomy; for credit and insurance portfolio management and development
- agri-extension services; for farmer and agri-value chain partner outreach, field level sensitization and activation campaigns, and call center support and management
- rural supply chain management; for enterprise and corporate customer acquisition, enterprise payment solution sales, and overall design, management, and expansion of a rural service acceptance networks

Staffing will likely be required at three levels: head office, regional and territory or branch.

- At the head office level, a dedicated business unit is advisable, with reporting lines into the steering committee. If a call center does not already exist, it will need to be established and staffed with management that have experience with agriculture value chains.
- At the regional level, there needs to be a dedicated manager to oversee DFS performance and management. If credit, lending, and insurance are part of the service offering, this manager should also assume a coordination role with a specialized unit focused on building an agri-finance portfolio, which should be led by someone with a background in agronomy.
- At the local/branch level, a dedicated point of contact is required to coordinate multiple aspects of the DFS offering, from supervising marketing, activation, and promotional campaigns, to account enrollment processing, and frontline after-sales customer service.

Providers should also consider a project management structure that blends participation from senior leadership across several departments. A cross-functional steering committee or a sub-committee (within the DFS committee if one already exists) will need representation from finance, legal, compliance, IT, market research, marketing/promotion, and sales. This can help surface a range of potential issues or constraints that would fundamentally impact the design process or alter how targets and KPIs around service launch and expansion are managed.

## STEP 9: *Define Product*

Providers will want to allocate adequate time to sensitize and train all relevant internal personnel on more than the deployment targets specific to a given department or unit. Senior leadership should present the core service features and link those to a commercial strategy that articulates the underlying assumptions about what will drive service uptake among target rural market segments. These internal engagement sessions can also serve as opportunities to validate basic assumptions about adoption potential, in terms of projected enrollment and activity rates as well as time required to reach these targets. As those principally responsible for reaching these targets, frontline staff and management may have valuable insights and recommendations that will reinforce observations and findings from preliminary market research or identify a need to calibrate certain assumptions and targets and re-assess deployment performance targets or the underlying business case. (See the Tool 5 for additional details and description.)

## STEP 10: *Marketing*

Marketing campaigns should account for the dominant agricultural cycles within a selected region. This will support planning for ATL or BTL activities and help identify periods where access to target customer segments is greatest. Periods of high transaction activity associated with harvest selling, for example, may be better suited to highlighting a value proposition linked to receiving and making payments or to storing and safely moving about with digital value instead of cash. These cycles also create predictable gathering patterns in larger trading centers that draw populations from more remote areas, which would otherwise be costly and time consuming to reach at the village level.

With respect to ATL activities, print-based channels, especially painting building facades or the use of adhesive materials, can provide the foundation for sustained brand positioning and core messaging. Radio, and to a lesser extent TV and internet, can play a valuable supporting role that builds on the print-based campaign to develop awareness of specific service attributes or additional use cases. BTL activities should seek to leverage different relationship networks created through

agri-value chain linkages, community-driven groups, or development-driven programming. Partnerships with anchor agribusinesses or last-mile aggregators or distributors, for example, can help providers aggregate rural demand for sensitization, activation, or education campaigns.

It will be important, however, to assess to what extent these linkages are predicated on trust or necessity as some buyers (e.g. small-scale commodity traders) are viewed skeptically by farming communities and would not make for a quality partnership to do customer outreach. Identifying local champions from among the secular or religious leadership at a local level can bring credibility. Even if these champions are not ideal users of the service, investing in their awareness with an emphasis on presenting value propositions that speak to how individuals and the community at large stand to benefit, can motivate them to serve as valuable promoters and educators. NGOs and other development organizations, especially those with an extension services focus around agriculture, health, or education should be identified and considered. These programs regularly recruit officers from within the communities where they operate, which represent highly localized and trusted intermediaries that will likely remain in these communities.

Finally, marketing strategies will need to account for differences among target customer segments, agents, and merchants. Rural customer segments can exhibit strong preferences for observing products and services in practice, such as agricultural inputs or equipment. Therefore, when introducing new services that cannot be physically held or observed, DFS providers will want to use simple, direct techniques that focus on practical considerations such as how the service works and what customers should expect to pay for these services. Depending on legal and regulatory permissions, for example, DFS providers could consider service offering comparisons around key product dimensions (i.e. interest rates, transaction/service fees, geographic footprint, and locations in force). (See the Tools section for additional details and description.)

## 10B STEP 10: *Promotion*

The incentives that drive a rural customer to enroll in a DFS offering may not necessarily be the same that encourage them to broaden their activity pattern or increase the frequency of their usage. DFS providers, therefore, will want to consider three types of promotional campaigns in a rural, agricultural context, which will require tailored approaches: activation, activity, and loyalty. Those responsible for leading these different campaigns should also develop KPIs that correspond to outcome-driven and process-driven measurements. An activation drive, for example, should be measured not only by applications originated or accounts activated but also by whether the customer successfully conducted at least two or more transactions (i.e. load value, check balance, transfer funds, purchase airtime, etc.).

The provider will also want to consider the cost, value, and appropriateness of different incentive packages. Campaigns to promote activation may only require small, practical giveaways (i.e. airtime, handset accessories, t-shirts) and a lottery for a high value, aspirational prize (e.g. solar home system). Whereas incentives to diversify or deepen service usage may require time-bound discounts (e.g. preferential rate on savings, insurance, credit, or loan product) or access to additional benefits through a loyalty program (e.g. discounted rates on partner products and services offered in a cross-sell or up-sell scheme). (See the Tools section for additional details and description.)

# STEP 11:
*Establish Service*

## Service Distribution and Management

DFS providers must give adequate attention to the design, roll-out and management of their rural service networks, which may include affiliated agents and merchants. Projections regarding geographic coverage and location density for both types of locations should be modeled based on the desired mix of service usage, not simply the transaction patterns driven by the lead or dominant use case (e.g. money transfer) during the initial roll-out phase. In general, achieving commercial break-even at the individual agent level regardless of geographic location – urban, peri-urban, or rural – is a challenge. This is due largely to the costs and operational difficulties in ensuring and supervising adequate levels of physical and digital liquidity among agents. As the DFS acceptance network expands into less densely populated or more remote areas, these financial costs and management challenges will increase. Providers must, therefore, develop strategies to minimize excessive reliance on withdrawing funds from the system and incentivize rural customers to conduct a wider range of digital transactions or operations, such as merchant payments (P2B), supply chain payments (B2B), or bill payments (P2B).

DFS providers will want to identify additional indicators beyond population density and the presence of mobile telecom or energy infrastructure as primary indicators for account enrollment and service consumption estimates. These could include which agri-value chains are more prevalent in a given area, the number of farmers tied to these value chains and what other types of actors are operating at different levels. Additionally, DFS providers should assess how the transaction patterns of these actors contribute to payments flows within a given value chain, but also payments flows outside the value chain with other local or regional market actors (i.e. construction or hardware supplies, household furniture and other durable products, other FMCG products). DFS providers will need a holistic picture of local and regional transaction relationships as it will provide insights into where, how, and which type of service locations are appropriate for their offerings.

With a more informed approach to rural service network design, DFS providers must consider a roll-out strategy that provides adequate guidance and the necessary tools to acquisition teams to strike a balance between quantity and quality of agents and merchants on-boarded. The Tool 5 (page 218) proposes different categories of criteria along with sub-sets of individual criteria attributable to each. The categories are intended to reflect the spectrum of analysis that should be undertaken when conducting preliminary rounds of agent and merchant identification and selection. This includes “basic” attributes such as location, on-site infrastructure, formal registration status, etc. “Hard” attributes refer to things that can be relatively easily measured or quantified and would support projections related to potential transaction volumes and values. “Soft” attributes refer more to

qualitative aspects that will help assess both the capacity of a given location to deliver the necessary services and the degree of quality and customer care.

A rural petrol station, for example, may have a modern, well-equipped store front, active management, an on-site safe and the capacity to process high frequencies of transactions. However, the company's cash management policy may restrict access to the on-site safe by hired staff, which would limit depositing or withdrawing activities. And certain rural customer segments (e.g. women) may not view this type of location or the staff working there as a viable alternative to receiving financial or payments services. In contrast, a local drug store or pharmacy that is independently owned and operated by a woman who is well known and respected in the community may actually represent a more viable agent candidate. Despite having a less sophisticated operation and a less formalized management structure, the location is convenient to access, offers extended hours of operation, and creates the type of relationships between customer and merchant that are more nuanced than those that exist between a petrol station attendant and a customer looking to buy gas or food snacks.

As rural acquisition teams develop their pipelines of agent and merchant candidates, DFS providers will need to devise an appropriate and effective training and on-going support strategy. These activities will be essential to establishing a solid foundation for service comprehension, quality standards, and a constructive working relationship between DFS provider and an affiliated agent or merchant. As addressed in the section in the Resource Materials, DFS providers should consider issues of venue, technique, frequency, and attendance for trainings aimed at rural agents or merchants. Beyond the preliminary rounds of training, DFS providers must also be cognizant of the need to develop an on-going support package that is multi-faceted. Agents and merchants must possess general knowledge of the offering, the capacity to deliver quality service, and an ability to identify quality customers. But these rural networks may also need basic business development services (BDS), such as cash flow tracking and calculation, inventory management, etc. If offered in parallel with DFS-centric support on a recurring basis, providers can demonstrate their commitment to the performance of enterprises and organization they have affiliated and therefore the sustainability of their rural service networks. (See the Tool 5 for additional details and description.)

# 12 STEP 12: *Acquire Customers*

## Customer Acquisition and After-Sales Services

DFS providers seeking to activate rural customer accounts may choose to delegate this responsibility to an internal unit or to an external firm or select partners. Regardless of the approach, frontline personnel charged with customer engagement, application origination and account opening must demonstrate strong working knowledge of service features and be able to articulate the value proposition as it relates to a rural, agricultural context. As opposed to mass market product offerings such as airtime or FMCGs, which can be easily understood, distributed, and consumed, DFS offerings require a minimum level of awareness and education so that customers can fully utilize the service. As with rural agent or merchant acquisition, rural customer activation activities require providers to prioritize and allocate resources to frontline training regarding customer engagement tactics as well as develop performance metrics that encourage the activation of quality customers.

For example, customer activation should ideally be completed in a single encounter or within a 24-hour period. Offline capability is critical for application origination and account

processing in case of poor connectivity. If activations cannot consistently happen the same day, DFS providers will need to divide the activation process such that frontline staff remain the primary customer touch point when contact is first made and when the customer becomes active so they can guide them through different use cases. Should partners represent a viable option for customer activation, DFS providers will want to prioritize corporations, enterprises, or other organizations that have established networks of rural groups, such as agribusinesses with a sizeable interest in input distribution and/or commodity sourcing, solvent and well-managed SACCOs, or NGOs that facilitate the growth and development of grower cooperatives or associations.

Once activated, rural customers will require after-sales service, but relying on a face-to-face support channel alone is not commercially viable nor practically feasible. Partnerships can help defray some of the operating costs associated with this channel but resources would have to be allocated to ensure designated personnel are adequately trained and managed. DFS providers should therefore consider a call center with the resources, management support, and capability to play a multi-dimensional role. The call center will need to be designed to provide reactive support (i.e. addressing and logging customer queries, complaints, etc.) and proactive outreach (i.e. short check-ins at strategic points in the customer journey from newly activated to loyal user). Call center staff should also be able to both disseminate and source information. In particular, call centers can be used to generate customer feedback to assess basic indicators of DFS network performance, ranging from the enrollment experience, ease of use of the product or service, as well as perceptions related to quality of service received from agents or merchants. (See the Tool 5 for additional details and description.)

# *Partnering to Digitize Cocoa Value Chain Payments in Côte d'Ivoire*

## Background context and commercial motivation for initiative

*This case study details how a non-traditional partnership that brought together private enterprises across the agriculture, banking, and mobile telecommunications sectors led to a digital payment offering intended to improve the payments process between agri-cooperatives and their farmer members for the collection of cocoa harvests in Cote d'Ivoire. This non-traditional partnership included a global commodity producer, exporter and distributor, two financial service providers and two MNOs. The project was part of the Partnership for Financial Inclusion, sponsored by the MasterCard Foundation, and implemented by IFC over a five-year period from 2013 to 2018.*

*In Cote d'Ivoire, cocoa and coffee production contribute to 15 percent of GDP and account for nearly 40 percent of exports. Yet most of the actors in these agri-value chains, farmers especially, are underserved or overlooked by financial service providers. Only the largest actors, such as exporters, are deemed bankable.*

*As in the rest of Sub-Saharan Africa, the recent increase in financial inclusion in Cote d'Ivoire has been driven by new mobile money accounts. Cote d'Ivoire boasts 34 percent mobile money account penetration, compared with 21 percent across the continent.*[166] *This figure is the highest in West Africa, and over half the Ivorian population are a unique mobile subscriber. This suggests that mobile money services represent a viable and strong digital channel for offering payments services to recently included market segments such as farmers.*[167]

## Understanding the market and the end customer

***Researching levels of farmer access, activity, and willingness:*** *To understand the market and the end customer (the farmer), IFC and its partners first conducted market research with over 1,000 Cargill farmers. The research found that a minority of farmers had accounts either at banks or MFIs. However, mobile money accounts were much more common, with more than half of the surveyed farmers reporting using the service. Nearly half the farmers said they could reach their nearest mobile money agent on foot in under 20 minutes, and 83 percent were able to access an agent in under an hour. Mobile network coverage was reasonably good in the researched area, with 81 percent of cocoa farmers reporting good network coverage near their homes and 99 percent having access to a mobile phone.*

*Having established that basic requirements such as mobile signal coverage, handset access, registered mobile money accounts, and decent agent proximity were in place, IFC and project partners went a step further to understand farmers usage of mobile money accounts. Most farmers did not take full advantage of their mobile money accounts, using only one or two of the transactions available, with a strong focus on P2P money transfers (sending and receiving). While the most common*

[166] The Little Data Book on Financial Inclusion. The World Bank, 2018. (https://openknowledge.worldbank.org/bitstream/handle/10986/29654/LDB-FinInclusion2018.pdf?sequence=1&isAllowed=y)

[167] Country Overview: Cote d'Ivoire. GSMA. (https://www.gsmaintelligence.com/research/?file=d1553a76179408fc82301b75174bc281&download)

*place to save was at home, some farmers reported using mobile money accounts to store value. Importantly, research findings revealed that 73 percent of farmers said that they would like to be paid via mobile money, indicating demand for digital payments existed.*

***Researching Cocoa Value Chain Patterns:*** *Cocoa is a two-harvest crop that employs over 1 million people in Cote d'Ivoire. The main cocoa season is from October to January when 80 per cent of the crop is harvested. Farmers cultivating cocoa certified by companies like UTZ or Rainforest Alliance receive a premium payment once or twice per year, normally during the lean period. Premiums are awarded based on the quality of cocoa received as it is assessed at different stages during the pre-export sourcing process. In addition to cocoa harvest income, most farmers have secondary sources based on other crop selling such as yams. A simplified income calendar reflecting major revenue or expenditure events appears below.*[168]

*Illustrative Income Cycle for Cocoa Farmers*

| MONTH | ACTIVITY |
|---|---|
| OCT | MAIN COCOA HARVERST<br>80% of annual production |
| NOV | |
| DEC | |
| JAN | |
| FEB | RECEIVE AGRI INPUTS FROM OFFTAKER |
| MARCH | |
| APRIL | SECOND COCOA HARVEST<br>20% of annual production |
| MAY | |
| JUNE | |
| JULY | CERTIFIED COCOA PREMIUM PAYMENT |
| AUG | |
| SEP | INTEREST FREE LOANS BY EXPORTERS |

*As the market research showed and project partner Cargill confirmed, very few cocoa farmers digitally receive harvest sale payments or the follow-on premium payments linked to certified cocoa cultivation. While agri-cooperatives are mostly paid via cheque by exporters, farmers are paid by these cooperatives in cash. IFC estimated that total cash payments to farmers in the cocoa sector exceeds $2 billion annually. In this context, the number of payment recipients and the volume of cash payments evidence fertile ground for developing a digital payment value proposition that would resonate with multiple market players involved in payment distribution.*

### Testing solutions and assessing partnership roles

***Drawing on market research findings, IFC and Cargill elected to explore payments solutions that required additional partnerships with the following banking and mobile telecommunications institutions:*** *Société Ivorienne Banque (SIB)*[169]*, Société Générale, Orange Money and MTN Money. They also decided to pursue digitization of only the premium payments. These payments streams are smaller than those associated with major or minor harvest collections and a preliminary digitization pilot focusing on such would be less disruptive to overall payments activity within the agri-value chain.*

