Market Mapping

an IFC—BMZ initiative

Scaling up Farmer Financing through AgTechs in Sub-Saharan Africa

IN PARTNERSHIP WITH

Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung

IFC International Finance Corporation WORLD BANK GROUP

Creating Markets, Creating Opportunities

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Please note that this report is complemented by a **Mapping of Digital Solutions** report, which offers a more comprehensive overview of climate-related solutions for financial services providers.

ACRONYMS & GLOSSARY

Agri-SME	Agricultural small- and medium-sized enterprises
B2B	Business to business
B2C	Business to consumer
BMZ	Federal Ministry for Economic Cooperation and Development
FSDP	Financial Systems Development Programme
IFC	International Finance Corporation
ISF	Industry leading research Strategic advisory Financial advisory
MSME	Micro-, small-, and medium-sized enterprises
SHF	Smallholder farmer
UNCDF	United Nations Capital Development Fund
WAEMU	West African Economic and Monetary Union

AgTech: digitally enabled businesses heavily involved in the agricultural value chain.

Geo-location: the identification of the geographic location of a user based on their geographic coordinates.

PAYGO: Pay-as-you-go (PAYGO) is a financing technology that allows end-users to pay for a product or service in weekly installments or whenever they are financially liquid.

Satellite data: satellite imagery and earth observation data of the earth's surface and its atmosphere.

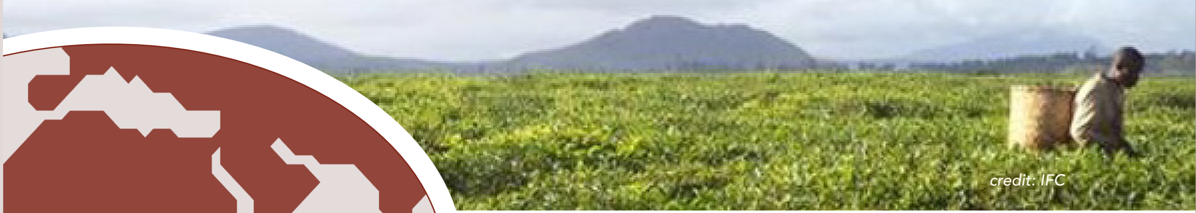
Remote sensing: a surveying and data collection technique, used to survey and collect data regarding an object.

Executive Summary

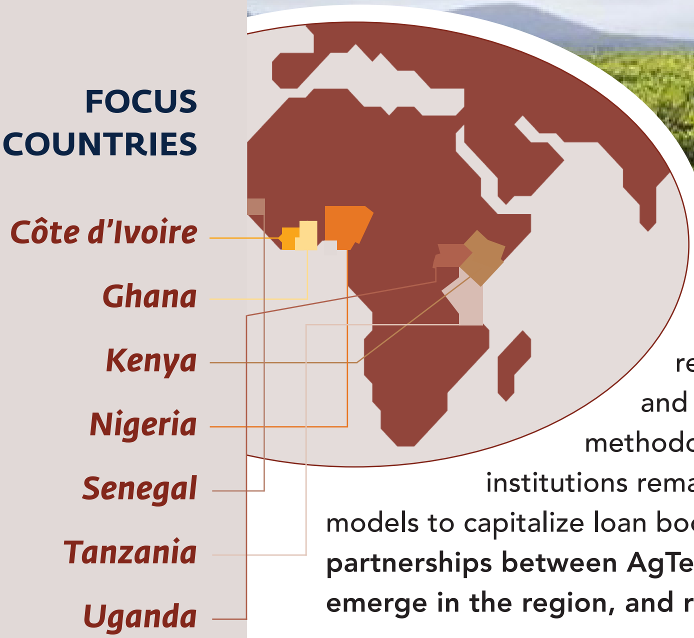
The burgeoning AgTech scene in sub-Saharan Africa demonstrates significant potential to capitalize on digitization and innovation to facilitate the provision of financial services for historically un- or under-banked consumer segments. This is especially important for the agriculture sector which is plagued by considerable financing gaps - the gap for agricultural small- and medium-sized enterprises (agri-SMEs) and smallholder farmers on the continent is estimated at $117 billion. In this context, this report explores how AgTechs can be a conduit for increased financing throughout seven markets in sub-Saharan Africa: ***Côte d'Ivoire, Ghana, Kenya, Nigeria, Senegal, Tanzania,*** *and* ***Uganda.***

Over the last decade, innovation in AgTech business models and the dissemination of mobile phones throughout the region have resulted in an optimal setting for AgTechs to flourish. A landscape assessment of the region revealed over 200 AgTech models operating across the seven countries of focus. As the AgTech market grows and diversifies, there has been a demonstrable shift in AgTechs expanding or pivoting their models to offer financial services. By leveraging their distribution channels, access to data, and technology, AgTechs are uniquely positioned to facilitate the credit and underwriting process at lower unit economics.

The sub-Sahara African AgTech market has a diverse mix of B2C models – who serve as direct enablers of finance – and B2B models – who work with a variety of value chain actors to indirectly enable the provision of financial services. When examining nuances in business models and value propositions, these AgTechs can be further categorized into six B2C and ten B2B model types.



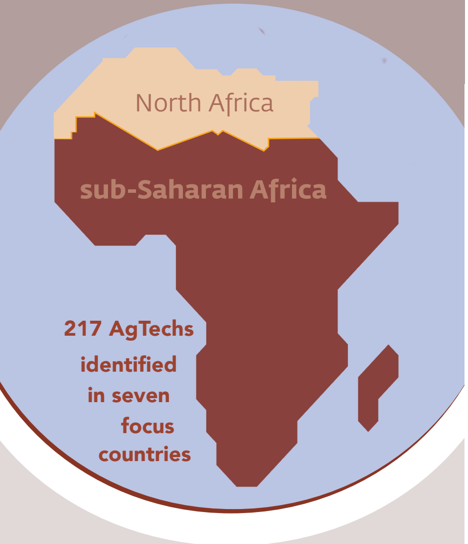
FOCUS COUNTRIES



Each model type possesses unique competencies to enable finance for SHFs and other value chain actors. Many of the AgTechs landscaped have a track record of working with historically unbanked segments and have established impressive in-house credit scoring methodologies. Despite this, it appears that local financial institutions remain hesitant to engage with these newer, riskier models to capitalize loan books. **This research found that, broadly speaking, partnerships between AgTechs and financial institutions are only beginning to emerge in the region, and remain highly dependent on country ecosystems.**

The seven countries of focus vary significantly in terms of maturity. Kenya, Nigeria, and Ghana are front-runners on the continent in terms of number and diversity of AgTech models. Each of these countries is supported by strong enabling ecosystems and relatively flexible regulatory environments. Uganda also appears to be maturing, with a few domestic AgTechs achieving product market fit. On the other hand, Tanzania, Senegal, and Côte d'Ivoire all have relatively underdeveloped AgTech markets and suffer from complex regulations.

This research showcases the dynamic, yet still nascent, AgTech sector in sub-Saharan Africa. While the sector has experienced significant growth, **AgTechs have not fully reached their potential to facilitate the provision of financial services for smallholder farmers and agri-SMEs.** In the coming decade, the sector will continue to mature both in the diversity of business models and the number of AgTechs operating across the region.



The agriculture sector is plagued by financing gaps — in sub-Saharan Africa alone, the gap for agricultural small- and medium-sized enterprises (agri-SMEs) and smallholder farmers is estimated at $117 billion.[1]

1. INTRODUCTION to Research

1. BACKGROUND

The recent rise of AgTechs - defined as digitally enabled businesses that are heavily involved in the agricultural value chain - has the potential to address information asymmetries, improve reach, de-risk rural customers, and facilitate the provision of financial services to these underbanked consumer segments. In this context, IFC engaged ISF Advisors to study how AgTechs can be a conduit for increased financing in the agricultural sector within seven markets in sub-Saharan Africa: **Côte d'Ivoire, Ghana, Kenya, Nigeria, Senegal, Tanzania,** and **Uganda.**

Through this analysis, ISF examined sector-level insights on the different AgTech models, as well as how market nuances influence the type and amount of AgTechs operating in each country. ISF's methodological approach pursued the following objectives:

1. **Outline a landscape of AgTechs operating in each of the seven countries;**
2. **Analyze the maturity and enabling environments of each country;**
3. **Develop a taxonomy of B2B and B2C models, including how they facilitate the provision of financial services.**

The resulting findings can inform further conversation and refinement in the sector, which will be crucial as the AgTech sector continues to evolve.


credit: World Bank/Marisa Zawacki

1 Based on $42B gap for smallholder farmers outlined in ISF's Pathways to Prosperity, in addition to the $75B gap for agri-SMEs outlined in ISF's state of the sector report, in collaboration with the CASA program ISF Advisors, "Pathways to Prosperity: Rural and Agriculture Finance State of the Sector Report 2019" (Feed the Future, Mastercard Foundation, Small Foundation, November 2019), https://isfadvisors.org/wp-content/uploads/2019/11/2019_RAF-State-of-the-Sector-10.pdf.