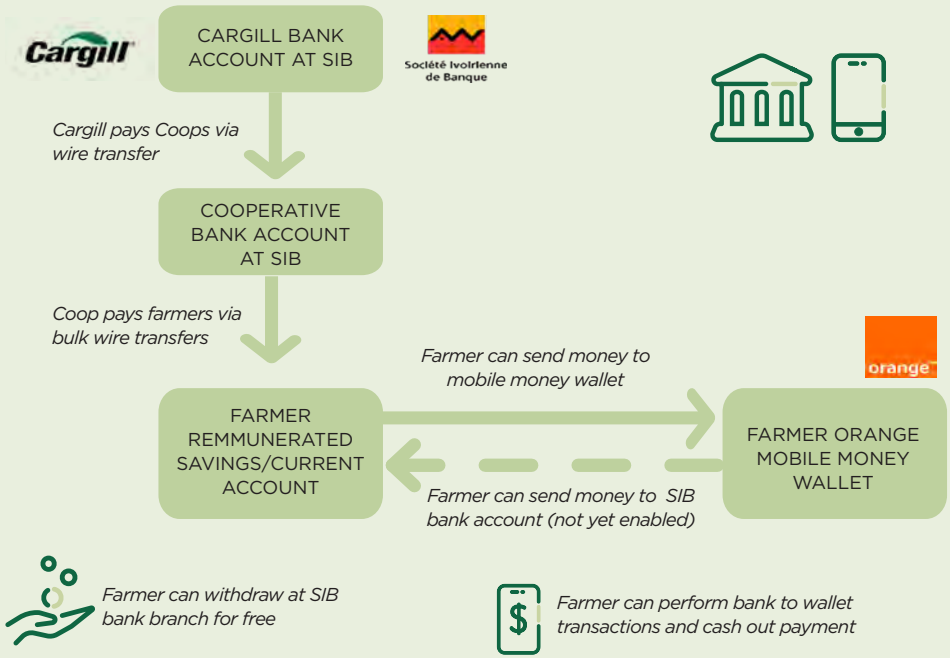
[168] Opportunities for Digital Financial Services in the Cocoa Value Chain Côte d'Ivoire, Insights from New Data, IFC 2014

[169] A subsidiary of Attijariwafa Bank

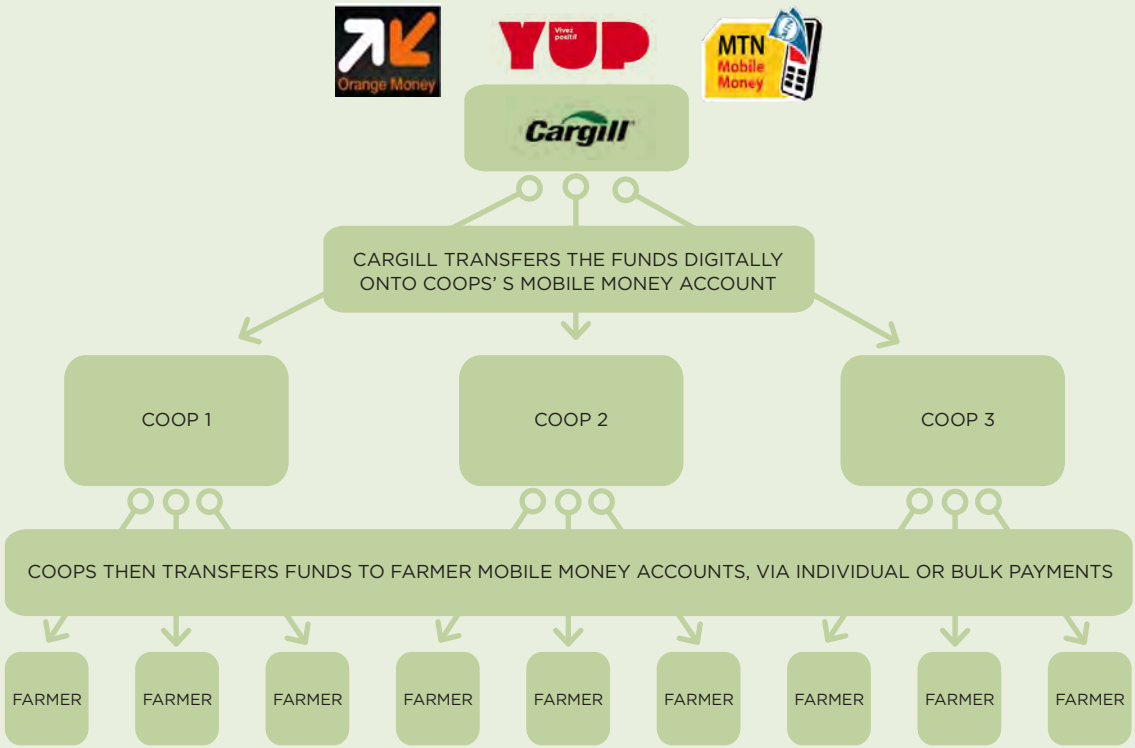
*IFC and Cargill also agreed to a two-pronged approach to allow for a comparison of digital payments models.*

- ***Model 1: Payment via bank account, with an option to push funds to a mobile money wallet:*** *In this model, Cargill engaged affiliated agri-cooperatives to open SIB corporate accounts as well as SIB retail accounts for farmer members. Once funds had been wired from Cargill to each cooperative, cooperatives would wire funds to farmer members. And additional digital dimension was added for farmers as they were on-boarded onto the Orange Money platform. This allowed farmers to push funds received into their SIB accounts to their mobile money wallets at their discretion.*
- ***Model 2: Payment via mobile money account, with individual or bulk payment options:*** *In this model, Cargill engaged three mobile money service providers – one bank managed (Société Générale's YUP product) and two MNO managed (Orange's Orange Money and MTN's MTN Money) – to assist with mobile money wallet account enrollment and activation for agri-cooperatives and farmers. These providers also managed payments processing between Cargill and affiliated agri-cooperatives, and between agri-cooperatives and farmer members. In this model, neither agri-cooperatives nor farmers were required to open a formal bank account to receive digital payments.*

*Model 1: Cargill, SIB and Orange Money*



*Model 2: Cargill, Société Générale, Orange and MTN*




*In both models, all partners had defined roles:*

- *Banks were to oversee either bank account or mobile money wallet provision as well as process payments initiated over its core banking or mobile money platform from Cargill to agri-cooperatives, or from agri-cooperatives to farmers.*
- *MNOs were to oversee mobile money wallet provision, from account registration to activation, for agri-cooperatives and farmers as well as process payments initiated over its mobile money platform from Cargill to agri-cooperatives and from agri-cooperatives to farmers.*
- *As the entity with the greatest understanding of agri-cooperative and farmer needs, Cargill was to engage both customer segments and facilitate linkages with digital payments providers as well as sensitize farmers regarding the selected digital payments offerings through its network of field inspectors, which typically supports groups of farmers with plot management and certification.*
- *IFC was to support overall project management, develop market research to understand digital payments demand, develop marketing materials to raise rural awareness, provide training through specialists when needed, and evaluate the pilots and suggest prerequisites for scale up.*

## Results and lessons learned to date

*The following table describes the results of the project. Similar pilots are being rolled out in two other markets, Burkina Faso and Mali, where agriculture represents a large percentage of GDP. In both, cotton will be the target agri-value chain.*

*Agri-Value Chain Payments Digitization Pilot: Model 1 and Model 2 Achievements*

| | PERIOD | DESCRIPTION | OBJECTIVE | ACHIEVEMENT |
|---|---|---|---|---|
| ***MODEL 1 Phase 1*** | *May 2016 - May 2017* | *Digital payments to farmers using bank to wallet.* | *1,000 farmers in 4 coops* | • *2,426 farmers with bank accounts and Orange Money accounts.*<br>• *1,172 (48%) linked bank account to mobile money wallet*<br>• *500 farmers paid $76,000*<br>• *700 farmers saved $200,000* |
| ***MODEL 1 Phase 2*** | *June 2017 - Dec 2017* | *Digital payments to farmers using bank to wallet.* | *8,500 farmers in 9 coops* | • *2,000 additional farmers with bank and mobile money wallet accounts. - Unfortunately, due to technical difficulties, no account interconnection was possible.* |
| ***MODEL 2*** | *April 2018 – to date* | *Digital payments to farmers using a mobile money wallet only* | *25,000 farmers targetted to be provided with an ewallet in 30 coops by December 2018*<br>*-MTN: 26 coops with about 20,000 farmers*<br>*-Orange: 3 coops with about 3,000 farmers*<br>*-Soc Gen: 2 coops with about 2,000 farmers* | • *MTN: 4000 farmers registered in two weeks as of June 2018*<br>*YUP: 450 farmers registered in one month as at June 2018* |

*During this multi-year project, IFC has extracted several important lessons, which appear below and will be applied as it migrates this pilot concept to other markets.*

### *Lesson 1: Develop detailed partnerships. Clarify who does what and the timeline for delivery.*

*Multiparty partnerships require seamless coordination across multiple phases of project implementation. For instance, when SIB opened accounts for farmers, Orange and MTN did not take the opportunity to engage farmers and register them for mobile money wallets due a lack of coordination. This decreased efficiency and required different providers to engage farmers multiple times. However, this type of coordination does not automatically occur when working in rural remote areas. The partnership agreement and project work plan should specify how account enrollment will proceed, at what times, and in what locations.*

### *Lesson 2: Chose a pilot geographic area with the most conducive operating environment.*

*Poor mobile network connectivity and a lack of formal documentation among farmers (more than 50 percent of the population do not have formal ID in Cote d'Ivoire) raised implementation challenges. Digital payments require reliable mobile network coverage and a population that can meet KYC requirements for bank account activation, which are typically more strict than for mobile SIM card issuance. Preliminary market research will want to confirm the status of mobile network infrastructure and the level of formal documentation. Geographic areas can then be ranked and prioritized according to where mobile network coverage and formal documentation are greatest.*

### *Lesson 3: Sensitize all partners on the benefits of digitization upfront so the value proposition is clear*

*At the beginning of each project IFC conducted workshops with each of the parties to explain the benefits of digitization. While some benefits are often more qualitative than quantitative, the table below summarizes a few of the benefits of digitizing payments:*

*Digital Payments Value Proposition based on Market Actor*

| Value Proposition | Farmer | Agri-Cooperative | Exporter | Bank | MNO |
|---|---|---|---|---|---|
| *Reduce cash transport and handling risks* | | | | | |
| *Save time and cost of collecting or distributing cash* | | | | | |
| *Improve payment transaction logistics* | | | | | |
| *Increase farmer loyalty* | | | | | |
| *New revenue streams and greater deposit mobilization* | | | | | |
| *Pathway towards financial inclusion* | | | | | |

### *Lesson 4: Business models must show where the return is and when to expect it.*

*Digitizing payments in rural areas has intrinsic added value because it creates a pathway to formal financial inclusion for unbanked farmers and other market actors. But banks and MNOs must also see an improvement in their bottom line. Therefore, the IFC team developed specific business cases for each project partner. The template below presents the business case for a bank to participate in digital payments offering by issuing retail accounts to farmers and providing digital payments services in a bank account to mobile money wallet model:*

*Bank Business Model Template: Bank to Mobile Money Wallet Payments Product*

| | Baseline | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|
| *Number of farmers in Total Addressable Market* | | | | | | |
| *Target % of SHFs* | | | | | | |
| *Target Number of Enrolled SHFs* | | | | | | |
| *Average Savings Balance* | | | | | | |
| *Average Payment Amount* | | | | | | |
| *Average Deposits/year* | | | | | | |
| *Average Withdrawals/year* | | | | | | |
| *Average B->W /year* | | | | | | |
| *Net Interest Margin* | | | | | | |
| *Transaction Fee Deposit* | | | | | | |
| *Transaction Fee Withdrawal* | | | | | | |
| *Transaction Fee B->W* | | | | | | |
| | | | | | | |
| ***Income*** | | | | | | |
| *Interest Income* | | | | | | |
| *Fee Income* | | | | | | |
| | | | | | | |
| ***Expenses*** | | | | | | |
| *Fee Expense* | | | | | | |
| | | | | | | |
| ***Net Income*** | | | | | | |

### *Lesson 5: Raise awareness on the issues related to digitization with the public sector too.*

*Cocoa is a highly regulated sector In Cote d'Ivoire. The Conseil Café Cacao (CCC) is a public entity that oversees the sector along with others, such as the Ministry of Agriculture. The CCC regulates the price of cocoa and can also intervene to impact when certification premiums are paid. This project did not spend time training government parties on the benefits of digitization. However, in countries where some commodities are extremely strategic to overall economic performance, public sector engagement must occur, preferably early on and over a sustained period until the various agencies and departments have been adequately sensitized to the role and impact of digital payments. One area where the public sector will likely need to engage with service providers is personal privacy of farmer data generated as a result of their participation in a digital payments scheme.*

### *Lesson 6: Before a full commercial roll-out, all parties must understand the prerequisites for DFS expansion*

*Once pilots have been designed and implemented, an evaluation phase is essential to define the requirements necessary for scaling the service. The next step is to make sure the parties are aware of the prerequisites needed for the scale up. The table below summarizes some of the prerequisites based on defined categories, including technology, internal organization, partner/external organization, product, and pricing.*

*DFS Expansion Prerequisites*

| Prerequisites | Description |
|---|---|
| Technology | Rapid account registration and activation via laptop or tablet |
| | Offline data collection |
| | Interconnection between mobile money and core banking platforms |
| | Ability to issue and view individual accounts at the farmer level |
| | Ability to link accounts of different types through unique database tags |
| Internal Organization Processes | Centralized team in charge of overall agri-value chain digitization |
| | Centralized management of agri-cooperative accounts |
| | Digitization primary point of contact at branch or territory level |
| | Roaming customer acquisition teams for account activation |
| | Differentiated application processing based on account types at branch level |
| | A well-equipped and adequately funded call center |
| Partner/External Organization Processes | Aggregate and organize farmer demand within selected agri-value chains |
| | Provide field level support for farmer on-boarding and account enrollment |
| | Educate and train farmers to encourage follow-on digital payments instead of cash-out following payment collection |
| | Mobile money agent network expansion plan |
| | Digital payment is requested by the commodity trader/exporter (at least part) |
| | Permanent/regular account opening mechanism within cooperatives |
| Product | Adapted product offering depending on customer type (i.e. cooperatives and farmers) |
| | Provide account activity updates and transaction activity via SMS |
| | Design products that meet farmers' needs (e.g. work with the regulator to increase regulatory thresholds on mobile money that allow for larger harvest payments) |
| Pricing | No account maintenance fees |
| | Provide remuneration for savings account |
| | Low cost channel to move funds between bank and mobile money wallet accounts (e.g. single flat rate) |

### *Lesson 7: Train rural customers to ensure adequate service awareness and product knowledge*

*While digital solutions are becoming increasingly mainstream for more and more populations in emerging markets, farmers and other rural actors may struggle to grasp the benefits of digital payments and have limited familiarity using mobile money wallets for reasons outside of money transfer. DFS initiatives must prioritize and allocate resources to building not only awareness but also product knowledge through promotional campaigns and trainings.*

### *Lesson 8: Link payments to other financial services.*

*Digital payments are only the gateway to financial inclusion. They are not substitutes for one of the most demanded services by farmers: access to credit to cover emergencies, to pay for school fees during the dry season, to buy a motorcycle or simply to acquire more land. Any project on seeking to digitize agri value chain payment flows should go hand in hand with preparing financial providers to develop customized credit and savings products to farmers.*

### *Lesson 9: Work towards creating a digital ecosystem where farmers can live digitally.*

*For digital payments to work, the farmer should be able to use their digital accounts for other purposes than receiving payments. Digitization initiatives should think about how to get farmers to pay for their children's school fees and utility bills digitally, to buy goods at local merchants through mobile money and to pay for medication at pharmacies without cash, it is only through this daily usage of digital accounts that adoption will take place.*

# SECTION 5

*Conclusion*

## Handbook Summary

While mobile money and agent banking have disrupted and transformed the financial sector in Sub-Saharan Africa over the past ten years with extraordinary impact on financial inclusion, rural households and smallholder farmers remain relatively untouched by these developments to date. This handbook suggests that the next big frontier for DFS on the continent will be in the agricultural sector. DFS offerings can effectively cater to a wide range of actors across agri-value chains – from smallholder subsistence farmers to international commodity traders. Reaching rural populations and communities remain challenging for myriad reasons. But with new technological advances and a more mature DFS industry with a range of actors, it is increasingly possible to sustainably reach these traditionally excluded market segments.

When surveying the DFS offering landscape in agriculture, two important trends emerges: bundled services and partnerships. In most of the examples profiled, multiple services are offered simultaneously or are envisioned as part of the broader service road map. There is also at least one partnership that enabled each DFS offering; whether from a purely back-office, technology systems perspective or from a front-office marketing or sales and distribution perspective. Sometimes, offerings combine a range of partnerships. The roles partners play can cover a wide range of issues and responsibilities from systems infrastructure, investment and maintenance, risk management, supervisory policies and procedures; to marketing and promotion, client/user acquisition, after-sales support, and service network management.

Different approaches to serving rural customer segments at the retail, enterprise, or even corporate level are justified as a number of models and offerings have progressed in a range of markets over the last decade that warrant closer attention. These models emphasize developing a more nuanced understanding of customer needs, patterns, preferences, and perceptions – specifically as they relate to farmers. When providers more effectively target the problems of this segment, their offerings will also address the problems of other rural customer segments adjacent to or above them. This approach also enables providers to invest in offerings with a compelling value proposition for a much larger percentage of a market for financial services that is sizeable but largely unsaturated.

## Lessons Learned and Key Considerations


***Innovation in DFS and other digital tools has created new opportunities for FSPs to engage rural customer segments in the agriculture sector.*** Agriculture is inherently difficult for the private sector to serve because value chain actors are often loosely organized, rural and subject to environmental factors that are hard to predict and control. Numerous market failures have resulted in the under-allocation of capital and other services to the agriculture sector. Accordingly, financial service providers have focused more on urban and peri urban clientele. The broader point of this handbook, however, is to convey that new tools and techniques to address chronic challenges in serving the agriculture sector have emerged. Digital solutions have created less expensive opportunities to gather and process information, to acquire customers, to deliver products, and to manage services over a wide geography where customer density is low and the cost to physically reach and serve them is quite high.