AgTech Landscape

Agriculture's perceived high risks and volatility dissuade traditional financial institutions and commercial banks from investing.

Additionally, farmers and agri-SMEs often lack the formal financial records necessary for commercial lending eligibility.

AgTechs present a key opportunity to provide smaller loans to agri-SMEs and smallholder farmers, and to make use of their distribution channels, access to data, and technology.

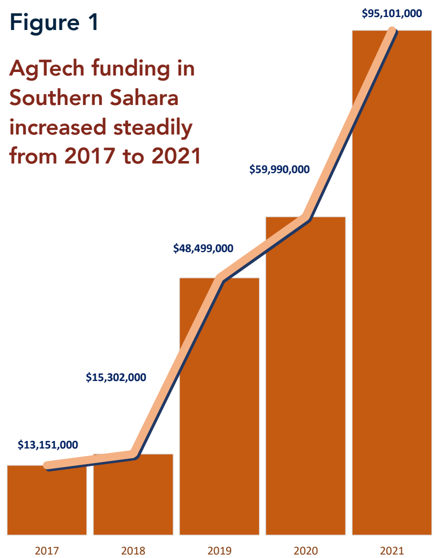
AgTechs have rapidly expanded in sub-Saharan Africa during the past decade, as demonstrated by increased venture capital funding.[1] This influx has been driven largely by technological advancements in both AgTech offerings and the enabling environment.

On the AgTech side, innovative business models—such as digital platforms and PAYGO offerings—capitalize on technology access and analyze data on rural customers. On the user side, increasing mobile penetration in the region allows users to interact with digital products and services and facilitate payments directly through mobile money.

Using industry leading resources and proprietary databases, ISF identified **217 AgTechs** operating in the seven focus countries—a substantial increase from the 71 models mapped globally in 2011.[2] **As investment levels increased, there has been a well-documented shift in AgTechs expanding or pivoting their models to include financial service provision.**[3] AgTechs are uniquely positioned to disaggregate funding into smaller ticket size loans for agri-SMEs and smallholder farmers, using their distribution channels, access to data, and technology to facilitate the credit and underwriting process at lower unit economics.

Figure 1

AgTech funding in Southern Sahara increased steadily from 2017 to 2021



Source: The African Tech Startups Funding Report, Disrupt Africa (2021)

1 DISRUPT Africa, "The African Tech Startups Funding Report 2021," 2021, https://mcit.gov.eg/upcont/Documents/Reports%20and%20Documents_122022000_ar_AR_The_African_Tech_Startups_Funding_Report_2021.pdf.

2 GSMA and IDH Farmfit, "Digital Agriculture Maps 2020 State of the Sector in Low and Middle Income Countries," 2021, https://www.gsma.com/r/wp-content/uploads/2020/10/GSMA-Agritech-Digital-Agriculture-Maps-2020-1.pdf.

3 Hemendra Mathur, "Pivoting From Agritech to Agri-Fintech," Inc42, December 5, 2021, https://inc42.com/resources/pivoting-agritech-to-agri-fintech/#:~:text=It%20is%20possible%20to%20improve,remain%20dependent%20on%20informal%20credit.

Countries of Focus

The seven countries analyzed for this study vary greatly in terms of market maturity and regulatory enabling environments. These differences are reflected in the capital flowing into these markets and the number of AgTechs that are able to successfully achieve product-market fit.

Kenya is the largest AgTech market in the region, capturing more than 70% of total 2021 market funding on the continent—with 100+ AgTechs operational, including 61 based in Nairobi.[4] **Nigeria** (25% of total AgTech funding, 30 companies) and **Ghana** are steadily emerging as additional leaders in the market. While Ghana has not seen the same influx of capital, it's home to 28 AgTechs and has experienced a steady increase in funded start-ups.

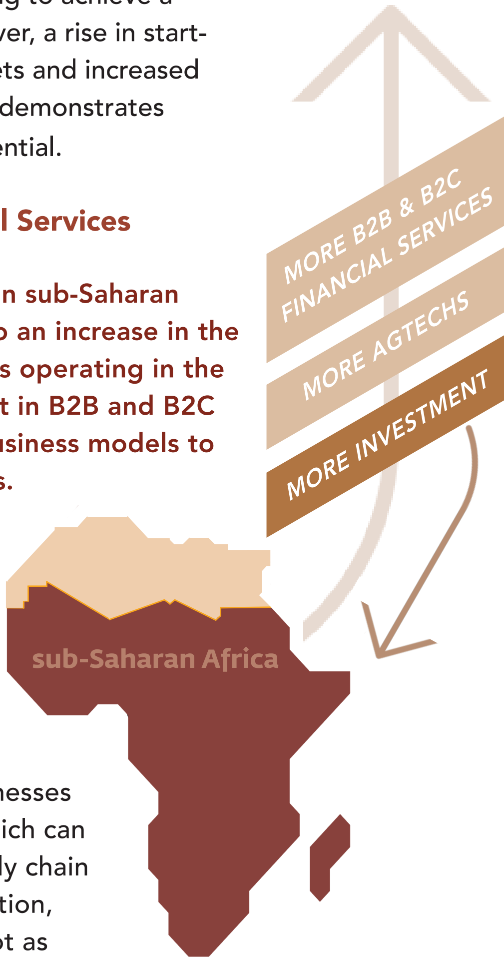
Uganda and **Tanzania** are less mature than these markets in terms of funding and number of AgTechs; however, they remain relatively large markets with 15 and 18 AgTechs headquartered there, respectively. Furthermore, Uganda has experienced one of the fastest growth rates in overall tech startup funding, up 376% from 2020.[5]

In Francophone Africa, **Senegal** and **Côte d'Ivoire** are relatively small markets, with fewer than **10 AgTechs** providing financial services in each country. Furthermore, the majority of AgTechs headquartered in these markets are still attempting to achieve a product market fit. However, a rise in start-up funding in these markets and increased flexibility from regulators demonstrates strong future growth potential.

credit: IFC

Positioning of Financial Services

Heightened investment in sub-Saharan Africa has not only led to an increase in the sheer number of AgTechs operating in the region, but also to a shift in B2B and B2C AgTechs shifting their business models to provide financial services.



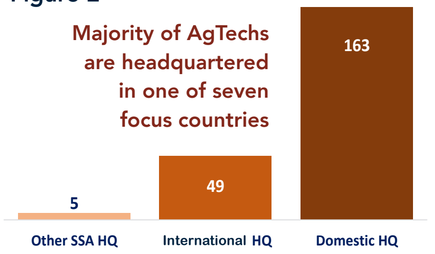
In general, B2C models directly with smallholder farmers and agri-SMEs. models, however, act as enablers of finance, with agri-SMEs, financial institutions, and agribusinesses on various use cases—which can include digitization, supply chain management, data collection, and decisioning. While not as straightforward as B2C models, these activities can facilitate financial service provision in the agricultural sector.

4 DISRUPT Africa, "The African Tech Startups Funding Report 2021."
5 DISRUPT Africa, "The African Tech Startups Funding Report 2021."

2. Methodology Research

ISF used industry leading resources and proprietary databases to **identify 217 AgTechs** operating across the seven focus countries, including ones headquartered both domestically and internationally.

Figure 2



Each of these AgTechs was screened against **five baseline criteria** to confirm sufficient maturity and ability to facilitate the provision of financial services:

1. **Established two or more years ago;**
2. **Post-pilot and generating revenue;**
3. **Operational in one or more focus countries;**
4. **Focused on agriculture;**
5. **Provides one or more relevant use cases: financial access, market linkage, or supply chain management.**

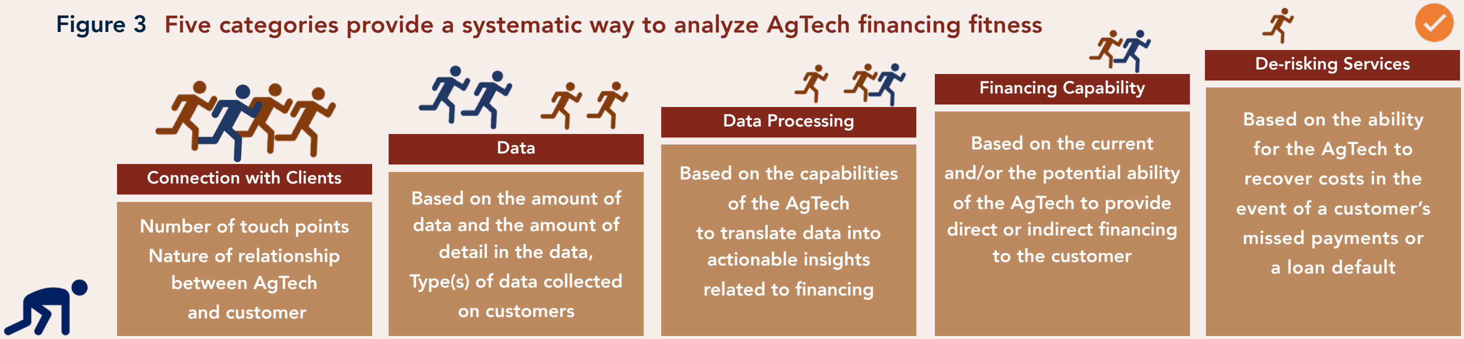
A total of **121 AgTechs across the seven markets met this baseline criteria**, with many having a presence across one or more of the countries. Using the database, ISF identified categorical differences in B2C versus B2B AgTech models.

From here, a further analysis of business models and product offerings was used to identify distinct model types operating in the market. The resulting taxonomy outlines six B2C model types and ten B2B model types.

Each of these model types was then mapped to five enabling areas of finance (connection with clients, data, data processing, financing capability, and de-risking services) to better understand how they can increase financial service provision for smallholder farmers. Within these different models, ISF also looked at the specific forms of finance offered by different providers.

Additionally, ISF reviewed the financial services licensing requirements for AgTechs operating in these focus countries and facilitated a comparative analysis of market maturity, which provided an in-depth understanding of the enabling environment in which these AgTechs operate.

Figure 3 Five categories provide a systematic way to analyze AgTech financing fitness



B2B B2C AgTechs

54 B2B AgTechs and 67 B2C AgTechs operate across the focus countries with some connection to financial services.

They fall into 16 distinct categories (10 B2B, 6 B2C) divided between direct B2C and indirect B2B models.

This section breaks down the differences between these models and examines how they are providing financing to smallholder farmers and agri-SMEs.

2. Emerging AgTech Models linked to Financial Services

Direct B2C AgTech Models

B2C models capitalize on digital technologies to engage with smallholder farmers, either directly or through farmer cooperatives. These models have the ability to establish connections with end clients and collect relevant data on production activities. This allows them to use alternative methods to de-risk smallholder farmers and provide direct financing or act as a financing conduit.

Figure 4 B2C models fall into six model types, with Integrated Product & Services Marketplace primary in region

Specialized Fintech		Digital Platforms			PAYGO asset service provider
Credit	Credit+	Product Marketplace	Integrated Product & Services Marketplace	Farm Services Rental Marketplace	
Digital first MFIs and payments providers	Specialized FinTechs providing broader range of services including advisory or market linkage	Digital platforms linking farmers to agri suppliers and buyers	Digital platforms facilitating access to holistic, bundled offerings for farmers	Farm equipment rental companies establishing a network of owner-operator franchisees	Asset-based businesses using PAYGO financing model to support sales on credit
Providers: 10	Providers: 11	Providers: 14	Providers: 25	Providers: 3	Providers: 4
Examples: Juhudi Kilimo, ADVANS	Apollo Agriculture	Kilimo Fresh	DMA Digital Mobile Africa, complete farmer.	hello tractor, TG	SunCulture, M-KOPA

As noted in Figure 4, B2C models in sub-Saharan Africa fall into six model types. The six model types can be defined by two broad categories, each with distinct differences in business model and value to the end user.

The first broad category, **Specialized FinTechs** are finance-first models centered around credit provision for smallholder farmers. Credit primarily comes in the form of input financing and, to a lesser extent, cash for farm services. Many of these models bundle products and services, such as embedded finance,


credit: IFC/WB

training, and insurance. The landscape assessment revealed that many of these AgTechs appear to operate as either non-profits (e.g. One Acre Fund) or rely heavily on subsidized funding (e.g. Babban Gona). Only a few select players (e.g. Apollo Agriculture) are achieving a product market fit using a commercial model.

The analysis revealed **two distinct types of Specialized FinTechs**:

Credit: These models provide smallholder farmers with access to digital lending products, many of which are designed specifically to meet the complex demands of smallholder farmers. For instance, **Crop2Cash's Cash Card** enables farmers to access basic financial services, such as savings and credit, directly from their mobile phone.

Credit+: Building on the Credit model, in addition to providing financial products these AgTechs integrate access to finance with a broader bundle of digital services for smallholder farmers, such as advisory services or access to inputs. **Apollo Agriculture** is a Kenya-based AgTech that made headlines for their $40 million Series B fundraising round in early 2022. Apollo's model centers around disaggregating funding to smallholder farmers in the form of input financing, bundled with training and insurance.

The other subset of B2C models, **Digital Platforms**, are built upon network effects, enabling multiple users on both sides of an exchange to interact and create shared value. Digital platforms can help smallholder farmers and agri-SMEs overcome market barriers by:

- Dis-intermediating markets, thereby generating wealth for the end farmer by removing layers of costly middlemen;
- Connecting multiple users to improve efficiency of interactions between users;
- Facilitating information-sharing, such as the exchange of pricing information or best practice knowledge;
- Providing farmers with a digital financial footprint by recording transactional data on the platform.

This research revealed that many platforms have moved beyond traditional models to include financial services. There appear to be four primary types of embedded financing:

1. **Vendor financing:** for products and services sold on the platform;
2. **Input financing:** credit to smallholder farmers in the form of in-kind inputs (or cash for labor) at the beginning of the season, generally to be repaid at harvest;
3. **Asset financing:** for productive assets, often in the form of innovative business models, such as PAYGO;
4. **Insurance:** bundled insurance for products and services offered on the platform.

The landscaping exercise revealed **three distinct types of Platform models**:

Product Marketplace: These AgTechs connect smallholder farmers to physical markets, including farm inputs suppliers and various kinds of off-takers (processors, trader, retailers, consumers). **Mkulima Young** is an online marketplace for farmers to purchase farm inputs and sell their produce.

credit: World Bank/Jason Florio

Integrated Product & Services Marketplace: These integrated marketplaces facilitate farmer access to a holistic bundle of product and services. While similar to Product marketplaces, these AgTechs offer a broader range of services for farmers – including offering access to finance or directly financing farmers. **Twiga** is a digital food distribution marketplace aimed at connecting vendors, suppliers, and consumers. They offer a range of digital financial services, including an e-wallet and working capital through a buy now, pay later model.

Farm Services Rental Marketplace: These unique marketplaces are shared economy platforms that link farmers to capital-intensive farm equipment and services. For example, **Hello Tractor** operates a platform that connects smallholder farmers to tractor rental services. In addition, they recently launched a PAYGO tractor financing offering.