This allows providers to offer needed services to multiple actors operating in the agriculture sector and to gain a valuable new customer base. In providing these services, keeping the customer at the center and understanding the value they derive from DFS is critical. Despite the major gap in financial services access that farmers have faced, uptake is not driven by the existence of a new product alone. Rather, these products must reflect local, contextually-determined needs, be disseminated through an accessible and affordable channel, and be built on content that is understandable and relevant to the target end user. Finally, these products must inspire trust in customers who may have limited experience with financial services and digital technology.


***To supply DFS in agriculture, understanding relevant value chains is key.*** The agricultural value chain is the foundation of the rural economy and the key to effectively serving the sector. Each value chain will have within it different cycles that stem from the relevant production process; translating into different payments, transaction patterns and financial needs. Understanding these patterns may not be something that the financial service provider has engaged in before as part of typical due diligence, but this is an essential part of market research and of understanding this customer segment. Products that are appropriately targeted to specific value chain actors, with consideration of their role within the value chain, will benefit from and at the same time strengthen the value chain by leveraging existing communication and distribution channels. DFS solutions can apply to a range of actors within the value chain, including a variety of SME agribusinesses, not just smallholder farmers or large multinational corporates.

Finally, there are new types of digital data, from advanced but increasingly available sensors, satellites and other tools, that augment traditional agricultural data from, for example, crop harvests. This data has the potential to not only help agricultural actors with immediate decision-making but also to help external actors, including financial service providers, better understand the sector and the risks that it may pose to an investor.


***Digital channels and data are transforming business models for FSPs targeting the agricultural sector.*** This sector has traditionally faced unmet demand for services that help them manage and improve their livelihoods and production. This trend is understandable as there are many reasons why agri-value chain actors have not been the most commercially attractive or viable for FSPs. Now, however, there are many ways to serve these segments and they rely on widespread changes in access to digital technology even in very low-income and rural areas. By leveraging the speed and scale offered by mobile telecommunications infrastructure, FSPs can serve customers with an operating cost structure that is a fraction of the costs associated with a rural network of brick and mortar branches. FSPs can also leverage new data sources and analytics to increase product adoption and usage by more accurately designing products to meet rural customer demand and needs.


***Digital channels open opportunities for FSPs to expand service offerings, but they are also associated with risks that must be actively managed.*** For individual providers, smaller scale agri-value chain actors such as farmers and enterprises in most developing countries represent a greater risk compared with customers residing in urban and peri-urban areas who are employed in more industrialized sectors. Rural customers, for example, disproportionately lack formal identification and supporting financial documentation that traditionally establishes creditworthiness or credit history. For the financial sector as a whole, there is also a broader risk associated with injecting larger volumes of credit and lending finance if DFS offerings lead to a situation where financing is aggressively marketed and offed but not aggressively managed and supervised. Lower rates of formal education, financial literacy, and digital literacy imply that rural market segments may not be as well-equipped to evaluate their risks of acquiring certain services, especially financing.

In a previous handbook published by IFC, a variety of potentially overlapping risks associated with DFS are described, including strategic, regulatory, agent management, fraud, technology and operational risk; if a situation arises relating to one type of risk it is likely to affect several others simultaneously.[170] These risks have a range of implications and potential consequences, that can affect the business at multiple levels, from the regulatory and policy environment to the local product supply to the end user experience. IFC's risk management handbook offers a framework that can be adapted by DFS risk management units, which prescribes recognizing, ranking, responding to and reporting on significant risks. The handbook notes that for DFS, "the area that is generally least developed is operational risk, and this requires the greatest attention."[171] Teams that are skilled in identifying operational risk provide a needed counterbalance to business development units that may see risk awareness and mitigation as a roadblock to successfully promoting their product.[172]

[170] Digital Financial Services and Risk Management. IFC, 19 (https://www.ifc.org/wps/wcm/connect/06c7896a-47e1-40af-8213-af7f2672e68b/Digital+Financial+Services+and+Risk+Management+Handbook.pdf?MOD=AJPERES).

[171] Ibid, 12.

[172] Ibid.


***Partners are a key ingredient to leveraging new DFS opportunities to serve the agriculture sector, but if not well-designed and managed they can introduce complexity.*** Financial services, generally, have been changed by technology. There are many new players that are not traditional banks. Fintechs for example are reaching new customer segments, such as SMEs, with products that meet needs that banks have never addressed. Part of the reason that partners are needed in this space is that new players (fintechs and MNOs) have entered and occupied a relevant and valuable role in the market. They are capturing market share and building momentum. As a result, they have learned lessons and possess skills that can be leveraged if properly approached.

Another reason is that the new world of DFS requires specializations that are costly to acquire. Advanced data analysis skills, for example, can be utilized through partners who specialize in this type of activity rather than purchased for full ownership. As the capabilities and requirements of new technologies change quite rapidly, it is worth partnering with specialists. Partners are also key to working with low-income agricultural clients. They remain underserved precisely because working with them has presented a number of enduring challenges. Partners that financial services institutions may not typically work with in the public and NGO sectors can make understanding and serving this sector commercially viable.


***Willingness to learn from earlier precedents and an openness to partnerships and product experimentation are critical.*** The reward for entering an under-served market can be significant but at the same time there are fewer established practices and protocols to follow. Experimentation does not have to be costly and FSPs must appreciate the necessity of absorbing the hard lessons associated with serving this sector in previous decades, and placing the potential of these new digital solutions within that broader context. This ethos follows closely that of the ICT sector, which elevates and invests in processes that allow for rapid testing, adaptation and iteration. In this way, providers are able to test some or all of their product features and quickly learn from feedback that is generated from a live market context. Partnership makes such experiments easier in many ways, as the risk is lessened. New information is being generated on this sector yearly and a willingness to learn from pilots and to share experiences will help to lift the industry as a whole while increasing the likelihood of the success of a new product offering.

## Four Predictions for the Next Five Years

1. ***Innovations in data availability, analysis and utility for market intelligence and risk evaluation will drive the trajectory of DFS offerings for agriculture.*** While digital devices and delivery channels are key to the success of DFS offerings for this sector, device availability and channel coverage have been aggressively built out in many developing countries and are expanding at a rapid pace in others. Mobile handset penetration, smartphones in particular, and increased mobile connectivity will ensure that products, services, and related information content are widely and rapidly accessible. They will also permit a richer user experience and allow greater product functionality. However, increased smartphone penetration alone is not adequate for DFS offerings in agriculture to mature and scale. DFS offerings in agriculture will need to leverage digital solutions to generate, collect and analyze data to effectively adapt to shifts in market conditions and trends and provide services that respond those shifts.

2. ***The utility of these services, and the ability of the technology solutions, analytic methods and operational processes that power them, will be aggressively tested at scale.*** More data will become available at lower costs, and more players will engage in new ways of analyzing it. From these advances new products will emerge and current products will be refined, enabled by the ability to better understand and target rural customers. It will be advancement or discovery in data availability and analysis that will drive the specifications of these innovations.

3. ***Long-term winners in the space of DFS and agriculture will be consortiums or partnerships.*** While many private banks in the past have preferred to build their own technology services in-house, serving the agricultural sector and taking advantages of the opportunities this growing market provides will likely require partnerships to be commercially viable. These partnerships will become the norm, as opposed to the continuation of individual service providers that own all required capabilities in-house. While single providers can certainly add value to DFS offerings targeting the agriculture sector, they are less likely to be leaders in the space, and to be able to offer market products with strong use cases for rural markets at commercially viable prices.

4. ***Without investment, agriculture will not meet the needs of growing populations.*** Agriculture is the foundation of developing economies, the driver of nutrition and food security and critical to mitigating climate change. At stake in the success of the industry is billions of people's livelihoods and everyone's survival. Yet without greater and more strategic investment, it will not be able to succeed in its critical role. While governments and international stakeholders have important roles to play in agricultural productivity, efficiency and resilience to the stresses of climate change, the private sector and especially financial service providers are essential. Without the introduction of capital and investment in financial services for the agriculture sector, it will continue to underperform.

# SECTION 6

*Tools*



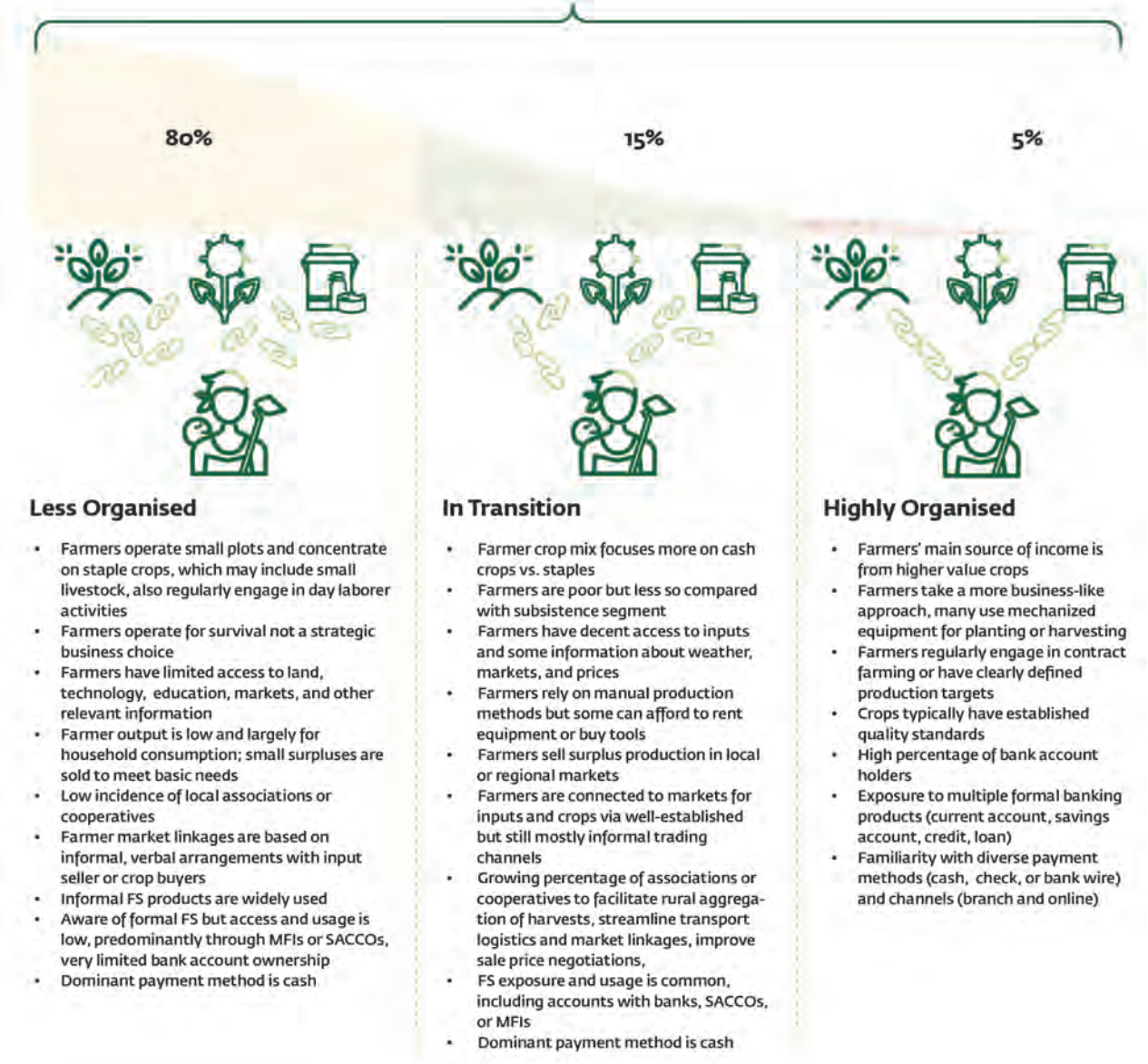
## Tool 1: A Value Chain Approach to Assessing DFS Opportunities in Agriculture

This section provides tools and techniques to guide preliminary strategy conversations around a new agri-DFS offering based on value chain attributes and production cycles. It supports opportunity identification at multiple levels within an agri-value chain, and informs market research initiatives that will surface and validate core assumptions and offering requirements. The section also provides a methodology for conducting a high-level market sizing exercise that will support segment prioritization and initial business case assessments.

## Step 1: Value Chain Attributes Analysis

Each value chain has certain attributes that make it possible to distinguish among different categories of DFS needs and opportunities for DFS adoption. A good first step is to identify the degree of organization of a specific value chain.

*Figure 16: Spectrum of Smallholder Farmers Distributed According to Segments*



The degree of value chain organization often determines the size, location, and role of stakeholders and governs the types of transactions that take place. Distribution of inputs, storage of outputs, and degree of processing are also influenced by value chain organization. Service providers should develop a checklist that describes how input requirements and output requirements are met in the target value chain.

**Input Requirements:** Greater amounts of inputs are viewed positively as they should correlate with more consistent purchase patterns, among farmers in particular, and financing needs. They may also indicate strong latent demand for digital payments at the C2B and B2B level given that farmers and other smaller value chain enterprises have sizeable cash payment requirements but also elevated risk.

| Input | Nature of Linkage: Farmer-Supplier | Frequency of Purchase | Transaction Point | Additional Details |
|---|---|---|---|---|
| *Proposed Answer Options* | • *Non-existent*<br>• *Weak, informal*<br>• *Established, informal*<br>• *Established, formal* | • *Rarely/sporadic*<br>• *Seasonal, inconsistent*<br>• *Seasonal, consistent* | • *Farm-gate*<br>• *Open-air market*<br>• *In-store*<br>• *Government distribution point*<br>• *Designated location* | • *No intermediary role (e.g. coop)*<br>• *Intermediary present*<br>• *Quality concerns*<br>• *Informal credit (dealer, etc)* |
| *Seed* | | | | |
| *Fertilizer* | | | | |
| *Pesticides/ Herbicides/ Vet supplies* | | | | |
| *Equipment/ Tools* | | | | |
| *Water* | | | | |

**Output Requirements:** Value chain organization also informs output requirements, most notably storage, transportation, and processing. These functions, depending on how and where they are performed, can influence financial services needs and potential needs for DFS products that can provide access to working capital, remote transaction methods, and relevant information regarding quantity and location.

| Output | Observed Practice or Need | Transaction Location | Financing Method | Infrastructure Requirements |
|---|---|---|---|---|
| *Proposed Answer Options* | • *No practice*<br>• *Weak practice*<br>• *Strong practice*<br>• *Weak need*<br>• *Strong need* | • *Farm-gate*<br>• *Trading floor*<br>• *Miller/Processor*<br>• *Warehouse*<br>• *Government Distribution point* | • *Farmer financed (savings)*<br>• *Farmer financed (informal loan)*<br>• *Farmer financed (formal loan)*<br>• *Trader financed*<br>• *Buyer financed* | • *Storage facility*<br>• *Processing tools/ equipment*<br>• *Cold storage*<br>• *Transport* |
| *On-farm storage* | | | | |
| *On-farm processing* | | | | |
| *Off-farm storage* | | | | |
| *Off-farm processing* | | | | |
| *Off-farm transport* | | | | |

## Step 2: Mapping Value Chain Transaction Relationships

In addition to value chain organization, value chain transaction relationships can also inform DFS opportunities. Using the farmer as the focal point, we recommend creating a transaction map that identifies key relationships and the distance between transacting parties. It is implied that closer proximity translates to greater frequency of interaction and a more established linkage, although this does not necessarily translate into greater levels of trust between the parties.

This exercise provides an understanding of how farmers transact, using which financial services and payments methods; as well as allowing the user to better gauge the relevance and strength of certain relationships and identify where digital solutions have emerged or are becoming more established. Figure 16 provides a partially completed transaction relationship map for a notional value chain.

Table 10 is organized by different phases associated with an agri-value chain (supply, production, distribution, consumption) and is designed to assist with mapping other actors, key activities, and quantifying other transaction dynamics.