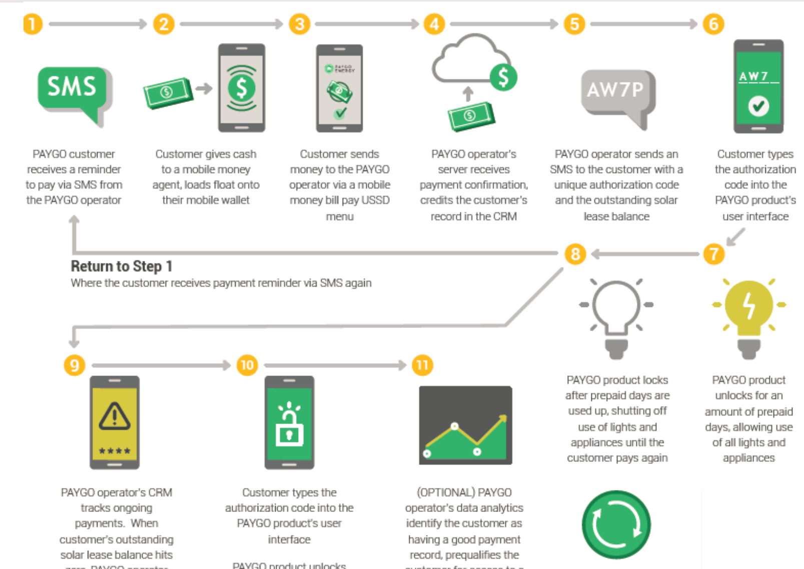
Beyond these two broader categories, there also appears to be a burgeoning sixth model type focused on asset financing.

PAYGO Asset Service Provider: These AgTechs use innovative financing models to offer assets, such as off-grid solar powered systems, to smallholder farmers and other rural consumers. Through these financing models users can pay in micro-installments and the AgTech can remotely control the system in case of arrears. For instance, Kenyan-based SunCulture offers home solar and irrigation systems to rural consumers. They have developed an impressive in-house credit scoring methodology to de-risk customers for their PAYGO model.

PAYGO off-grid solar payment model

Pay-as-you-go (PAYGO) is a financing technology that allows end-users to pay for solar energy in weekly installments or whenever they are financially liquid. PAYGO removes the initial financial barrier to solar energy access by allowing consumers to make a series of modest payments to buy time units for solar electricity instead of paying upfront for the entire solar lighting system.

Source: Energypedia



Source: Winiecki et al. 2017.

While B2C models in the region continue to increase, they face inherent barriers when operating in these markets. These include:

- **Weak infrastructure.** The agriculture sector has existing, albeit weak, infrastructure and disparate value chains, hindering AgTech growth. As B2C models attempt to scale, they will need investments to develop this infrastructure, as in the case of AFEX, which built a network of infrastructure throughout Nigeria to enable their commodities exchange.
- **Reliance on field agents.** Successful models remain heavily reliant on "boots on the ground," even after achieving product-market fit. Agents are generally equipped with mobile phones to help acquire customers and collect farmer data. While these agents are viewed as an integral part of B2C models, onboarding and training is often costly and time consuming.

Furthermore, AgTechs must have a solid supply of capital to successfully scale their financing offerings. The most common sources of financing for AgTechs are through equity and bank debt:

- **Equity financing can be raised from investors and is generally less restrictive than bank debt, however this form of capital is more expensive for AgTechs;**
- **Banks can provide debt financing to AgTechs who use this debt to on-lend to farmers. In this model, AgTechs absorbs the risk of directly lending to farmers;**

AgTechs in the region noted a dearth of debt funding. For B2C models, a solid supply of debt is increasingly important to scaling their lending activities. In the absence of sufficient debt capital, models must rely on equity to pilot and scale financing solutions—which is generally not a sustainable model.

As an alternative to these common financing sources, AgTechs can also partner with banks to on-lend to farmers. In this less common model, AgTechs source and screen (i.e. credit score) prospective farmers, and then banks lend to the farmer. Through this mechanism, the farmer lending risk is generally shared between the bank and AgTech.

While this is a promising partnership model and many B2C AgTechs are interested in partnering with financial service providers, banks remain hesitant to engage with AgTechs. This may be due, in part, to the alternative credit scoring processes that AgTechs use to make lending decisions (vs. the stricter regulations followed by financial service providers).

Enabling B2B AgTech Models

While B2C models exist to serve the end user (generally SHF), B2B models create solutions for intermediaries that own relationships with end-users. Based on this analysis, there appear to be four target audiences for B2B services:

1. **Financial service providers**, which benefit from greater understanding of the agriculture sector, improved ability to assess/monitor risks, better customer acquisition, and streamlined loan processing.
2. **Agri-SMEs**, which benefit from improved farmer management, reduced barriers to scale, lower transaction costs, and accelerated decisioning.
3. **Off-taker agribusinesses**, which benefit from reduced transaction costs, improved farmer accountability, better quality assurance and traceability, heightened profitability, and accelerated decisioning.
4. **Input company agribusinesses**, which benefit from improved farmer relationships, heightened input quality, and reduced input counterfeiting.

Figure 5 B2B models appear to fall into 10 model types, with supply chain management solutions most common

Financial Access Enablers				Supply Chain Management					Climate
Alternative Credit Scoring (Financial Analytics)	Remote Field Monitoring	Insurance	FSP Digitization	Farm Management	Traceability	Logistics Optimization	Production Planning & Decisioning (ERP)	Digital Infrastructure Solutions	Climate Risk Intelligence
Aggregates farmer datasets to develop digital financial identities or alternative credit scores for farmers to access financing	Utilizes remote sensing to assess or monitor field productivity, allowing for risk scoring or loan monitoring for FIs	Digitally enabled agriculture insurance providers	Assists financial service providers in digitizing solutions, thereby improving efficiency and access to hard-to-reach users	Digital solutions for onboarding & managing SHF relationships, creating a digital identity for farmers to gain access to farming	Specialized track and trace tech allowing buyers, producers, and input companies to trace products back to source and monitor farmer output	Digitally manages and optimizes physical storage and logistics infrastructure, allowing improved access of these services for farmers	End-to-end supply chain digitization that enables precision tracking and management of value chain, including digital identities for farmers	Digitally-enabled hardware solutions, including storage or warehousing that can provide digital receipts or market linkage services for farmers	Companies focused on analyzing agroclimatic data, including climate risk for agribusinesses, regional analyses to FIs, or carbon monitoring
Providers: 6	Providers: 5	Providers: 3	Providers: 4	Providers: 13	Providers: 7	Providers: 2	Providers: 9	Providers: 3	Providers: 2
Examples FarmDrive, Social Lender	6grain, YAPU	acre AFRICA, PULA	kwara	eprod	eHakiki, Manobi Africa	Cowtribe, RELEAF	SourceTrace, FarmERP	SESI, SokoFresh	SATELLIGENCE, Weather Impact

As documented in Figure 5, the ten B2B model types fall into two broad categories.

The first category, **Financial Access Enablers** are primarily focused on engaging and designing offerings for financial service providers. Each of these models and their indirect provision of financial services vary greatly, as noted in the four distinct model types:

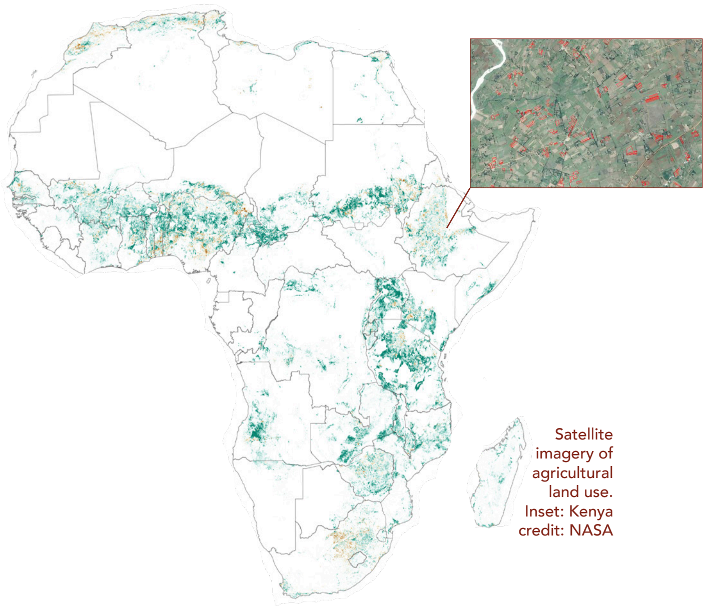
Alternative Credit Scoring: These models indirectly enable the provision of financial access for farmers through aggregating farm and farmer data, developing a digital financial footprint for the farmer, and sharing this with financial institutions. **Social Lender** uses data from online, offline, and social community platforms to generate a social reputation score for individuals, including farmers. This score is then used by FSPs to determine creditworthiness.

Remote Field Monitoring: These AgTechs use remote sensing technology to monitor field productivity. The data they generate varies by provider but can be used for risk scoring or loan monitoring for FIs. For instance, **SatSure** works with FSPs to provide predictive agroclimatic data insights backed by satellite imagery analytics, ML and AI to facilitate decision making across the loan cycle. Many of these models also work with agribusinesses. 6th Grain engages with input providers and growers to facilitate field mapping, perform regional market intelligence, and predict optimal crop growth curves backed by remote sensing data.

Insurance: Ag-focused InsurTechs capitalize on digitization to enable access to ag-specific insurance products for smallholder farmers. One of the agriculture sector's leading InsurTechs – **Pula** - offers crop and livestock insurance products to help smallholder farmers endure yield risks in the face of climate change.

FSP Digitization: These solutions leverage technology to help financial service providers improve efficiency and effectiveness while making it easier to reach rural customers. Providers such as **Musoni** assist FSPs who work directly with smallholder farmers in digitizing their processes, including customer data, transactions, and lending.

The second broad category of providers, **Supply Chain Management Solutions** primarily serve agribusinesses or agri-SMEs to provide digitization services across the supply chain. Digitization for on- and off-farm activities allows for improved data collection and digital footprints for smallholder farmers. A select number of these companies, such as CropIn, are also packaging their data as a tailored service for financial institutions.



Satellite imagery of agricultural land use. Inset: Kenya credit: NASA

B2B Solutions:
Digitization and Supply Chain Management

The analysis revealed five distinct **Supply Chain Management** solutions:

1. Farm Management: These AgTechs focus on digitizing on-farm activities, including onboarding and managing SHF relationships. In turn, this digitization provides SHFs with a digital identity that can help them access financing. This can be seen in the case of eProd. Founded in 2004, **eProd** provides software to digitize the management of outgrower schemes, including enrollment, extension, offtake, payment, and credit facilitation. Through this, eProd collects robust farmer data, including KYC metrics.

2. Traceability: These AgTechs specialize in track and trace technology that allow farmers, buyers, producers, and input companies to trace products to the source and monitor farmer output. **Capture Solutions** offers a WeightCapture product that uses biometric inputs, Bluetooth, and cloud-backed technology to verify and trace agriculture goods.

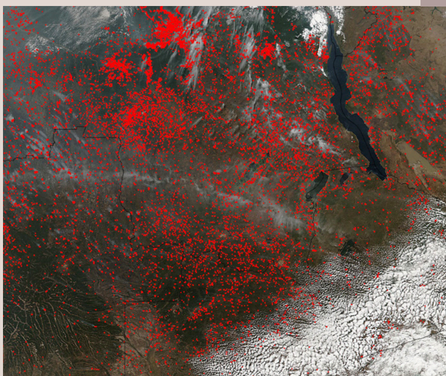
3. Logistics Optimization: This smaller subset of AgTechs is focused on using digitization to optimize physical storage and logistics infrastructure, thereby allowing improved access of these services for farmers. For instance, **Releaf** uses geospatial mapping technology to identify optimal locations for agricultural processors.

4.Production Planning & Decisioning (ERP): These ERP systems focus on end-to-end supply chain digitization. Many of these providers also offer farm management, traceability, and logistics services, however they package these as end-to-end offerings that help streamline core business processes throughout the agriculture value chain, including supply chain, finances, reporting, and logistics. For instance, **CropIn** offers a suite of digital solutions including CropIn Grow (farm monitoring and management system), CropIn Connect (value chain communications solution), and CropIn Trace (farm-to-form traceability solution).

5. Digital Infrastructure Solutions: These AgTechs specializes in digitally-enabled hardware solutions, including storage or warehousing that can provide digital receipts or market linkage services for farmers. While logistics optimization focuses on the digitization of existing infrastructure, these Digital Infrastructure Solutions provide the actual infrastructure as well as the digitization components. This can be seen in the case of **SokoFresh**, an AgTech offering mobile cold storage solutions to farmers and aggregators.

A third category—**climate models**—are an emerging force on the continent. This category is intentionally broad, as there is a growing number of climate risk solutions beyond sub-Saharan Africa that will continue to evolve in the coming decade.

Climate Risk Intelligence: This growing subset of AgTechs is centered around analyzing agroclimatic data. There are various use cases, including but not limited to farm productivity monitoring, carbon monitoring, crop yield prediction, and farm- or portfolio-level credit risk analyses. For example, **Satelligence's** remote sensing services offer semi-automated satellite-based insights into supply chain environmental risks, such as deforestation, forest fires, and flooding.



NASA Suomi NPP satellite imagery of forest fires in Central Africa, 2016 credit: NASA

In terms of offering financial services, B2B models are enablers rather than direct facilitators of finance to smallholder farmers. The way they enable finance varies based on model type, as noted in Figure 6.

Note: *To illustrate the distinctions between model types, each type of provider was mapped to five enablers of finance: 1. connection with clients, 2. data, 3. data processing, 4. financing capability, 5. de-risking services/incentives. The examples in Figure 6 show AgTechs in each model type that are currently capitalizing on their enablers to offer financial services to farmers.*

Figure 6 B2B models offer various enablers of finance

	Financial Access Enablers				Supply Chain Management					Climate
	Alternative Credit Scoring (Financial Analytics)	Remote Field Monitoring	Insurance	FSP Digitization	Farm Management	Traceability	Logistics Optimization	Production Planning & Decisioning (ERP)	Digital Infrastructure Solutions	Climate Risk Intelligence
B2B Channel	FSP	FSP Agribusiness	Agribusiness Agri-SME	FSP Agri-SME	Agribusiness Agri-SME	Agribusiness	Agribusiness	Agribusiness	Agribusiness	FSP Agribusiness Agri-SME
Client connection	MEDIUM	LOW	LOW	LOW	HIGH	MEDIUM	LOW	MEDIUM	LOW	LOW
Data	HIGH	MEDIUM	MEDIUM	LOW	HIGH	HIGH	LOW	HIGH	MEDIUM	MEDIUM
Data processing	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	HIGH	LOW	HIGH
Financing capability	LOW	HIGH	MEDIUM	LOW	MEDIUM	LOW	LOW	MEDIUM	LOW	MEDIUM
De-risking services/incentives	LOW	MEDIUM	HIGH	LOW	LOW	LOW	LOW	LOW	LOW	MEDIUM
	FarmDrive	SatSure	PULA	ensibuuko	EzyAgric	KOLTIVA	RELEAF	Cropin	SESI	SATELLIGENCE

As stated in the Note on the Mapping, this report is complemented by a **Mapping of Digital Solutions** report, which offers a more comprehensive overview of climate-related solutions for financial services providers.

Considerations for Agribusinesses

1. Build 2. Buy 3. Partner 4. Outsource

Agribusinesses are increasingly integrating technology into their supply chains. There are key differences in the types of agribusinesses operating in sub-Saharan Africa, resulting in a distinct build, buy, partner, outsource strategy these firms must consider.

There are tradeoffs for in-house development versus outsourcing technology solutions. The strategy of agribusinesses is highly dependent on internal capabilities and the strategic choices each are making around digitization over time.

AgTechs providing enabling services for agribusinesses exist in this global landscape and are constantly reacting to changing client strategies around technology (buy, build, partner, outsource). For some of the B2B AgTech solution providers, solutions are likely to be too niche or technically specialized for agribusinesses to build or operate in-house. But other solutions (and the data they generate) may represent a significant source of competitive advantage for agribusinesses to bring in-house.

LEVEL OF INVESTMENT: HIGH TO LOW →

Build	Buy	Partner	Outsource
Establishing proprietary data and systems as a competitive advantage Difficulties in partnering with start ups, due to lack of maturity and conflicting cultures Real/perceived higher degree of complexity and longer lead times of adapting external solutions versus developing solutions in house	Allows corporates to maintain focus on core business without need to develop new development and management capabilities Opens door to acquisition based on experience using the solution first Builds on relatively higher degree of innovation and existing market share of start ups	Can capitalize on the advanced technological capabilities of larger technology firms Can seek existing and proven solutions	Reduces the need for large up-front capital expenditure (and risk) to develop solutions in house Allows business to focus on core functions
Olam In house platforms, Olam AtSource & Olam Farmer Information System (OFIS) provide smallholder tools and traceability services	John Deere's recent investment in Hello Tractor indicates interest in potential acquisition, which would increase SSA presence	Bayer and Microsoft partnered to build a cloud-based set of digital tools for use in agriculture and adjacent industries, e.g., Bayer Climate Fieldview	Flour Mills of Nigeria outsources technology development to 10+ vendors, including Microsoft

credit: World Bank/Amparo Palacios-Lopez credit: World Bank/Vincent Tremeau

Data on the AgTech landscape reveals ecosystems at different stages of development.