*Figure 17: Farmer Transaction Map - Relevant Connections, Proximity and Transaction Types*

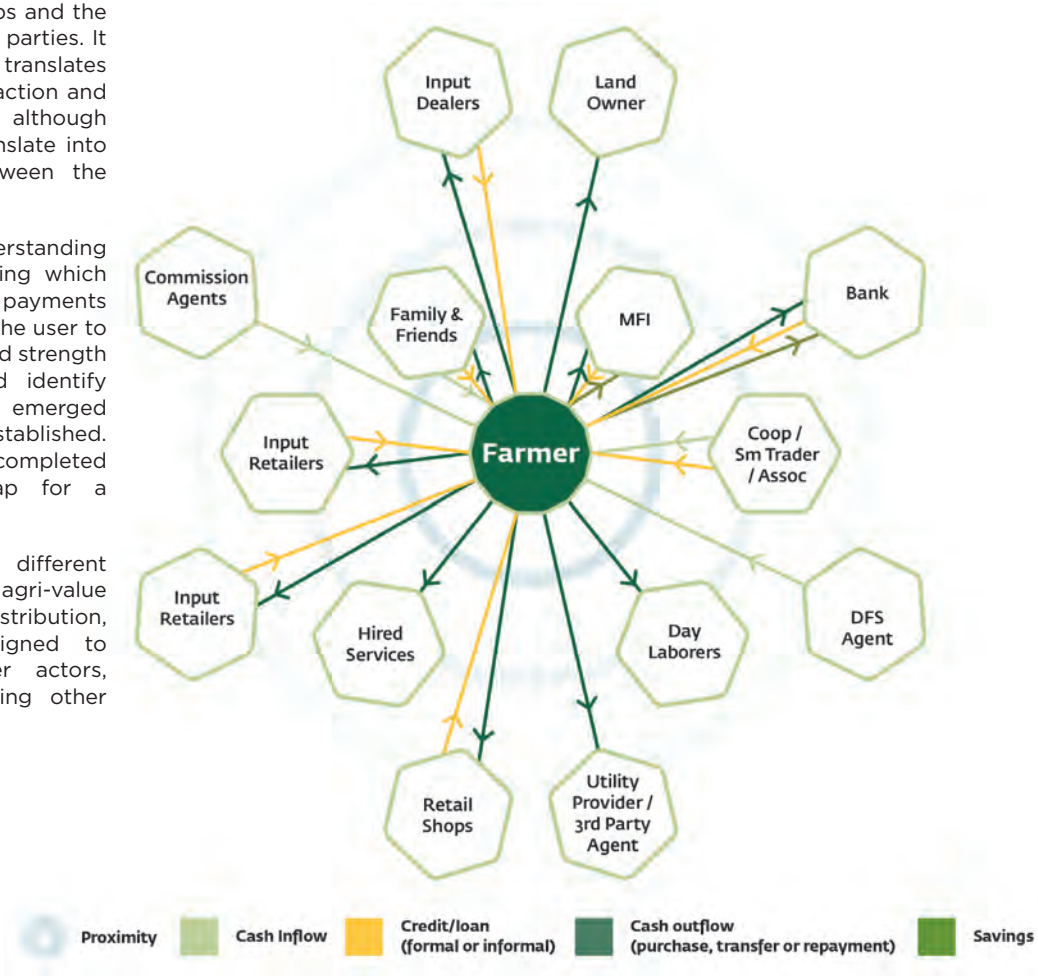


*Table 10: Agri-Value Chain Mapping – Activities, Actors and Transaction Dynamics*

| Cycle Phase | Supply Inputs | Produce Outputs | Source Outputs | Store | Wholesale | Process | Market | Consume |
|---|---|---|---|---|---|---|---|---|
| *Key Activities (indicative)* | • *Produce*<br>• *Distribute*<br>• *Sell* | • *Till*<br>• *Plant/Raise*<br>• *Apply inputs*<br>• *Tend*<br>• *Harvest* | • *Deliver*<br>• *Bulk*<br>• *Collect*<br>• *Purchase*<br>• *Transport* | • *Transport*<br>• *Weigh*<br>• *Record*<br>• *Inventory*<br>• *Distribute* | • *Transport*<br>• *Weigh*<br>• *Record*<br>• *Store*<br>• *Trade/Sell* | • *Transport*<br>• *Weigh*<br>• *Record*<br>• *Process*<br>• *Package*<br>• *Distribute*<br>• *Sell* | • *Transport*<br>• *Sell*<br>• *Stock* | • *Sell* |
| *Actors Involved (select applicable)* | • *Farmer*<br>• *Ag coop*<br>• *Producer*<br>• *Distributor*<br>• *Retailer* | • *Farmer*<br>• *Laborer*<br>• *Extension Officer*<br>• *Agri-Service Provider* | • *Farmer*<br>• *Ag coop*<br>• *SACCO*<br>• *Trader*<br>• *Collector* | • *Storage entity*<br>• *Transport provider* | • *Wholesaler*<br>• *Transport provider* | • *Process entity*<br>• *Transport provider* | • *Retail entity*<br>• *Transport provider* | • *Consumer* |
| *No. of Players (figure)* | | | | | | | | |
| *No. of Payments (figure)* | | | | | | | | |
| *Avg Payment Size (figure)* | | | | | | | | |

Service providers should use this template to create a target segment specific map and augment the farmer transaction relationships with specific transaction values, volumes, and attributes of other agri-value chain actors.

## Step 3: Quantifying Outputs

The high-level financial capacity of a specific market segment can be determined by quantifying outputs. Using both primary and secondary sources, the service provider can calculate the typical revenues associated with a specific type of farmer. This revenue information informs both the types of financial products the farmer may require, as well as provides an indication of the farmer's capacity to pay. Following are formulas to calculate revenues for three distinct value chains. Data sources to complete the analysis include:

- World Bank
- Food and Agricultural Organization (FAO)
- National Ministry of Agriculture
- Buyers Associations
- Interviews with national or regional buying enterprises

**Plant-based (perennial crops, cereals, and perishables)**

*Formula 1: A x B x C = E [Total Volume of Commodity Produced (in MT)]*

*Formula 2: E x D x 100 = F [Total Value of Commodity Produced (in USD)]*

| Plant-based crop (cereal, perishable, etc.) | No of growers | Avg farmer plot size (in Ha) | Avg yield per Ha/per year | Avg price per kilo | Total volume of commodity produced | Total value of commodity produced |
|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* |
| | | | | | | |
| | | | | | | |

**Dairy**

*Formula 1: A x B x C = E [Total Volume of Commodity Produced (in Ltr)]*

*Formula 2: E x D = F [Total Value of Commodity Produced (in USD)]*

| Type of dairy source (cow, etc.) | No of farmers | Avg liters per day per farm | Avg no of production days | Avg price per kilo | Total volume of commodity produced | Total value of commodity produced |
|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* |
| | | | | | | |
| | | | | | | |

**Livestock (cattle, goats, sheep, pigs, poultry)**

*Formula 1: A x B x C = E [Total Volume of Commodity Produced (in Kg)]*

*Formula 2: E x D = F [Total Value of Commodity Produced (in USD)]*

| Type of livestock (cows, goat, poultry) | No of farmers | Avg no of livestock maintained/ year | Avg no of livestock sold/ year | Avg price per kilo | Total volume of commodity produced | Total value of commodity produced |
|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* |
| | | | | | | |
| | | | | | | |

From the figures generated by making these calculations, additional analysis can be conducted to determine the potential for financing, insurance, payments, savings, and transfers.

## Step 4: Quantifying Market Opportunities for Various DFS Products

### Payments

TAM calculations can be made for four major types of payments:

1. Farmers buying inputs
2. Last-mile aggregators buying outputs
3. Wholesalers buying outputs
4. Consumers buying outputs from retailers or distributors

1. **Farmers buying inputs:** These are P2B payments that include farmers purchasing inputs from input suppliers, such as seed and fertilizer in the case of maize. For other value chains, they may also include veterinary services and supplies, seedlings, pesticides and other required inputs, depending on what's appropriate for the value chain. The case of maize is fairly straightforward as it is just two inputs, seed and fertilizer, typically purchased from the same input dealer or stockist. In this example, the TAM be calculated using the following calculation:

*Formula: (A x B) + (C x D) x E = F*

| Type of input purchased by farmers | No of seed bags sold/ha | Avg cost of 1 seed bag | No of fertilizer bags sold | Avg cost of 1 fertilizer bag | Total no of ha under production | Total value of P2B payments: farmers to input suppliers |
|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* |
| | | | | | | |
| | | | | | | |

2. **Last-mile aggregators buying outputs:** These are B2P payments that occur at the farm gate or designated rural collection point. Depending on the value chain, these buyers may include cooperatives, associations, farmer groups, or independent traders. In this example, we have assumed a simple model of last-mile aggregators that purchase wet maize from farmers at the farmgate:

*Formula: A x B = C*

| Type of output purchased | Avg price of output/ MT | No of hectares under production | Total value of B2P payments: buyers to farmers |
|---|---|---|---|
| | *A* | *B* | *C* |
| | | | |
| | | | |

3. **Wholesalers buying outputs:** These B2B payments can be made by processors, millers, transporters, traders, wholesalers and others that purchase and add value at various stages of the value chain. Depending on the commodity, these value-added activities may include drying, storing, processing, exporting, and retail distribution. These value-adding roles can also be done by a variety of actors from independent businesspersons and large or small companies, to agri-cooperatives, farmer associations or NGOs. Furthermore, there may be multiple layers of wholesale buying, selling, and value additions that farm outputs go through before they reach the retail consumer. In the context of the maize example it is usually sold by the bulkers to larger traders or directly to millers, who then process and package for retail sales. The amount of payments is the total sum of all of these payments, even if the same ton of maize changes hand through multiple actors.

*Formula: (A x B) + (C x D) + (E x F) = G*

| Type of output purchased | No of wholesalers | Price/MT paid by wholesalers | No of processors | Price/MT paid by processors | No of grocers | Price/MT paid by grocers | Total value of B2B payments: wholesalers, processors, grocers |
|---|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* | *G* |
| | | | | | | | |
| | | | | | | | |

4. **Consumers buying from grocers/retailers:** These are P2B payments and the last and final time the goods are bought and sold before they are consumed. At this point, outputs are packaged and sold in smaller quantities at grocers or small food shops in rural areas.

*Formula: A x B = C*

| Type of product purchased by customer | Total kg sold | Retail price/kg | Total value of P2B payments: customers to grocers/retailers |
|---|---|---|---|
| | *A* | *B* | *C* |
| | | | |
| | | | |

To arrive at the aggregated TAM for payments, add the totals from 1. to 4.

*Formula: A + B + C + D = E*

| Total value of P2B payments: farmers to input suppliers | Total value of B2P payments: buyers to farmers | Total value of B2B payments: wholesalers, processors, grocers | Total value of P2B payments: customers to grocers/retailers | Aggregated TAM for payments |
|---|---|---|---|---|
| *A* | *B* | *C* | *D* | *E* |
| | | | | |
| | | | | |

## Credit

There are two types of demand for credit. There is demand from farmers to borrow for inputs, and there may also be business demand for working capital. The payments calculations above can be used in the same manner to estimate the demand for credit. For example, the size of payments from farmers to input suppliers is also equally representative of the potential demand for farmer credit. Similarly, the size of payments from buyers, bulkists, traders, wholesalers and processors is also representative of the maximum demand for farm business working capital.

1. **Farmer credit:** The total demand for credit is equal to the total P2B payments from farmers to input suppliers:

*Formula: (A x B) + (C x D) x E = F = G*

| Type of input purchased by farmers | No of seed bags sold/ ha | Avg cost of 1 seed bag | Avg no of fertilizer bags sold | Avg cost of 1 fertilizer bag | Total no of ha under production | Total value of P2B payments: farmers to input suppliers | Total farmer demand for credit |
|---|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* | *G* |
| | | | | | | | |
| | | | | | | | |

2. **Buyer/trader credit:** The total demand for credit/working capital is equal to all payments to farmers (B2P) and between businesses (B2B) within the value chain:

*Formula: A + B = C*

| Total value of B2P payments: buyers to farmers | Total value of B2B payments: wholesalers, processors, grocers | Total buyer credit/working capital needed |
|---|---|---|
| *A* | *B* | *C* |
| | | |
| | | |

Total Value of B2P payments = A = Avg price of output/MT x No of Ha under production.

Total Value of B2B payments = B = (No of wholesalers x price/MT by wholesalers) + (No of processors x price/MT paid by processors) + (No of grocers x price/MT paid by grocers)

To estimate the total demand for credit, farmer credit for inputs and business credit for working capital can be added together to achieve the TAM for Credit.

### Insurance

Insurance products are typically structured to insure either the cost of inputs invested or future potential losses from low (or no) crop outputs. Insurance products only covering the cost of inputs are much smaller in size, although typically more affordable. Insurance products that cover potential losses tend to be much larger policies, which carry greater risk and higher premiums.

Similar to credit calculations, the initial payments calculations can also be used to estimate the size of the TAM for insurance.

1. **Input insurance:** The total cost of inputs invested by farmers

*Formula: (A x B) + (C x D) x E = F = G*

| Type of input purchased by farmers | No of seed bags sold/ ha | Avg cost of 1 seed bag | No of fertilizer bags sold | Avg cost of 1 fertilizer bag | Total no of ha under production | Total value of P2B payments: farmers to input suppliers | Total input insurance demand |
|---|---|---|---|---|---|---|---|
| | *A* | *B* | *C* | *D* | *E* | *F* | *G* |
| | | | | | | | |
| | | | | | | | |

2. **Output insurance:** The total potential revenue for farmers

*Formula: A x B = C = D*

| Type of output purchased | Avg price of output/ MT | No of hectares under production | Total value of B2P payments: buyers to farmers | Total output insurance demand |
|---|---|---|---|---|
| | *A* | *B* | *C* | *D* |
| | | | | |
| | | | | |

## Tool 2: Agri-Production Cycles – Identifying Variations and DFS Relevance

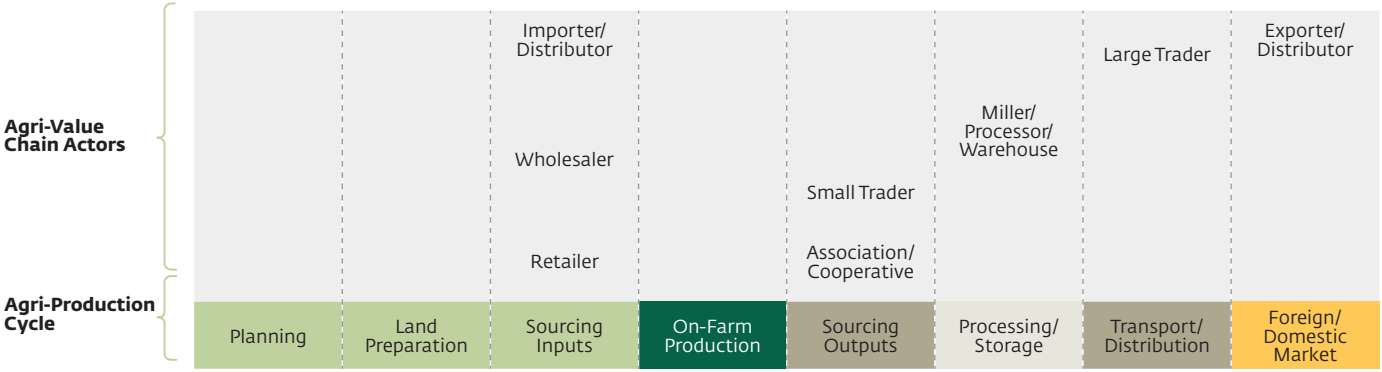
Customer segmentation aggregates the product needs of similar customers and enables efficient development of product requirements. This is particularly important in the agricultural sector where potential customers are more dispersed and consumer resources are more limited. This section uses the Agricultural Production Cycle as a framework to present the relationship between various agricultural value chains and the DFS product needs of small holder farmers. It examines the following value chains:

- Cereal
- Perennial tree-based crops
- Perishable crops
- Dairy
- Livestock

In each case, we present an illustrative value chain map that identifies each step in the production cycle relevant to that value chain and includes identification of key stakeholders aligned to the appropriate production cycle step. The initial production cycle map for each selected value chain is followed by a blow-out map of the on-farm production step in the production cycle. In the graphic, we highlight production cycle sub-steps and identify needed financial services.

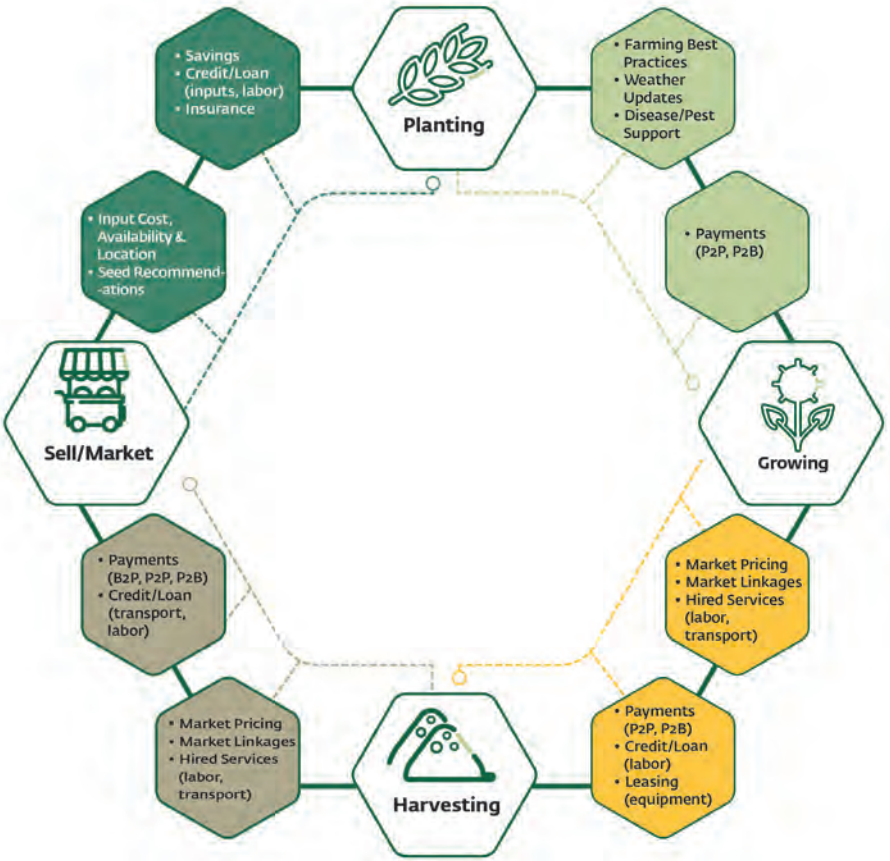
This series of value chain production cycle maps are designed to identify potential DFS based on specific needs generated by the requirements of the production cycle.