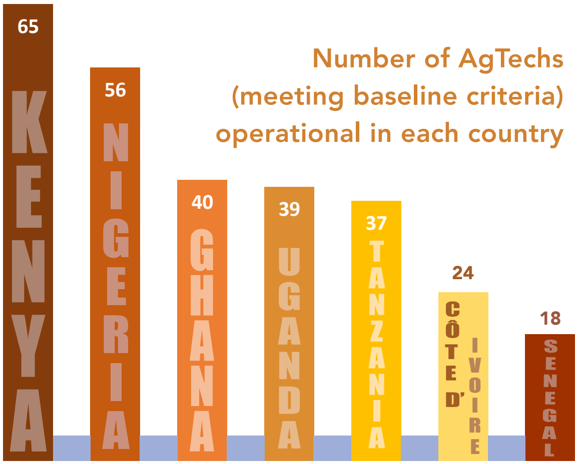
The markets in each country vary in terms of maturity and enabling environments, which influences the number and types of models in operation.

3. Key Market Differences & the enabling Regulatory Environment

Market Maturity

This research demonstrated that Kenya and Nigeria are the largest and most mature AgTech markets in sub-Saharan Africa, based on the number of AgTechs operational and/or headquartered in each country and vast majority of firms in the scaling and growth phases. The burgeoning Nigerian AgTech scene centers around commodity value chains with an Integrated Product & Service Platform model, which includes some form of financial services (e.g., AFEX, AgroMall, Thrive Agric) developed in response to Central Bank of Nigeria's lending initiatives designed to stimulate agricultural growth (e.g., the Anchor Borrower's Program).

Figure 7



Ghana appears to be steadily catching up in terms of number of AgTechs headquartered in-country; however, the majority appear to still be in the start-up phase. Uganda has a few standout players that appear the be achieving a product-market fit and are beginning to scale internationally. Tanzania, Senegal, and Côte d'Ivoire each have only a few AgTechs headquartered in-country, generally in the start-up phase.

In terms of regional expansion, about half of the AgTechs in the analysis are operational in more than one of the seven country markets. Examining country differences through the lens of model types demonstrates that the vast majority (85%) of B2C models are headquartered domestically within one of the seven focus countries. The majority of B2B models, on the other hand, are headquartered either internationally or in the more mature markets (e.g. Kenya).

The number and diversity of AgTechs headquartered in each market is indicative of the larger enabling environments, which has significant impact on the development of AgTech ecosystems within a country or region.

Enabling Environments

An analysis of the regulatory environments in each of the seven markets helped to reveal the ability of AgTechs to facilitate financial services provision. Legal and regulatory environments are a key enabler (or inhibitor) of AgTechs' ability to emerge, operate, grow, and succeed. This is especially crucial for AgTechs, which are characterized by high dynamism, innovation, and experimentation in business models, delivery mechanisms, and financial service provision.

Given the innovative nature of many AgTech business models, the regulatory and legal environment often lags behind developments in the sector. Furthermore, the majority of markets lack a specific regulatory body with jurisdiction over digital financial service providers. As a result, regulators tend to employ either a flexible "test and learn" or a reactive "wait and see" approach.

Within sub-Saharan Africa, Kenya and Ghana are standout players in terms of their proactive approaches to digital innovation. In Kenya, regulators employ a flexible approach to digital financial service providers, as can be seen in the case of M-Pesa, a digital payment provider that was granted a letter of no objection in 2007. M-Pesa was thereby able to pilot and scale in the market. In response to its success, Kenyan regulators enacted legislation surrounding digital payment providers. Other efforts, such as a regulatory sandbox and innovation hubs, have fostered a supportive enabling environment for AgTechs in Kenya.

Figure 8

AgTechs headquartered in each country: while B2C solutions are appearing across markets, B2B solutions are heavily skewed to headquarters in the more mature markets—Kenya, Ghana, Nigeria, Uganda—or internationally.

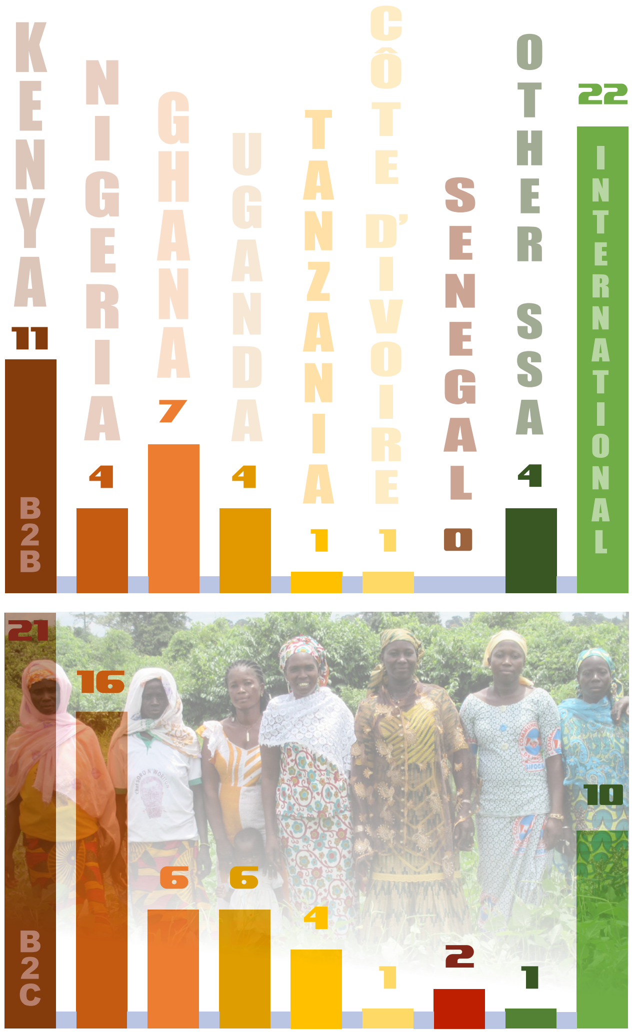


photo credit: IFC/World Bank

More recently, Ghana has emerged as a leader in the digital financial service provider regulatory landscape. In 2020, the country established a FinTech and Innovation office to oversee digital financial service providers, which appears to have reduced barriers to entry within the market and spurred the launch of innovative business models.

In the other focus countries, regulators appear to be more reactive, waiting to see what works in other markets. This has led AgTechs to suffer from complex or lacking regulatory requirements and overlapping regulator jurisdictions.

While the environment remains complex, regulators across the seven focus countries recognize the need for improvement to promote robust growth of AgTechs and other digital financial service providers, especially those that support financial inclusion. The potential for increased flexibility and adaptation in the coming years is highlighted through recent initiatives:

- **The establishment of a Ministry of Communication and Information Technology in Tanzania;**
- **The introduction of regulatory sandboxes in Uganda and Nigeria;**
- **Control by the Central Bank of West African States over financial service providers in eight jurisdictions, including Côte d'Ivoire and Senegal. While the Bank has historically lagged behind in regulations, it launched a Fintech Innovation Bureau in April 2022.**

Beyond AgTechs, startup bills—intended to formalize relationships between regulators and startups—are becoming increasingly popular across the region and have been issued in Kenya, Nigeria, and Senegal.

Financial Institution Engagement

This research demonstrated that partnerships between AgTechs and financial institutions exist in the markets today; however, there is significant variation based on the market maturity and enabling environment.