*A. Cereal Crops: Value Chain Map (Illustrative)*




Cereals (i.e. maize, rice, beans, ground nuts):

- » Overall: Seasonal expenses requiring capital/financing are land preparation, inputs, and harvesting.
- » Planning and Land Preparation: Informal, largely manual labor costs; tools and equipment are relevant depending on sophistication of farming knowledge and production capacity.
- » Inputs Sourcing: seasonally recurring input expenditures (seeds, fertilizer, herbicides, pesticides).
- » On-Farm Production: Recurring labor expenses are related to crop planting, tending, harvesting and transportation to market; In lower rainfall areas there are recurring water use expenditures. Depending on yield volumes, quality, and market prices there may be transport or storage expenses.



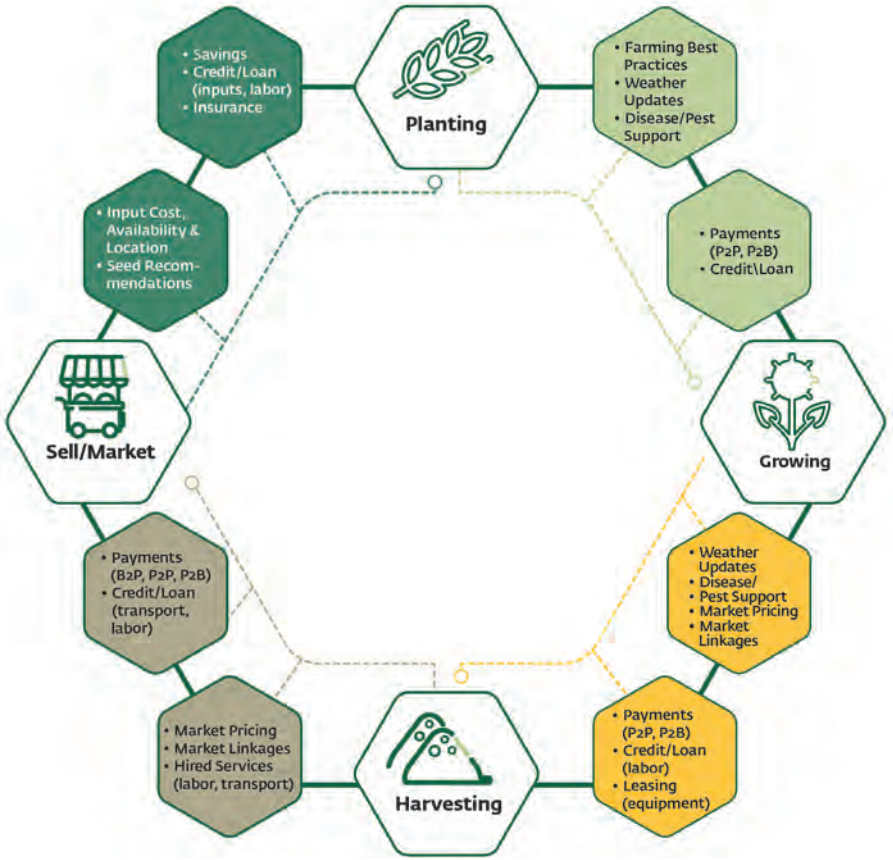

*A. Cereal Crop*

*B. Perennial Tree-Based Crops: Value Chain Map (Illustrative)*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Agri-Value Chain Actors** | | | Importer/ Distributor<br>Wholesaler<br>Retailer | | Small Trader<br>Association/ Cooperative | Processor/ Warehouse | Large Trader | Exporter/ Distributor |
| **Agri-Production Cycle** | Planning | Land Preparation | Sourcing Inputs | On-Farm Production | Sourcing Outputs | Processing/ Storage | Transport/ Distribution | Foreign/ Domestic Market |

Perennial tree-based crops (i.e. rubber, coffee, tea, cocoa, citrus, mangoes, nuts):

- » Overall: Labor is the dominant, seasonally recurring expense requiring capital/financing.
- » Planning and Land Preparation: Once trees have reached maturity, which could take up to four or five years, planning and preparation requirements are low.
- » Inputs Sourcing: Unlike crops with a single season harvest, tree-based crops require minimal inputs and expenditures are often only triggered for things like pesticides and herbicides in the event of an outbreak.
- » On-Farm Production: No planting/ seeding labor costs, some recurring labor costs related to tending, harvesting and transportation to market. In lower rainfall areas, water use related expenditures. Depending on yield volumes, quality, and market prices, transport or storage expenses could be sizeable.



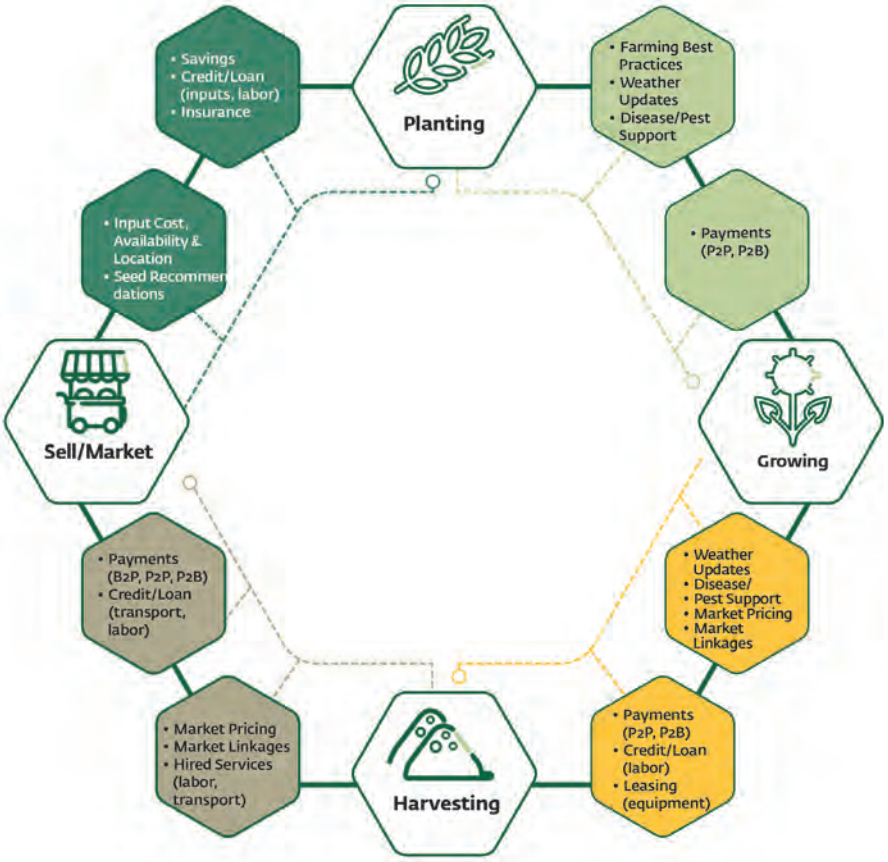

*B. Perennial, Tree-Based Crops*

*C. Perishable Crops (Illustrative)*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Agri-Value Chain Actors** | | | Importer/ Distributor<br>Wholesaler<br>Retailer | | Small Trader<br>Last-mile Aggregator | | Large Trader | Exporter/ Distributor |
| **Agri-Production Cycle** | Planning | Land Preparation | Sourcing Inputs | On-Farm Production | Sourcing Outputs | Processing/ Storage | Transport/ Distribution | Foreign/ Domestic Market |

Perishables (i.e. seasonal vegetables, non-tree based fruits):

- » Overall: Seasonal expenses requiring capital/financing include inputs, manual labor (lower relative to cereals), and transporting harvest to market.
- » Planning and Land Preparation: Perishable crops require both planning and land preparation and within a relatively shorter growing cycle of three to five months, depending on the crop grown, cultivation region, etc. Planning activities will typically involve calculating input needs such as seeds, fertilizer and pesticides or herbicides.
- » Inputs Sourcing: Seasonally recurring input expenditures (seeds, fertilizer, herbicides, pesticides), less intensive than cereals.
- » On-Farm Production: Recurring expenses related to temporary labor to support land preparation, crop tending, harvesting and transportation to market; In lower rainfall areas there may be recurring expenses related to water use.



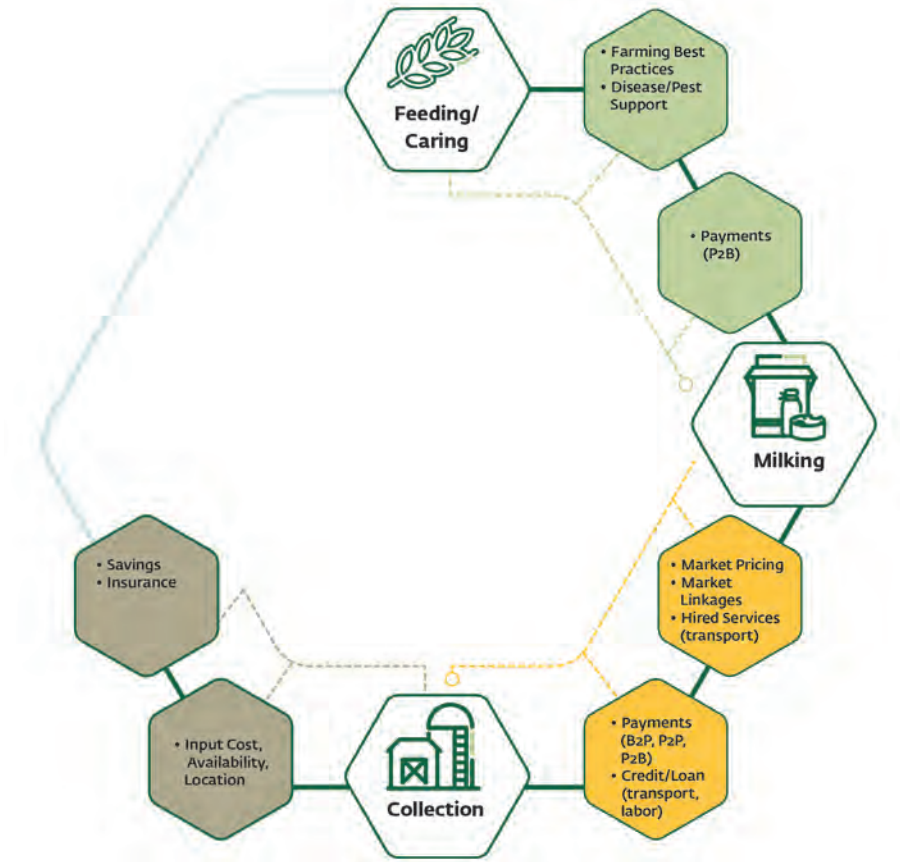

*C. Perishable Crops*

*D. Dairy Production: Value Chain Map (Illustrative)*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Agri-Value Chain Actors** | | | Importer/ Distributor<br>Wholesaler<br>Retailer | | Small Trader<br>Farmer/ Cooperative | Processor/ Warehouse | Large Trader | Exporter/ Distributor |
| **Agri-Production Cycle** | Planning | Land Preparation | Sourcing Inputs | On-Farm Production | Sourcing Outputs | Processing/ Storage | Transport/ Distribution | Foreign/ Domestic Market |

Dairy:

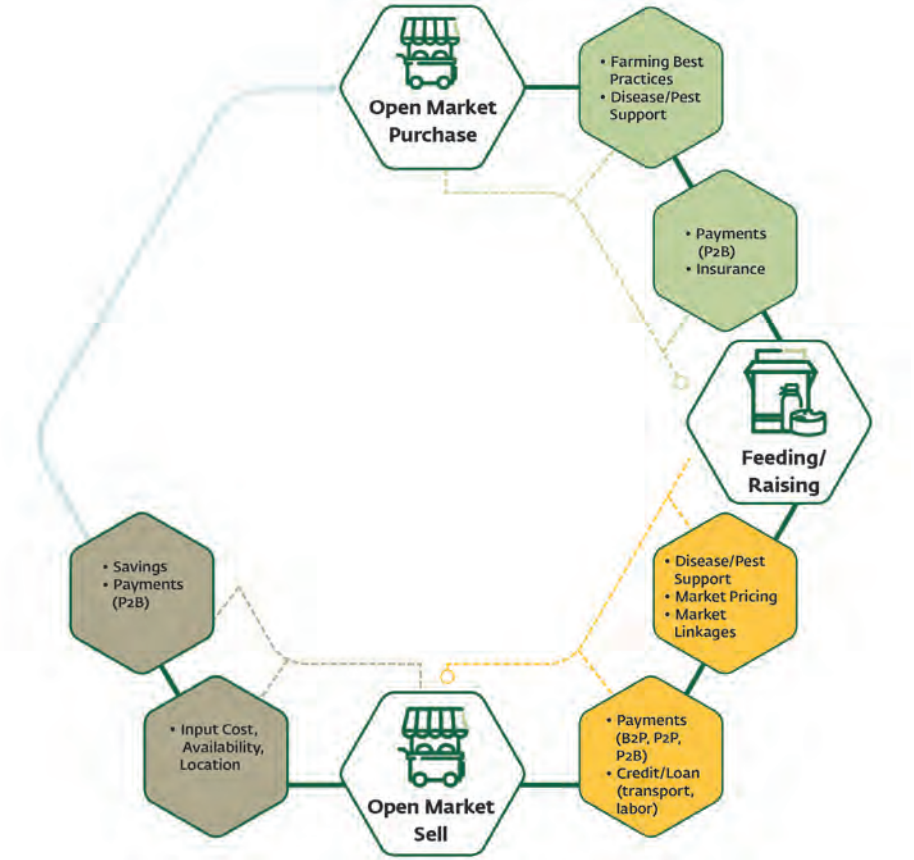
- » Overall: Recurring expenses or capital needs related to animal health.
- » Planning and Land Preparation: Planning activities will focus on quantities and costs of inputs required to sustain milk production. As there are no crops to harvest, land preparation requirements are minimal.
- » Inputs Sourcing: Recurring expenses or capital needs related to food (grazing or feed).
- » On-Farm Production: Recurring expenses or capital needs related to water sources.




*D. Dairy*

*E. Livestock: On-farm Production Phase (Illustrative)*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Agri-Value Chain Actors** | | | Importer/ Distributor<br>Wholesaler<br>Retailer | | | Processor (Butcher) | Large Trader | Exporter/ Distributor |
| | | Open Market | | Farmer | Open Market | | | |
| **Agri-Production Cycle** | Planning | Land Preparation | Sourcing Inputs | On-Farm Production | Sourcing Outputs | Processing/ Storage | Transport/ Distribution | Foreign/ Domestic Market |




Livestock (cattle, goats, sheep, poultry, pigs):

- » Overall: Recurring expenses or capital needs related to sourcing or selling livestock at market.
- » Planning and Land Preparation: Similar to the dairy production cycle, planning activities involving livestock focus on animal versus crop health, nutrition, and other needs. Depending on how livestock are raised, there is also a low probability that land will require preparing to support management activities.
- » Inputs Sourcing: Restricted to those farmers that can afford feed.
- » On-Farm Production: Renting land for grazing and in the case of seeking medical treatment for animals.

*E. Livestock*

*Table 11: Agricultural Production Cycles: Schedule, Requirements and Relevance for DFS*

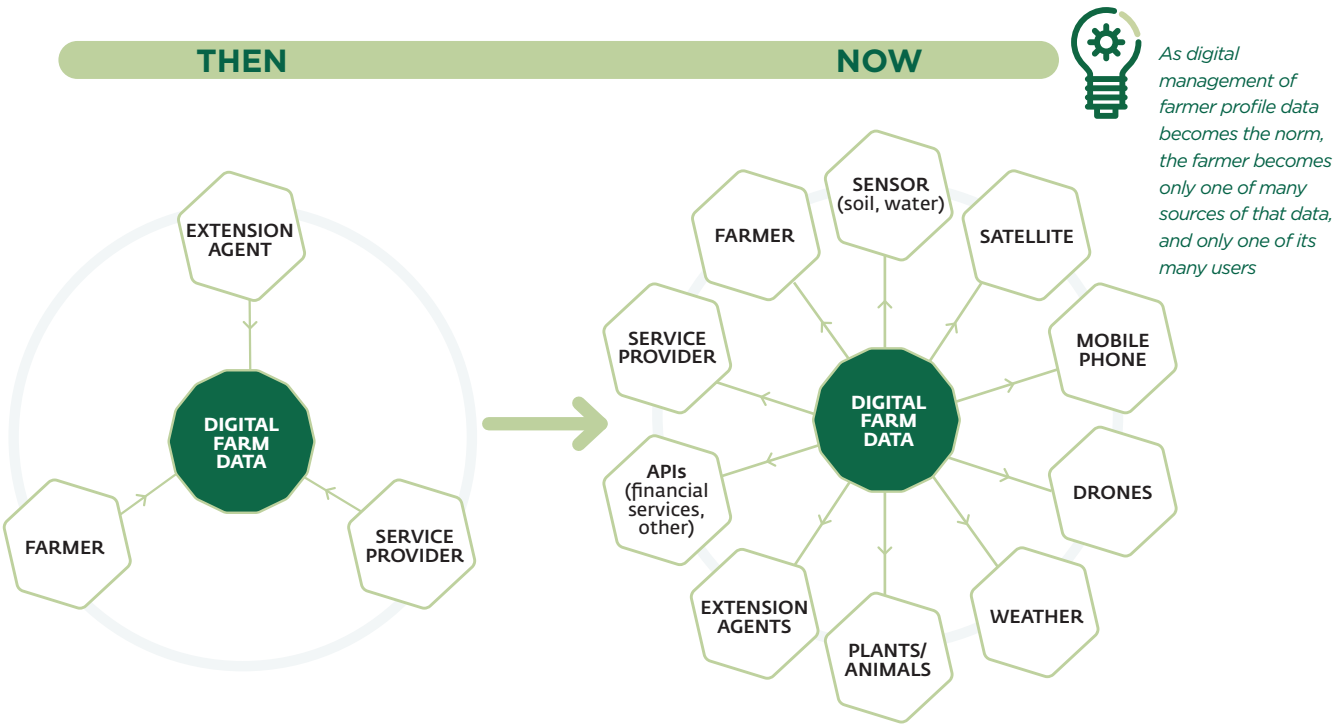
| Production Cycle | | Harvest/Production Schedule | Production Requirements | Post-Production Requirements |
|---|---|---|---|---|
|  | ***Cereals*** | *1-2 per year* | *Land preparation: intensive*<br>*Inputs: intensive*<br>*Tools/Equipment: intensive* | *Harvesting: intensive*<br>*Transport: intensive*<br>*Storage/Processing: intensive* |
| | *Relevance for DFS* | • *Access to quality seeds and fertilizer impacts yields – digital financing mechanisms can enable farmers to purchase inputs at reasonable rates of interest and on more flexible terms*<br>• *Yields are also tied to weather conditions – insurance can guarantee minimum income levels*<br>• *Market information on pricing and market linkages are not well-established – remote payments and digitally linking sellers and payers can optimize trading activity* | | |
|  | ***Perennial, Tree-based*** | *1-2 per year* | *Land Preparation: Light*<br>*Inputs: Moderate*<br>*Tools/Equipment: Light* | *Harvesting: Moderate*<br>*Transport: Intensive*<br>*Storage/Processing: Intensive* |
| | *Relevance for DFS* | • *Ability to hire and pay day laborers is typically important in this value chain*<br>• *Sufficient funds for pest control tied to affordable credit mechanism*<br>• *Availability of leasing instruments for equipment can improve yields and post-harvest handling* | | |
|  | ***Perishables*** | *6-8 per year* | *Land Preparation: Moderate*<br>*Inputs: Intensive*<br>*Tools/Equipment: Moderate* | *Harvesting: Moderate*<br>*Transport: Intensive*<br>*Storage/Processing: Moderate* |
| | *Relevance for DFS* | • *Produce price volatility places a premium on market information and speed of payments*<br>• *Storage mechanisms can improve produce pricing to the farmer*<br>• *Sufficient funds for pest control tied to affordable credit mechanism* | | |
|  | ***Dairy*** | *Daily* | *Land Preparation: Light*<br>*Inputs: Moderate*<br>*Tools/Equipment: Intensive* | *Production: Intensive*<br>*Transport: Intensive*<br>*Storage/Processing: Intensive* |
| | *Relevance for DFS* | • *Digital payments to farmers reduces cost of cash burdens to buying cooperatives* | | |
|  | ***Livestock*** | *Varies based on type and desired buyer demand* | *Land Preparation: Light*<br>*Inputs: Moderate*<br>*Tools/Equipment: Light* | *Trading: Light*<br>*Transport: Moderate*<br>*Storage/Processing: Moderate* |
| | *Relevance for DFS* | • *Market pricing and transportation information are key revenue drivers*<br>• *Funds for feed and new animals are often financed*<br>• *Savings mechanisms are important to smooth income flows* | | |

# Tool 3: New Data Sets Powering DFS And Other Digital Information Offerings for Agriculture

## Context

Over the last several years, a sizeable and growing number of third party technology providers have emerged specializing in digital solutions to collect, analyze, and visualize information that can be used by different actors involved in agriculture. What has historically been, and still remains, a 'data light' sector across much of Sub-Saharan Africa and other regions, is becoming more 'data heavy'.

At this nascent stage of development, there is an appreciable gap in the market between potential and actual application of these offerings to drive new or better financial services for rural customers along agri-value chains. Furthermore, assuming partnerships form between these technology vendors and financial service providers, there are early indications – which we seek to capture in our case studies – to suggest that both sides should expect to spend more time, energy, and resources than originally envisioned to get these partnerships off the ground and in a position to operationally scale. This section, therefore, seeks to present the basic contours of what a 'heavier' data environment in agriculture looks like in a way that is not overly technical. Specifically, it identifies different types and sources of data and highlights topics or issues for service providers to consider when evaluating partnerships with these types of technology vendors.




*As digital management of farmer profile data becomes the norm, the farmer becomes only one of many sources of that data, and only one of its many users*

## Data Types

Table 12 identifies and briefly describes the different types of data that are being generated or captured digitally. The list, which is not exhaustive, presents a wide array of information, touching on topics as diverse as climate and weather, agriculture, and individual consumption patterns of mobile telecommunications services.

*Table 12: Data in the Agricultural Sector*

| Data Type | Description |
|---|---|
| *Climate* | *Information that reflects patterns and variations in variables such as temperature, wind, humidity, and atmospheric pressure over long periods of time (years, decades, etc.).* |
| *Weather* | *Information that reflects patterns and variations in variables such as rain, temperature, and humidity over much shorter periods of time (hours, days, weeks)* |
| *Soil* | *Information that supports analysis of overall soil health, which informs production potential within a given growing cycle and overall production potential of a plot.* |
| *Crops* | *Information that supports analysis of crop health and maturity, which supports estimates regarding harvest timing, volume, and quality.* |
| *On-farm practices* | *Information that identifies whether specific types of inputs are being used by farmers such as fertilizer or agri-equipment (i.e. precision planting, irrigation, or mechanized seeding or reaping)* |
| *Yield production* | *Information that supports advance estimates of the quantity, and to some extent the quality, of crop yields identifiable down to an individual farmer's plot* |
| *Off-farm processing/ storage* | *Information related to inventory management, which could include total weight present at a warehouse, or quantities and type of commodity delivered or shipped* |
| *Transportation/ supply chain activity* | *Information related to the location of commodities in transit (at the shipment or bag level), locations of vehicles in a fleet, and estimated pick-up or drop-off times of individual vehicles* |
| *Financial Services* | *Information related to payments volumes, values, and frequencies associated with the sale of agri-inputs or the purchase of commodities* |
| *Mobile telecom services consumption* | *Information related to when, how often, and how much rural mobile telecommunications subscribers consume voice or data services. This data provides insights into, among other things, average pre-paid account balance, average account top-up, call duration, or amount of data consumed over a specific period.* |
| *Consumer patterns, preferences and perceptions* | *Information from individual respondents, including from rural geographies, on a range of topics that include current behaviors, preferences, or perceptions. This data is increasingly viewed as a viable proxy for measuring the capacity or willingness to pay for financial services as well as with propensity to repay in a credit or loan product scenario.* |

## Data Sources

In Table 13, we identify the sources of these new data sets. They are generated from the deployment of hardware (i.e. satellite, drone, fixed device), use of a system (e.g. mobile telecom network), or manually collected (e.g. human entering information onto a digital device).

*Table 13: Data Sources in Agriculture*

| Data Sources | Description |
|---|---|
| *Satellite* | *Complex hardware designed for space orbit, owned by either public or private sector entities. Equipped with a number of sophisticated sensors, they produce a wide range of imagery-based data.* |
| *Aerial drone* | *Hardware designed for lower elevation flight or hovering. Produces imagery-based data. This hardware can be either publicly or privately owned and managed.* |
| *Fixed station* | *Hardware designed either for installation, such as a weather station, or for insertion into the ground. Sensors used can collect data on a range of meteorological and soil-related data such as temperature, pressure, moisture, oxygen levels, or the presence of specific nutrients.* |
| *Geolocation device* | *Device designed to be attached to vehicles, equipment or hardware and provide geo-coordinates to support real-time or near real time tracking of that object. Some devices are equipped with additional sensors designed to measure the performance of certain types of agricultural equipment (e.g. tractors) in terms of engine activity, etc.* |
| *Field-level collection* | *Digital device such as a terminal, tablet, or smartphone that collects information when entered manually, registered automatically after a particular action or event such as weighing.* |
| *Billing data record system* | *Systems that track the use of mobile telecommunications services, both voice and data consumption. These systems are usually managed directly by MNOs.* |
| *Survey data* | *Information collected in an automated fashion using a mobile delivery channel or collected manually using a digital device and software. This survey data is collected by third-party providers, typically marketing firms or fintechs, seeking to curate psychometric profiles of specific consumer segments.* |

## Connecting Different Types of Data with Relevant Sources: Illustrative Examples

Table 14 shows the types of data generated by different sources. Notice the broad presence of satellites, aerial drones, and fixed stations. Additionally, as digital information sources emerge, the analytic methods for interpreting and applying this information are also maturing, which is essential if these new sources are to have a meaningful impact on the commercial activities of other providers that may want to license or acquire this information.

*Table 14: Data collection by source in agriculture*

| Type of Data | Relevant Data Sources |
|---|---|
| *Climate* | *Satellite networks, fixed stations* |
| *Weather* | *Satellite networks, fixed stations* |
| *Soil* | *Satellite networks, aerial drone, fixed stations* |
| *Crop* | *Satellite networks, aerial drone, field-level collection* |
| *Farming practices* | *Aerial drone, field-level collection* |
| *Yield production* | *Satellite networks, aerial drone, field-level collection* |
| *Off-farm storage/processing* | *Field-level collection* |
| *Transportation/supply chain* | *Geolocation device* |
| *Mobile telecom services consumption* | *Billing data records system* |
| *Consumer patterns, preferences and perceptions* | *Survey data, billing data records system* |

## Considerations for Other Service Providers

Table 15 highlights issues and topics that a financial service provider evaluating a potential partnership with a third-party technology vendor should consider and apply to any ongoing internal or external discussions. While the data trends described above are a welcomed development conceptually, these data-driven offerings are new and untested to many would-be partners in the banking, finance, insurance, or even agriculture. Not only are the sources and methods for generating such information flows not well-understood by other private sector providers at a conceptual level, but also there is a need to have personnel with the necessary skills to interact with and analyze this information in ways that will ultimately drive commercial planning or decision-making.

Added to that are entrenched perceptions of volatility and risk surrounding investment and financing that are not easily overcome. Another emerging risk or consideration among many banking industry stakeholders has to do with issues of consumer protection. These new data flows are accelerating the rate at which finance is being offered, and also the terms and conditions being presented. Potential borrowers are not always presented with a clear view into the basis for extending this financing package and, more importantly, the terms and conditions attached to them. Rural borrowers may find themselves in a position where they remotely opt in for a micro-credit line or micro-loan with the same ease that they might buy an airtime or data bundle without adequate financial literacy to assess the implications.

*Table 15: Evaluating a third-party technology vendor*

| Issue/Topic | To Consider |
|---|---|
| *Ownership* | *As some sources are publicly owned or managed, such as certain types of satellite data, third party technology vendors may not fully own this content or control how it is generated and accessed. This has strategic, legal, and operational implications that service providers will want to clarify as they pursue partnerships with these types of vendors.* |
| *Generation* | *Not all new data sources are digital from the start, nor are they purely automated. Manual collection is often required, especially to generate farmer profiles or business operations of agri-enterprises (i.e. millers, processors, warehouses, retailers, and traders).* |
| *Format* | *Data sets are presented in a range of formats, depending on the type of data – satellite imagery versus farm profiles versus psychometric survey responses. Certain formats lend themselves to easier processing and incorporation into the systems of potential partners than others. For example, the digital systems of a lending institution, however sophisticated, cannot immediately process hi-resolution satellite imagery data in a way that would seamlessly fit with the decision-making or monitoring processes of a lending unit. In virtually every case, additional time and investment is required.* |
| *Data Analytics and Management* | *Providers that access or acquire these data sets will have to invest resources to effectively apply insights from these new digital data streams; otherwise, these new data inflows may not have an appreciable impact on the commercial or operational performance of a provider's offering.* |
| *Standards* | *Given the diverse sources, methods, and technologies, the sector lacks broadly accepted and clearly defined standards. This has implications for how information is gathered and stored by the third-party vendor, and how that vendor shares it with different partners.* |
| *Integration* | *A lack of formatting standards and a diversity of data types has implications for potential partners seeking to integrate and leverage multiple data streams to power an investment platform, a financial service, or an insurance product. Additional layers, systems, or processes may be required, which introduce a capital investment requirement that should be thoroughly vetted. It also points to conceptual and operational complexities around aggregating and analyzing multiple data streams at scale and within acceptable risk levels.* |

## Tool 4: Agri/Rural Household Segmentation

It is necessary to create a detailed profile of prospective target customer segments. A good way to accomplish this is to examine household dynamics of the farmer and to characterize farming and other related activities across the following 17 characteristics. With these profile segments completed, service providers are able to better understand the scope of the household's activities, where and to what extent they differ, and begin to craft product and service requirements.

| | |
|---|---|
| 1 | **Production Orientation: Select orientation** |
| | a. Subsistence-focused |
| | b. In transition / More cash crops sales than subsistence growing |
| | c. Market-focused |
| 2 | **Population Segment estimate** |
| | a. Enter figure or range |
| 3 | **Landholding size: Select size** |
| | a. Communal land |
| | b. Rented land |
| | c. Owned land |
| 4 | **Landholding size: Select size** |
| | a. Communal land |
| | b. Rented land |
| | c. Owned land |
| 5 | **Gender distribution** |
| | a. Predominantly female |
| | b. Mix male/female |
| | c. Predominantly male |
| 6 | **Yield Expectation** |
| | a. Enter figure or range |
| 7 | **Crop/Livestock Mix: Select all that apply** |
| | a. Perennial, tree-based |
| | b. Cereals |
| | c. Perishables |
| | d. Dairy |
| | e. Livestock |
| 8 | **Inputs Requirements/Use: Select all that apply** |
| | PLANT-BASED |
| | b. Seeds |
| | c. Fertilizer |
| | d. Pesticides/herbicides |
| | e. Water |
| | LIVESTOCK-BASED |
| | a. Feed |
| | b. Medical supplies |
| | c. Water |
| 9 | **Labor: Select type** |
| | a. Unpaid |
| | b. Paid/family |
| | c. Paid/temporary or migrant labor |
| | d. Paid/staff |

| | |
|---|---|
| 10 | **Farming practices: Select type** |
| | a. Manual only |
| | b. Manual with some tool use (tilling, planting, irrigation, harvesting) |
| | c. Heavy use of tools and equipment (tilling, planting, irrigation, harvesting) |
| 11 | **Farm Management: Select all that apply** |
| | STORAGE |
| | a. None on-site |
| | b. On-site capability |
| | RECORD KEEPING |
| | a. None on-site |
| | b. On-site capability |
| 12 | **Income: Select all that apply** |
| | a. Crop selling only |
| | b. Labor (daily, close-by or migratory) |
| | c. Commodity trading |
| | d. Other hired services (transport) |
| | e. Family/relatives |
| | f. Government (subsidy, pension, etc.) |
| 13 | **Membership in Community Based Organizations (CBOs): Select all that apply** |
| | a. Savings and Credit Cooperative (SACCO) |
| | b. Microfinance Institution (MFI) |
| | c. Village Savings and Loan Association (VSLA) |
| | d. Grower association |
| 14 | **Access to Formal Financial Services: Select all that apply** |
| | a. Savings |
| | b. Loan |
| | c. Credit |
| | d. Insurance |
| 15 | **Access to Informal Financial Services** |
| | a. Formal input supplier credit/loan |
| | b. Formal offtaker credit/loan |
| | c. Land owner |
| | d. Informal trader |
| | e. Local money lender |
| 16 | **Access to Markets: Select type** |
| | a. No intermediary, direct to local markets |
| | b. Single intermediary, informal trader |
| | c. Single intermediary, aggregator organization |
| | d. Single intermediary, public sector actor |
| | e. Single intermediary, formal enterprise |
| | f. Multiple intermediaries |
| 17 | **Access to Digital Technology: Select type** |
| | a. Mobile handset, basic |
| | b. Mobile handset, feature phone |
| | c. Mobile handset, low-cost smartphone |

This table can be used as a segmentation profile tool:

| Characteristic | Responses | Implications |
|---|---|---|
| *1. Product orientation* | | • *Indicates which value chain attributes will apply* |
| *2. Population Segment* | | • *Indicates total size of customer base* |
| *3. Landholding size* | | • *Indicates likely income*<br>• *Indicates production capacity* |
| *4. Land Management/ Ownership* | | • *Indicates whether farmers have additional costs related to accessing arable land*<br>• *Indicates whether there may be limitations to increasing production capacity without land title* |
| *5. Gender Distribution* | | • *Indicates what other financial management obligations may exist*<br>• *Indicates potential level of KYC documentation or other formal documentation available* |
| *6. Yield Expectations* | | • *Indicates likely income* |
| *7. Crop/Livestock Mix* | | • *Indicates which value chain attributes will apply*<br>• *Indicates degree of diversification and sophistication* |
| *8. Inputs requirements* | | • *Indicates size and frequency of input related expenses* |
| *9. Labor* | | • *Indicates whether payroll obligations exist requiring funds and payment mechanisms* |
| *10. Farming practices* | | • *Indicates whether farm employs equipment or other capital* |
| *11. Farm management* | | • *Indicates whether farm uses storage facilities and whether it employs sophisticated record keeping* |
| *12. Income* | | • *Indicates level and diversification of income and ability to pay for DFS* |
| *13. Memberships (e.g. CBOs)* | | • *Indicates connection to formal institution that can provide credit worthiness information, savings platforms, agricultural information, buying centers* |
| *14. Access to formal financial services* | | • *Indicates connection to formal financial sector, awareness of formal offerings* |
| *15. Access to informal financial services* | | • *Indicates connection to informal sources of working capital, basic awareness of financial product concepts* |
| *16. Access to markets* | | • *Indicates degree of flexibility as to where the farmer sells product*<br>• *Indicates access to market and pricing information* |
| *17. Access to digital technology* | | • *Indicates appropriateness of digital technology for account access*<br>• *Indicates ability to afford and use digital technology* |