For example, in Nigeria, partnerships between commercial banks and AgTechs do exist, however are often directly supported by Central Bank of Nigeria mandates. Many B2C AgTechs in Nigeria appear to have developed in response to these mandates, and center around AgTechs registering farmers, providing them with input financing, and securing offtake. These AgTechs collect data on smallholder farmers and refer them to commercial lending partners (for which the capital is mostly provided by the Central Bank). Thus, financial institutions perceive these AgTechs primarily as service providers that assist in basic "Know Your Customer" data collection, as opposed to strategic partners.

photo credit: IFC

While strategic partnerships between Nigerian AgTechs and financial institutions are not widespread—largely due to the lack of maturity on the AgTech side and regulatory constraints on the financial institution side—a select few of the more established players (e.g. AFEX, Babban Gona) are beginning to strategically collaborate with financial institutions. For example, Babban Gona recently received funding from Citibank Nigeria through a partnership between Citi, the US International Development Finance Corporation (DFC), and Ford Foundation to support input credit and harvest advances to smallholder farmers in Nigeria.

In Kenya, the diversity of B2C model types could indicate a greater potential for strategic partnerships. However, experts indicated that AgTechs would likely be reluctant to work with commercial banks, given their lengthy processes, more stringent underwriting criteria and perceived high costs of capital (as compared to accessing FX funding). Furthermore, bank partnerships may result in AgTechs losing clients (particularly less risky ones) to banks. In contrast to these sentiments, the majority of AgTechs instead expressed strong openness to working with financial institutions. They were quick to caveat that, while they are willing to borrow from financial institutions to on-lend, they are not confident that these institutions have the risk appetite for non-traditional credit scoring models and unsecured lending approaches.

From the perspective of banks, many of these AgTech models are still maturing and achieving a product-market fit. Furthermore, commercial banks face their own regulatory limitations, hindering the potential for innovative partnerships and alternative credit scoring approaches. Given this, there does not appear to be widespread partnership models between financial institutions and B2C AgTechs in Kenya.

Looking at the broader region, strategic partnerships between innovative start-ups and financial institutions are just beginning to emerge.

- **Jumo and MANSA Bank:** Jumo—a mature FinTech offering "intelligent banking technology" with a strong track record of interacting with rural consumers—recently entered into a partnership with MANSA Bank in Côte d'Ivoire. Through this partnership, Jumo and MANSA, along with MTN Mobile Financial Services, introduced a new short-term credit product, VitKash, to provide micro-entrepreneurs in particular with access to finance and assist them with building their credit profile.
- **Digital Mobile Africa, UNCDF, and Postal Bank of Tanzania**: Digital Mobile Africa is working with UNCDF and the Postal Bank of Tanzania to facilitate market linkage and financing for farmers. While currently in pilot stage, the Digital Mobile Africa platform collects and stores farmer transaction and crop yield data, which can be translated into farmer financial profiles by partner financial institutions to increase financing, thereby allowing farmers to access financing.

These partnerships can be advantageous for numerous reasons, such as enabling the cross selling of financial products and expanded financial service offerings through the AgTech.

The working hypothesis that, on a case-by-case basis, there are further opportunities for partnerships between financial institutions and the more mature AgTech models—such as those that have successfully proven their alternative credit scoring approaches in the market. **The number of partnerships will likely rise as models continue to mature in the coming years.**

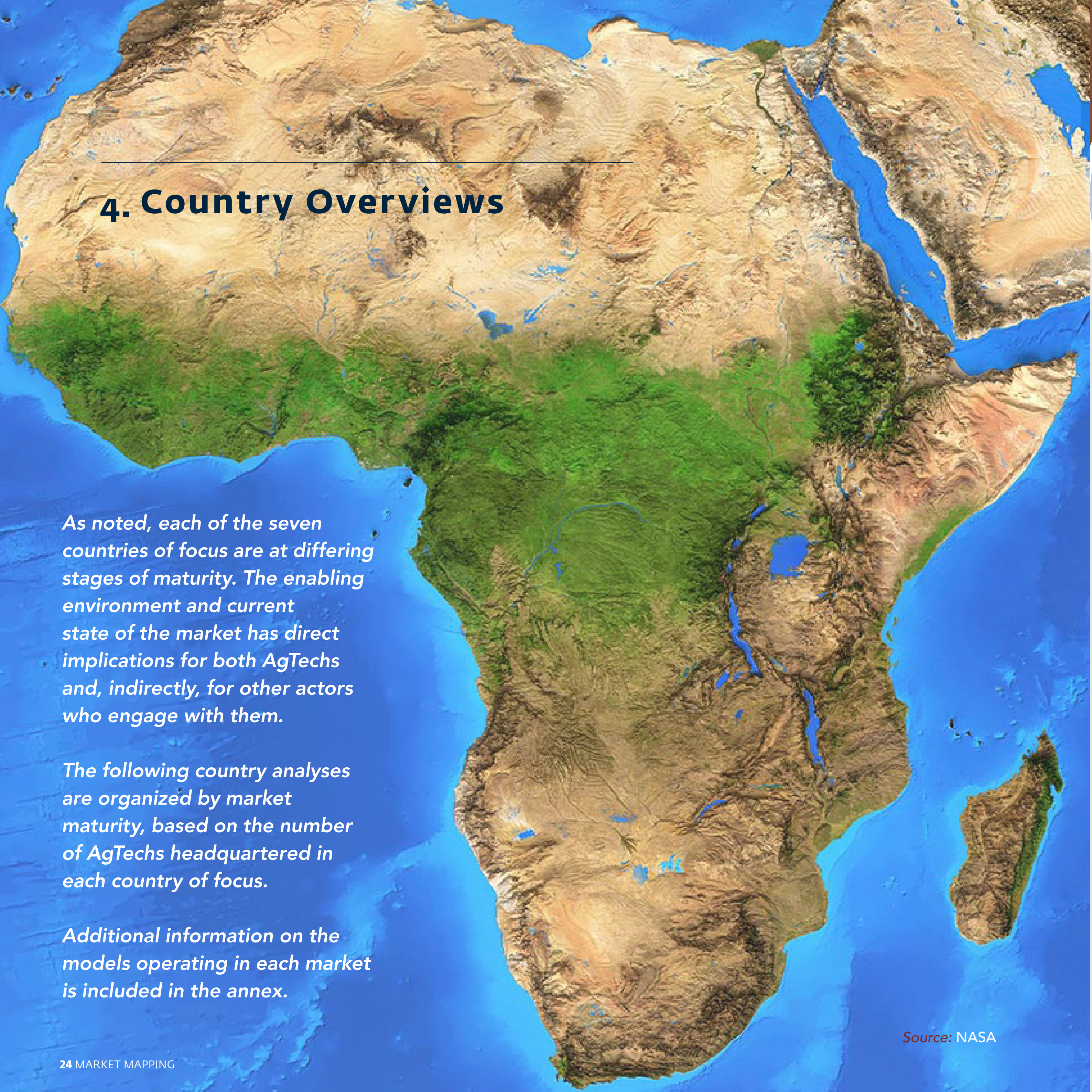
photo credit: IFC/World Bank

4. Country Overviews

As noted, each of the seven countries of focus are at differing stages of maturity. The enabling environment and current state of the market has direct implications for both AgTechs and, indirectly, for other actors who engage with them.

The following country analyses are organized by market maturity, based on the number of AgTechs headquartered in each country of focus.

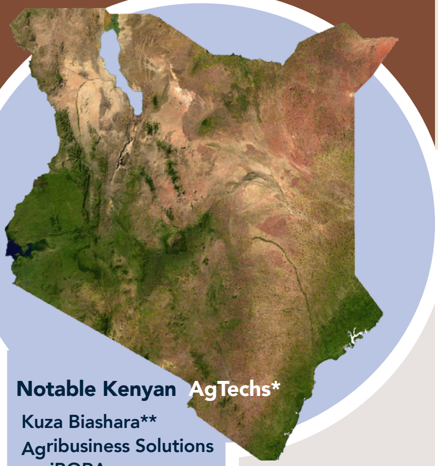
Additional information on the models operating in each market is included in the annex.



Source: NASA

Regulatory Environment:

- No specific regulations governing AgTechs; regulators employ a test and learn approach.
- Regulators value innovation, e.g., the letter of no objection granted to M-Pesa.
- Other efforts (regulatory sandbox) have led to a supportive enabling environment for AgTechs.



Notable Kenyan AgTechs*

Kuza Biashara**
Agribusiness Solutions
agriBORA
Amtech Technologies
eProd Solutions
PlantVillage
SunCulture
USOMI Ltd

*Finalists at the 2023 AgTech Innovations Challenge which recognized agricultural technologies identified by the World Bank as having the potential to transform agriculture in Africa.