## Tool 5: Go To Market Reference Materials

This section contains materials intended to support DFS providers that have reached the go to market phase of their offering development. It includes a reference table with descriptions of specific components organized into categories (i.e. personnel, product, marketing) and sub-categories. There is also a check list to help DFS providers assess whether they have considered key components of a training and support strategy for rural agent and merchants.

| Go To Market Component | Description |
|---|---|
| **PERSONNEL** | |
| ***Head Office*** | |
| *Sr. Management Steering Committee* | • *Cross-functional, bringing together relevant departments/units that may not always convene in a traditional product development cycle: Marketing/Promotion, Sales, IT, Supervision.*<br>• *Responsible for pushing project team to define core assumptions regarding adoption and uptake, and to assess multiple projection scenarios (over a 3+ year time horizon) to identify options to manage service roll-out and growth depending on market conditions and developments.*<br>• *Diverse representation can alleviate delays or disruptions in product development or implementation by surfacing issues or constraints (due to IT, legal, or supervisory requirements) that may not have been addressed in the initial research/design phase.* |
| *Dedicated DFS Business Unit* | • *May stand alone or report into a larger unit.*<br>• *Within banks, DFS offerings are usually managed by a separate Agency Banking Unit with a direct reporting line into the VP level with direct Board oversight.*<br>• *Within MNOs, DFS offerings have been managed by existing units or by stand-alone units that report into the Airtime Sales VP or the Chief Commercial Officer.* |
| *Call Center* | • *Purpose is to do more than address and catalogue customer queries or complaints.*<br>• *It should serve as a first-line service touch-point for customers, agents, and merchants.*<br>• *Will want to train, manage and measure call center staff against these roles, not simply the speed or accuracy with which they complete the call encounter.*<br>• *For customers, inquire about ease of activation process and quality of service (QoS) of registration agent, remind about core offering (information, banking, payments), and express appreciation for product adoption. Solicit suggestions or areas of improvement.*<br>• *For agents and merchants, inquire about ease of activation and QoS of registration agent, probe for customer issues, preferences, validate assumptions about operational and technical elements of service (i.e. software, hardware, connectivity).* |
| ***Regional*** | |
| *DFS Manager* | • *Manage local DFS promotion and activation teams.*<br>• *Management's KPIs should balance customer acquisition targets with indicators linked to service location quality, location, reputation, and QoS.* |
| *Agri-finance Unit* | • *If there is a credit, lending or insurance component to the DFS offering, it will be necessary to recruit at least one senior agronomist to assist with portfolio management.*<br>• *A small number of junior agronomists may also be appropriate to support field staff charged with account origination and processing.* |

| | |
|---|---|
| ***Local/Branch*** | |
| *DFS Point of Contact* | • *Oversee ATL/BTL campaign activities.*<br>• *Coordinate teams of mobile agents for activation/promotional campaigns.*<br>• *Oversee account application processing/review.*<br>• *Lead external partner relationship outreach with agri-value chain actors.*<br>• *Emphasis on ability to build relationships instead of simply creating a sales channel.* |
| **PRODUCT** | |
| *Business Case/Financials* | • *Identify targets for customer acquisition and activity; targets, growth rates, and timelines need to reflect a realistic trajectory given the rural market context.*<br>• *Quantify projected revenues using multiple growth trajectories.*<br>• *Quantify projected costs that consider eventual shifts in marketing and activation responsibilities onto rural partners.*<br>• *Demonstrate commercial viability that accounts for different scenarios of customer enrollment and activity rates.* |
| *Key Features* | • *Define dominant use case, which will create the foundation for the marketing campaign.*<br>• *Identify secondary use cases that will help establish product relevance in minds of rural customer segments and drive commercial growth.*<br>• *Importance of leveraging views of frontline staff responsible for marketing, activation and after-sales service.* |
| *Pricing Parameters & Rationale* | • *Prudent to anticipate potential shifts in legal, regulatory or policy frameworks (especially as they relate to taxation and licensing permissions) that will impact cost structure and service management at an operational level.*<br>• *Importance of creating "play space" to allow for adjustments in market based on competition or shifting demand.*<br>• *Options could include: small cost reductions, internal promotions, cross-promotion with corporate clients or partners.* |
| **MARKETING** | |
| ***Above the Line (ATL)*** | |
| *Print* | • *Print can include posters, fliers, stickers/adhesives.*<br>• *Purpose is to disseminate brand logo and key message in the customer consciousness.*<br>• *Make sure agents and merchants get collateral upon activation and that the positioning of printed materials is done to optimize brand visibility.*<br>• *Billboard and building painting is for introducing core brand and messaging.*<br>• *Painting has an added-value in rural areas in that it benefits ecosystem participants (acquired agents or merchants) and may entice others to register (merchants).* |

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| *Radio* | • *Has the widest distribution, but messaging should be tailored where regional dialects are more commonly used among rural communities and national language implies an urban listenership.*<br>• *Will need to develop messaging content to ensure service value proposition resonates with rural customer segments.*<br>• *Time campaigns to coincide with agricultural cycles and patterns.*<br>• *Timing to coincide with broadcast programming that is primarily agricultural in nature (farmer call-ins/radio talk shows).*<br>• *Many NGOs with agriculture development projects will fund agri-extension broadcasting and there may be opportunities to join those broadcasts.* |
| *TV* | • *Look for media companies that have identified a lower mass market segment as the priority a customer base that is more regional than national in focus.*<br>• *Identify programming with the greatest potential to reach rural customers.* |
| *Internet* | • *Best addressed to SMEs operating as last-mile distributors/aggregators or agribusinesses above farmers on the inputs and outputs side.*<br>• *Smartphone penetration, mobile internet usage is higher among this segment vs. farmers.*<br>• *Consider relatively value and impact of aggressive push campaigns or more organic consumption driven by relationships and social media channels.* |
| ***Below the Line (BTL)*** | |
| *Stand-alone event* | • *Chosen because of location and likely foot traffic, can be used as an initial wave to focus attention on establishing brand recognition.* |
| *Piggyback Local Event* | • *A recurring social or economic activity (i.e. sporting event, market day).* |
| *Community Group Gathering* | • *Chosen because the attendees are motivated by a specific purpose, financial, agricultural, or social.*<br>• *Many development projects are also actively engaged in creating or strengthening VSLAs, which creates access to a dedicated group that exists for an explicit financial purpose.* |
| *Door-to-Door* | • *Staff interact with individual customers to encourage registration and activation.* |
| *Local Champions/ Brand Ambassadors* | • *Local government, religious leaders, community elders should all be candidates.*<br>• *Even if they may not be active users, if they can understand and appreciate how the service works and why it may benefit others in the community, they can help stimulate registration.* |
| **PROMOTION** | |
| *Activation* | • *Airtime/data bundles.*<br>• *Product cross-sell.*<br>• *Lottery draw for aspirational products out of reach.* |
| *Activity* | • *Preferential rates on core offering if additional transactions are conducted.*<br>• *Link to aspirational products that are stretch purchases (i.e. bicycle, radio, mobile handset accessories).* |
| *Loyalty* | • *Rewards for consistent use or expanded use.*<br>• *Link rewards to other products that benefit external partners linked to agri-value chains (e.g. product discounts).* |

| ***Service Distribution & Management*** | |
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| *Identification & Selection* | *Selection criteria and evaluation scoring for agents or merchants should include multiple tiers of attributes. Three proposed tiers appear below: basic, hard, and soft.*<br>*"Basic" Attributes*<br>• *License, tax ID, additional documentation*<br>• *Infrastructure and energy source*<br>• *Store front location*<br>• *Type of enterprise*<br>*"Hard" Attributes*<br>• *Years in business*<br>• *Hours of operation (# of days, opening and closing times)*<br>• *Operational management / Role of owner*<br>• *Access to financial services (business credit or loan)*<br>• *Degree of mobile technology familiarity and usage*<br>• *Client footfall and average transaction time*<br>• *Cash handling practices (i.e. lock box, till, daily deposits, etc.)*<br>*"Soft" Attributes*<br>• *Business plans/motivation (new launch, growth, expansion)*<br>• *Enterprise's reputation and owner's standing in community*<br>• *Quality of products and service offered*<br>• *Client engagement (e.g. difference between visiting your pharmacist and pumping gas)*<br>• *Personnel demographics (age, gender)*<br>*Specific to agents*<br>• *Financial products are more complicated and more sensitive for customers. How they treat rural customers in these transactions is very important.*<br>• *Criteria may need to be more selective. Not selling airtime/data or FMCG products.*<br>*Specific to merchants*<br>• *Acquisition strategy needs to follow established purchase or trading patterns of retail customers and small agribusinesses.*<br>• *Basic requirements are fewer in terms of core infrastructure but issues of location, reputation, and quality of service are just as relevant.* |

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| *Training, Support and Management* | *DFS Providers will want to apply a similar approach to training rural agents and merchants, with four elements to consider:*<br>• *Venue – Trade-offs to centralized vs. decentralized training locations should be identified and weighed.*<br>• *Techniques – How content is presented and conveyed impacts how information is absorbed and retained.*<br>• *Cadence – rural service networks are not 'switched on,' they are grown and tended; balancing cost with quality is key.*<br>• *Attendance – rural business owners often outsource duties to other hired staff and training teams will want to be cognizant of timing and participation to ensure that appropriate people are present.*<br>*Trained agents and merchants will require different levels of support, with agents requiring more frequent and in-depth outreach focused on customer awareness, education and outreach.*<br>• *Agents provide "higher touch" customer experiences; should be actively monitored and properly supported through in-person and remote channels (i.e. field reps and call center).*<br>• *Merchant support may have more to do with responding to FAQs from their customers and ensuring that their marketing and promotional materials have been supplied and are sufficiently visible both outside and inside the store.*<br>*Rural service network management should prioritize and measure responsiveness to agent and merchant queries, either in-person or remote via call center.*<br>• *This is especially true for queries and complaints relating to performance issues specific to software or hardware.*<br>• *A rapid and responsive support service channel can accelerate trust and credibility and contribute to low churn rates among agents and merchants.*<br>*Support to affiliated merchants can be broader than DFS and may include BDS type activities designed to strengthen an affiliated merchant or enterprises location's core business.*<br>• *Some smaller enterprises could benefit from improved knowledge and techniques to calculate cash flow, track inventory, and project restocking needs.*<br>• *Other enterprises may benefit from support that allows them secure certificates or registrations that will help them qualify for new classes of financial products (i.e. purchase-order finance or other working and investment capital packages).* |
| **CUSTOMER ACQUISITION & AFTER-SALES SERVICE** | |
| *Enrollment & Activation* | *Use of internal activation teams*<br>• *Can be drawn from pool of existing credit/loan officers or local sales representatives.*<br>• *Even among experienced local sales representatives and managers, there will be a need to allocate time and resources for adequate training and capacity building.*<br>• *Sales cycle is not the same as SIM registration of basic FMCGs, requires time and explanation; expectations, targets, and KPIs need to balance quantity with quality.*<br>• *Sales tactics must be different for different users (individual customer vs. enterprise vs. corporate); will require developing unique value propositions and tailoring the outreach and sales pitch accordingly.*<br>*Use of external firms for activation campaigns*<br>• *Firms with mass-market activation experience may not necessarily be well-equipped or staffed to deliver without active engagement and management from provider.*<br>• *External frontline staff will need the same knowledge and training as assigned internal staff.* |

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| *Post-Enrollment* | *Use of call centers*<br>• *Can play a versatile role that projects provider support into rural areas and increases customer touch remotely, not only for service or product redress.*<br>• *Train and manage staff to not only process and address questions or grievances but remind rural customers of use cases and request service feedback (i.e. connectivity, agent QoS, product features, merchant acceptance locations).*<br>• *Streamline the access process for agents and merchants by allocating dedicated codes and staff for agents and merchants.*<br>• *Customer may use the general service care code but there should be a way to identify the call as mobile money related.*<br>• *Consider using waiting periods to disseminate key messages about rural use cases (school fees, money transfer, storing and moving with value).* |

## Agent or Merchant Training and Support: Check List

| ***Venue*** | ***Description/Relevance*** | ***Status*** | ***Importance*** |
|---|---|---|---|
| *HQ/Capital* | • *Opportunity to rally large numbers of agents; communicate network wide message / updates.*<br>• *Prestige associated with visits to HQ/capital.*<br>• *Access to more training resources/support infrastructure.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| *Regional* | • *Allows provider to gather agents in smaller groups by distinct geography, likely with similar economic activity and eventual DFS transaction patterns.*<br>• *Smaller, off-site venues lend themselves to reinforcing new concepts, products, or promotions.*<br>• *Can more easily address issues/concerns resulting from new service features or changes.*<br>• *Venues are easier, less expensive for agents to reach.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| *District level/on-site* | • *More intimate / comfortable setting for agents.*<br>• *Provides field staff with greater context re: operating environment and demand dynamics.*<br>• *Activities that reinforce practice/execution of discrete transactions, customer service issues are better suited vs. new product concepts or changes to service.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| ***Techniques*** | ***Description/Relevance*** | ***Status*** | ***Importance*** |
| *Scenario-based instruction* | • *Introduce and describe use cases grounded in a specific context.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| *Pictograms / Visual aids* | • *Supplements written materials and oral presentation.*<br>• *Reinforces key themes and overall narrative of training.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |

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| *Simulation* | • *Role-play for agents in training to transact as agents and as clients with different needs/requests.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| *P2P learning (e.g. veteran agents)* | • *Involve top performing agents at various stages of the training, esp. during simulation, to provide additional "voice" with credibility.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| ***Cadence*** | ***Description/Relevance*** | ***Status*** | ***Importance*** |
| *One-off/Infrequent* | • *Initial introduction to offering, agent roles and responsibilities.*<br>• *Opportunity to rally large numbers of agents together.*<br>• *Introduce new concepts at a high level and review progress.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| *Periodic/Frequent* | • *As much a diagnostic activity as a training/support.*<br>• *Allows field team to assess individual performance as well as build skills.*<br>• *Reinforce specific features associated with new products, promotions, etc.* | *Have* ☐<br>*Do Not Have* ☐ | *High* ☐ *Med* ☐ *Low* ☐ |
| ***Audience*** | ***Description/Relevance*** | ***Status*** | ***Include*** |
| *Owners* | • *Signatories to any contract but less likely to conduct DFS operations on a daily basis.*<br>• *Should attend out of respect and to build awareness of general duties for oversight purposes.*<br>• *Older age cohort; less familiar with technology in general.*<br>• *Literacy/numeracy and formal education may be more of a challenge; such skills/knowledge may be lacking but position as owner should be recognized.* | *Invited* ☐<br>*Not Invited* ☐ | *Yes* ☐ *No* ☐ |
| *Managers* | • *Responsible for day-to-day operations.*<br>• *May also assume agent role or decide to train trusted staff and support owner with general oversight.* | *Invited* ☐<br>*Not Invited* ☐ | *Yes* ☐ *No* ☐ |
| *Staff/Family* | • *Individual who directly interacts with customers and conducts the majority of transactions and is assigned additional DFS agent duties.*<br>• *In most medium to larger retail outlets or shops, this person is entry level staff, possibility of high turnover.*<br>• *In micro- to small enterprises, this person is often a trusted immediate or extended family member.*<br>• *Staff are typically younger, with higher literacy levels, familiarity with mobile tech and technology in general.* | *Invited* ☐<br>*Not Invited* ☐ | *Yes* ☐ *No* ☐ |

# SECTION 7

## *Glossary of Key Terms*

| TERM | DEFINITION |
|---|---|
| **Agent** | *A person or business contracted to process transactions for users. The most important of these are cash in and cash out (that is, loading value into the mobile money system, and then converting it back out again). In many instances, agents also register new customers. Agents usually earn commissions for performing these services. They also often provide front-line customer service, such as teaching new users how to complete transactions on their phones. Typically, agents will conduct other kinds of business in addition to mobile money. Agents will sometimes be limited by regulation, but small-scale traders, MFIs, chain stores, and bank branches serve as agents in certain markets. Some industry participants prefer the terms 'merchant' or 'retailer' to avoid certain legal connotations of the term 'agent' as it is used in other industries. (GSMA, 2014).* |
| **Agent Banking** | *Banking services, often limited, carried out by an agent.* |
| **Rural Aggregation Point / Rural Buying Point** | *A point in the value chain that touches groups of smallholder farmers either directly (e.g., producer organizations or cooperatives) or indirectly through relationships (e.g., a buyer with contracts with many individual farmers); aggregation points increase the efficiency of the provision of financing.* |
| **Aggregator** | *A service provider with existing integrations to a number of MNOs and/or PSPs to facilitate billing, technical, and operational relationships and interfacing across operators via one link to the aggregator, as opposed to separate integrations with each provider.* |
| **Alternative Data** | *Non-financial data from MNOs, social media, and their transactional databases. Access to other alternative data such as payment history and utility bills can also enable the creation of credit scores for clients who may be otherwise unserviceable.* |
| **Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT)** | *AML/CFT are legal controls applied to the financial sector to help prevent, detect, and report money-laundering activities. AML/ CFT controls include maximum amounts that can be held in an account or transferred between accounts in any one transaction, or in any given day. They also include mandatory financial reporting of KYC for all transaction in excess of $10,000, including declaring the source of funds, as well as the reason for transfer.* |
| **Automatic Teller Machine (ATM)** | *An electronic telecommunications device that enables the customers of a financial institution to perform financial transactions without the need for a human cashier, clerk, or bank teller. ATMs identify customers via either a magnetic or chip-based card, with authentication occurring after the customer inputs a PIN number. Most ATMs are connected to interbank networks to enable customers to access machines that do not directly belong to their bank, although some closed-loop systems also exist. ATMs are connected to a host or ATM controller using a modem, leased line or ADSL.* |

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| **Application Program Interface (API)** | *A method of specifying a software component in terms of its operations by underlining a set of functionalities that are independent of their respective implementation. APIs are used for real-time integration to the CBS/MIS, which specify how two different systems can communicate with each other through the exchange of 'messages'. Several different types of APIs exist, including those based on the Web, TCP communication, and direct integration to a database, or proprietary APIs written for specific systems.* |
| **Average Revenue Per User (ARPU)** | *ARPU is a measure used primarily by MNOs, defined as the total revenue divided by the number of subscribers.* |
| **B2B2C** | *Business to business to consumer. Used in reference to retail supply chain payments that involve a supplier, merchant, and customer* |
| **Branchless Banking** | *The delivery of financial services outside of conventional bank branches through the use of retail agents and ICT.* |
| **Call Center** | *A centralized office used for the purpose of receiving or transmitting a large volume of requests by telephone. As well as handling customer complaints and queries, it can also be used as an alternative delivery channel to improve outreach and attract new customers via various promotional campaigns.* |
| **Chain Traceability** | *The recording and transferring of product or process data through a supply chain between various organizations and locations involved in the provenance of food.* |
| **Channel** | *The customer's access point to a financial service provider, namely who or what the customer interacts with to access a financial service or product.* |
| **Contract Farming** | *A transaction between buyers and agricultural producers that is governed by a contract that may stipulate product and quality attributes, production methods, and/or the commitments for the future sale (e.g., timing, location, price)* |
| **Credit History** | *A record of a borrower's repayment of debts; responsible repayment is interpreted as a favorable credit history, while delinquency or defaults are factors that create a negative credit history. A credit report is a record of the borrower's credit history from a number of sources, traditionally including banks, credit card companies, collection agencies, and governments.* |
| **Credit Scoring** | *A statistical analysis performed by lenders and FIs to access a person's credit worthiness. Lenders use credit scoring, among other things, to arrive at a decision on whether to extend credit. A person's credit score is a number between 300 and 850, with 850 being the highest credit rating possible.* |
| **Digital Credit** | *A product offered under digital finance. Lending that involves limited in-person contact, leveraging digital infrastructure.* |
| **Digital Financial Inclusion** | *Access to and ability to use at least one formal transactional account that can perform most, if not all, of payment needs; safely store value; and serve as a gateway to other financial services.* |
| **Digital Financial Services** | *Banking and financial products that are delivered or accessed through digital channels.* |

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| **Electronic banking** | *The provision of banking products and services through electronic delivery channels.* |
| **e-money** | *Short for 'electronic money', it is stored value held in accounts such as e-wallets or on cards. Typically, the total value of e-money issued is matched by funds held on one or more bank accounts and usually held in trust, so that even if the provider of the e-wallet service was to fail, users could recover the full value stored in their accounts.* |
| **e-wallet** | *An e-money account belonging to a DFS customer and accessed via mobile phone.* |
| **Financial Institution (FI)** | *A provider of financial services including credit unions, banks, non-banking financial institutions, microfinance institutions, and mobile financial service providers.* |
| **Float (Agent Float)** | *The balance of e-money, or physical cash, or money in a bank account that an agent can immediately access to meet customer demands to purchase (cash in) or sell (cash out) electronic money.* |
| **Interactive Voice Response (IVR)** | *A technology that allows a computer to interact with humans through the use of voice and dual-tone multi-frequency (DTMF) tones input via keypad. IVR allows customers to interact with a company's host system via a telephone keypad or by speech recognition.* |
| **Interoperability** | *With respect to mobile money and other digital financial services, "interoperability" generally refers to platforms that permit the transfer of funds from mobile accounts of one service provider to mobile accounts of another service provider.* |
| **Know Your Customer (KYC)** | *Rules related to AML/CFT that compel providers to carry out procedures to identify a customer and that assess the value of the information for detecting, monitoring, and reporting suspicious activities.* |
| **Long-term financing** | *Financing with a term of more than one year (typically for renovation or equipment).* |
| **Master Agent** | *A person or business that purchases e-money from a DFS provider wholesale and then resells it to agents, who in turn sell it to users.* |
| **Merchant** | *A person or business that provides goods or services to a customer in exchange for payment.* |
| **Microfinance Institution (MFI)** | *A financial institution specializing in banking services for low-income groups, small-scale businesses, or individuals.* |
| **Mobile banking** | *The use of a mobile phone to access conventional banking services. This covers both transactional and non-transactional services, such as viewing financial information and executing financial transactions. Sometimes called 'm-banking'.* |
| **Mobile money service/ mobile financial service (MFS)** | *A DFS that is provided by issuing virtual accounts against a single pooled bank account as e-wallets, that are accessed using a mobile phone. Most mobile money providers are MNOs or PSPs.* |
| **Mobile Network Operator (MNO)** | *A company that has a government-issued license to provide telecommunications services through mobile devices.* |
| **Mobile Phone Type - Feature Phone** | *A type of mobile phone that has more features than a standard mobile phone but is not equivalent to a smartphone. Feature phones can provide some of the advanced features found on a smartphone such as a portable media player, digital camera, personal organizer, and Internet access, but do not usually support add-on applications.* |

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| **Mobile Phone Type - Smartphone** | *A mobile phone that has the processing capacity to perform many of the functions of a computer, typically having a relatively large screen and an operating system capable of running a complex set of applications, with internet access. In addition to digital voice service, modern smartphones provide text messaging, e-mail, web browsing, still and video cameras, MP3 players, and video playback with embedded data transfer, GPS capabilities.* |
| **Mobile Phone Type - Standard Phone** | *A basic mobile phone that can make and receive calls, send text messages and access the USSD channel, but has very limited additional functionality.* |
| **Moveable**<br><br>**Collateral** | *Non-affixed assets, such as inventory, accounts receivable, livestock, crops, equipment and machinery, which are used as collateral on loans, typically in secured transactions.* |
| **Noncommercial Smallholders** | *Farmers who own no land or less than one hectare and produce staple crops mostly consumed by the household for subsistence and have very little, if any, engagement with any markets as a seller of food.* |
| **Open Data** | *Data that anyone can access, use or share.* |
| **Out-grower Scheme** | *An arrangement in which companies ensure supply of agriculture product through formal or informal contracts with individual farmers or groups of farmers.* |
| **Purchase Order Financing** | *Not a general loan or line of credit; it is a transaction-specific form of short-term working-capital finance. It allows an SME to obtain the capital necessary to fill a particularly large customer order – larger than it could fill without assistance – that may present a growth opportunity. The capital finances the purchase of the raw material, packaging, production, and shipment of the goods ordered by the client. POF is provided by specialized commercial financiers, usually managed by trade finance and merchant banking professionals, and professionals from manufacturing and trading. Banks and non-bank financial institutions do not provide POFs.* |
| **Service Level Agreements (SLAs)** | *The service contract component between a service provider and customer. SLAs provides specific and measurable aspects related to service offerings. For example, SLAs are often included in signed agreements between internet service providers and customers. SLA is also known as an Operating Level Agreement (OLA) when used in an organization without an established or formal provider-customer relationship.* |
| **Short-Term Financing** | *Financing with a term of less than one year (typically for inputs, harvest, trade, and export).* |
| **Side Selling** | *A farmer's sale of its product to a buyer other than the agreed-on buyer. Farmers may fail to honor contracts with buyers for a number of reasons (buyers pay late, or prices in the local market are higher than the original price agreed on with the buyer, for example).* |
| **Smallholder Farmers (or smallholders)** | *Farmers who cultivate crops or livestock on up to one Ha of land.* |
| **Smallholders in Less Organized Value Chains** | *Farmers with up to one Ha of land that produce stable crops and some cash crops consumed by the household for subsistence and producing a reliable surplus sold through relatively informal, local markets.* |

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| **Smallholders in Highly Organized Value Chains** | *Farmers with at least 2 hectares of land that produce cash crops and relatively few staple crops; while some production may be consumed by the household for subsistence, a reliable surplus could be sold through relatively informal, local market cash crops and are sold in regional or export markets through contract farming.* |
| **SME Lending** | *Credit facilities designed for small and medium enterprises* |
| **Social Lending** | *Impact driven smallholder agricultural lending that is primarily driven by social and environmental intent to support smallholder farmers, likely with lower than risk-adjusted net market returns.* |
| **Software as a Service (SaaS)** | *A software licensing and delivery model in which software is centrally hosted and licensed on a subscription basis.* |
| **Supply chain** | *The set of buy-sell interactions as goods flow from raw materials through production to the final retailer where consumers can buy them. Often used interchangeably with commercial supply chain and value chain.* |
| **Unstructured Supplementary Service Data (USSD)** | *A protocol used by GSM mobile devices to communicate with the service provider's computers/network. This channel is supported by all GSM handsets, enabling an interactive session consisting of a two-way exchange of messages based on a defined application menu.* |
| **Value Chain** | *The series of steps and related actors that transform raw materials into finished products.* |
| **Value Chain (Less Organized)** | *Value chains (often involving "open marketed crops") that offer farmers have a variety of marketing options and opportunities to sell to various buyers. Loose value chains present more opportunities for competition and may present producers with a variety of options for marketing their crops.* |
| **Value Chain (Highly Organized)** | *Value chains with clearly established relationships and a single channel, usually involving contracts or formal agreements. Often these involve closed marketed crops,' which pose transportation challenges due to bulk or perishability, thus making side selling costly and unlikely. In these value chains, producers have few or only one option to sell their products. Tight value chains may include export commodities.* |
| **Value Chain Finance** | *Any or all of the financial services, products, and support services that flow to and/or through a value chain to address the needs and constraints of its participants in accessing finance, securing sales, procuring products, reducing risks, and/or improving efficiency (Miller and Jones 2010).* |
| **Warehouse receipts** | *Also known as inventory credits, a WHR finance system is based on receipts or – warrants – that prove ownership of a specific non-perishable commodity of a stated quality and condition stored in a specified location. When the commodity is pledged or sold by mere delivery of the receipt, the buyer or pledgee bank has the assurance, without physical inspection, that the specific commodity will be available when it is required.* |
| **Weather-based index insurance** | *Insurance that substitutes an indicator that is easy to measure for individual loss assessments (in this case, weather) as a proxy for the loss.* |

# SECTION 8

## *Resource Materials*


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4. Digitizing Value Chain Finance for Smallholder Farmers, Consultative Group to Assist the Poor (CGAP), 2017 http://www.cgap.org/sites/default/files/Focus-Note-Digitizing-Value-Chain-Finance-Apr-2017.pdf
5. Serving Smallholder Farmers: Recent Developments in Digital Finance, CGAP, 2014 https://www.cgap.org/sites/default/files/Focus-Note-Serving-Smallholder-Farmers-Jun-2014.pdf
6. Understanding Demand, Driving Innovation: Smallholder Households and Financial Services, CGAP, 2015 (https://www.smefinanceforum.org/sites/default/files/post/files/513471_gpfi_g20_roundtable_cgap_smallholder_demand_landscape_paper_draft_02_sep_15.pdf)
7. Designing Digital Financial Services for Smallholder Families, CGAP, 2015 (http://www.cgap.org/sites/default/files/Perspectives-Designing-Digital-Financial-Services-for-Smallholder-Families-Oct-2015.pdf)
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10. The Business Case for Digitally-Enabled Smallholder Finance, Dalberg and Rural and Agricultural Finance Learning Lab, 2016 (https://www.dalberg.com/system/files/2017-07/business_case_for_digitally_enabled_smallholder_finance.pdf)
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## About the Authors

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**Nicholas Lesher** has worked for nearly a decade in digital financial services – including branchless banking, mobile money, and e-vouchers. His work centers on market research to support requirements definition for DFS providers to improve existing offerings or more effectively target new consumer segments; agent network strategy, build-out and management; DFS project pilot implementation and evaluations for private, public, and NGO sector clients; as well as general program monitoring and evaluation involving the integration of digital technology to provide financial services to unbanked or underbanked populations. He has worked with a range of clients, including IFC, World Bank, UN and USAID, mobile telecommunications companies, financial institutions, digital payments companies, and international NGOs such as Mercy Corps, Catholic Relief Services, CARE, and PACT. He has worked on DFS-related projects in markets throughout the Caribbean, Asia, and Africa – notably Morocco, Jordan, Senegal, DR Congo, Tanzania, Malawi, Uganda, and Kenya.

**Meritxell Martinez** is an IFC Operations Officer working with banks, MFIs, and mobile network operators on financial development operations for the last 12 years; specifically, in the areas of market research, product development, digital financial services, and agriculture. She has experience in Latin America, Asia, the Balkans and mostly fragile countries in Africa. Before IFC, she worked for CGAP and the European Commission and was a research associate with UNICEF and Dvara during her studies. She has published on financial inclusion with CGAP and IFC on topics such as SME financing, inactivity of mobile wallets, agriculture and digital finance in Cote d'Ivoire, and impact evaluation in financial inclusion. Based in Abidjan, Cote d'Ivoire, Meritxell has a degree in Public Policy from Pompeu Fabra University in Barcelona, a Post-Graduate Degree in International Trade from Solvay Business School and a MSc in Public Administration/International Development from Harvard University.

**Hamilton McNutt** brings over ten years of experience in international development, with the last six years of his career being focused on digital financial services and digital payments. After starting his career in the classrooms of Washington, DC, Hamilton took a position at a small tech advisory firm based in Guatemala, where he helped small tech entrepreneurs develop and implement business plans to establish mesh networks in communities without access to connectivity. He later moved to Solimar International, a small consulting firm to develop and implement business plans for small and medium enterprises in Ecuador and Bolivia. Since 2011, Hamilton has focused on helping clients better understand how using digital payments can help improve transparency and lower costs while also helping to expand the access and relevancy of financial services for individuals who previously have operated entirely in cash. His work has taken him to over 20 countries, provided insights into a variety of sectors from education to agriculture, and exposed him to a variety of business models and digital channels that can continue to bridge the financial inclusion gap on a global level.

**Mandana Nakhai** has six years of experience advancing international economic development and cross-cultural exchange programs. She is passionate about the intersections of digital technology, access to financial services and sustainable and regenerative development. Currently, she works on initiatives to support digital financial services in agriculture, expanding access to women's use of digital financial services and mobile money agent network development. Mandana previously worked with ACDI/VOCA, researching adaptive learning in development projects, and with Accion's Center for Financial Inclusion in Bangalore, India on disability inclusive finance. Before her graduate studies at The Fletcher School, Mandana supported outreach programming to expand opportunities for academic and cultural exchange through the Fulbright Scholar Program at U.S. higher education institutions that serve minority students, faculty and staff.

## The Partnership for Financial Inclusion

The Partnership for Financial Inclusion is a $37.4 million joint initiative of IFC and Mastercard Foundation to expand microfinance and advance mobile financial services in Sub-Saharan Africa. It brings together the intellectual and financial capital of the Foundation with IFC's market knowledge, expertise and client base. The Partnership is also supported by the Bill & Melinda Gates Foundation and the Development Bank of Austria (OeEB, Oesterreichische Entwicklungsbank AG), and collaborates with knowledge partners such as the World Bank and the Consultative Group to Assist the Poor (CGAP). An important objective of the partnership is to contribute to the global community of practice on financial inclusion, and to share research and lessons learned. This publication is part of a series of reports published by the partnership. To find out more, please visit www.ifc.org/financialinclusionafrica.

## Strategic Impact Advisors

SIA is a woman-owned, global consulting firm that supports the creation and expanded use of financial services and digital solutions to transform a wide variety of economic activities and access to finance, information, and services. We assess market opportunities, advise service providers on new digital product strategies, assist donors and NGOs in leveraging digital solutions to enhance program impact, and support training and knowledge sharing to reinforce demand-side initiatives. We bring expertise and qualifications in digital financial services across multiple sectors from banking, mobile telecom, and strategic consulting, as well as digital solutions and related data analytics. SIA also provides end-to-end support for digital solutions deployments. For the past decade, we have worked to promote DFS and completed more than 50 projects.

## Mastercard Foundation

Mastercard Foundation seeks a world where everyone has the opportunity to learn and prosper. The Foundation's work is guided by its mission to advance learning and promote financial inclusion for people living in poverty. One of the largest foundations in the world, it works almost exclusively in Africa. It was created in 2006 by Mastercard International and operates independently under the governance of its own Board of Directors. The Foundation is based in Toronto, Canada. For more information and to sign up for the Foundation's newsletter, please visit www.mastercardfdn.org. Follow the Foundation at @MastercardFdn on Twitter.

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IFC – a sister organization of the World Bank and member of the World Bank Group – is the largest global development institution focused on the private sector in emerging markets. We work with more than 2,000 businesses worldwide, using our capital, expertise, and influence to create markets and opportunities in the toughest areas of the world. In fiscal year 2018, we delivered more than $23 billion in long-term financing for developing countries, leveraging the power of the private sector to end extreme poverty and boost shared prosperity. For more information, visit www.ifc.org.

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