**Voted best startup at the 2023 Agtech Innovations Challenge

The Kenyan market has experienced a proliferation of AgTechs in the last decade. This has led to a diverse mix of innovative business models in the market.

In the more mature models, there were examples of impressive data collection processes and comprehensive credit scoring programs developed in-house.

Digital Financial Services Licensing Requirements[6]

The philosophy of Kenyan regulators centers around maximizing opportunity while minimizing risk. Broadly speaking, this has resulted in Kenyan regulators employing a flexible approach for digital financial services providers. Regulators are keen to promote innovation, demonstrated by efforts such as regulatory sandboxes, letters of no objection, and innovation hubs. While this has allowed innovative business models to emerge, it has also created complexity for digital financial services providers. Under the Banking Act of 2015, providers, aside from those accepting deposits from customers, are not considered financial institutions.[7] However, they are still subject to regulations depending on the services they provide – meaning that a single AgTech may need to engage multiple regulators to obtain the proper licenses.

Until December 2021, AgTechs that digitally lent or operate as a credit-only MFI were largely allowed to operate unlicensed. However, in 2021, the Central Bank of Kenya Amendment Bill was enacted and now requires these AgTechs to obtain a license.[8] Furthermore, AgTechs using mobile money are required to abide by the National Payment Systems Act.[9]

Market Analysis

Out of the seven countries studied, Kenya has the most AgTechs (32) headquartered in country (full list of AgTechs in annex). The mature market, both in number and diversity of models, can be largely attributed to the enabling environment. Kenya's widespread reliance on mobile money and flexible regulations will likely continue to encourage the development of Nairobi-based AgTechs in the coming decade.

AgTechs Headquartered in Kenya

B2B Model Type

Financial Access: Alternative Credit Scoring	1
Financial Access: Insurance	1
Financial Access: FSP Digitalization	1
Supply Chain Management: Farm Management	4
Supply Chain Management: Production Planning & Decisioning	2
Supply Chain Management: Digital Infrastructure Solution	2

B2C Model Type

FinTech: Credit+	3
FinTech: Credit	4
Digital Platform: Product Marketplace	2
Digital Platform: Integrated Product & Services Marketplace	9
Digital Platform: Farm Services Rental Marketplace	1
PayGo Asset Service Provider	2

6 Catalyst Fund Powered by BFAGlobal and Cambridge Center for Alternative Finance, "Fintech Regulation in Kenya" (BFAGlobal, January 31, 2021), https://bfaglobal.com/wp-content/uploads/2021/12/0.-Fintech-Regulation-in-Kenya.pdf.

7 Central Bank of Kenya, "Kenya Banking Sector Charter 2019" (2019), https://www.centralbank.go.ke/uploads/banking_circulars/113414645_Kenya%20Banking%20Sector%20Charter-2019.pdf.

8 Central Bank of Kenya, "Kenya Gazette Supplement No. 56 (National Assembly Bills No. 10) The Central Bank of Kenya (Amendment) Bill 2021" (2021), http://kenyalaw.org/kl/fileadmin/pdfdownloads/bills/2021/TheCentralBankofKenya_Amendment_Bill_2021.pdf.

9 Central Bank of Kenya, "Kenya National Payments System Vision and Strategy 2021-2025," 2021, https://www.centralbank.go.ke/wp-content/uploads/2020/12/CBK-NPS-Vision-and-Strategy.pdf.

Regulatory Environment:

- The progressive Startup Bill 2021 offers optimism that regulators are shifting to a more flexible mindset for AgTechs and a broader digital financial services sector.

The Central Bank launched policies to stimulate agricultural growth. Many AgTechs leveraged their digital offerings to capitalize on these initiatives and grow in the market.

The primary model types are Integrated Product & Service Platform models with some type of financial services.

Digital Financial Services Licensing Requirements[10]

Nigerian regulators tend to employ a cautious approach to companies offering innovative digital financial services. Historically, they have prohibited certain business models from operating in the market until comprehensive regulations are in place. While this limits regulatory gaps, it also causes complexity for newer, more innovative business models.

In recent years, regulators have appeared receptive to feedback and have taken steps to promote innovation in the digital financial services sector, as demonstrated by the establishment of regulatory sandboxes and innovation committees.

Although there are no specific regulatory requirements for AgTechs in Nigeria, they are subject to regulations based on the services they provide. All AgTechs that provide financial services are defined as other financial institutions and are required to be licensed by the Central Bank of Nigeria. Furthermore, they are under the jurisdiction of money lending laws which can vary between Nigerian states, potentially adding complexities for AgTechs operating at a national level.

Market Analysis

Of the seven countries studied, Nigeria has the second highest number of AgTechs (20) headquartered in the country (full list of AgTechs included in annex). The vast majority of the models are B2C models, with FinTech: Credit + being the most common.

Based on this analysis, it appears that many of the Nigerian models are emerging in response to the Central Bank's initiatives to promote lending to the agriculture sector. Through this, models enter into partnerships with FSPs and are responsible for customer acquisition and "Know Your Customer" data collection.

AgTechs Headquartered in Nigeria

B2B Model Type

Financial Access: Alternative Credit Scoring	1
Supply Chain Management: Farm Management	2
Supply Chain Management: Logistics Optimization	2

B2C Model Type

FinTech: Credit+	3
FinTech: Credit	4
Digital Platform: Product Marketplace	2
Digital Platform: Integrated Product & Services Marketplace	9
Digital Platform: Farm Services Rental Marketplace	1
PayGo Asset Service Provider	2

10 Catalyst Fund Powered by BFAGlobal and Cambridge Center for Alternative Finance, "Fintech Regulation in Nigeria" (BFAGlobal, June 23, 2021), https://bfaglobal.com/wp-content/uploads/2021/06/0.-Fintech-Regulation-in-Nigeria-16-March-2021.pdf.

AgTechs headquartered in Ghana are a mix of B2C marketplace models and B2B farm management providers.

The majority (77%) appear to still be in start-up phase. However, it appears the more mature players are beginning to expand to neighboring markets after achieving a viable product market fit in Ghana.

Regulatory Environment:

- Ghana prides itself on being a leader in the FinTech regulatory landscape.
- The Bank of Ghana established the FinTech and Innovation Office in 2020 to oversee licensing for digital Financial Service Providers.
- 'One Stop Shop' licensing is unique in the region, lowering barriers to entry for new AgTechs

Digital Financial Services Licensing Requirements

Ghana prides itself on being a leader in the digital financial services regulatory landscape. In 2011, the Financial Sector Assessment Program highlighted the lack of autonomy that the Bank of Ghana had in the licensing process, prompting shifts in the sector. In response, in 2018 the government implemented a National Financial Inclusion and Development Strategy.[11] Furthermore, in 2020 the Bank of Ghana established their novel FinTech and Innovation Office.[12] This Office – one of the first of the kind in the region – is responsible for licensing and oversight of digital financial service providers, including AgTechs. There are six licensing categories based on provider type and companies can apply for a license directly through the Office's portal.

Ghana's longstanding commitment for financial sector innovation appears to have created positive effects for both companies and consumers. The "one stop shop" licensing through the dedicated FinTech Office is unique in the region and serves to lower barriers to entry for innovative providers. Furthermore, the Office's Innovation Hub demonstrates the Bank's commitment to modernization.

Market Analysis

Out of the seven countries studied Ghana has the third highest number of AgTechs headquartered in the country (full list of AgTechs included in annex). There is a mix of both B2C and B2B AgTechs, with Integrated Products and Services Marketplaces and Farm Management solutions firms being the most popular models.

While there are a growing number of AgTechs in Ghana, the vast majority of AgTechs appear to still be in startup phase and finding their footing domestically. In the coming years, it's likely the burgeoning market, supported by a progressive regulatory environment, will continue to mature and emerge as a leader on the continent.

AgTechs Headquartered in Ghana

B2B Model Type

Financial Access: Remote Field Monitoring	1
Supply Chain Management: Farm Management	3
Supply Chain Management: Traceability	1
Supply Chain Management: Logistics Optimization	1
Supply Chain Management: Digital Infrastructure Solution	1

B2C Model Type

FinTech: Credit	1
Digital Platform: Product Marketplace	1
Digital Platform: Integrated Product & Services Marketplace	3
Digital Platform: Farm Services Rental Marketplace	1

11 Ghana Ministry of Finance, "National Financial Inclusion and Development Strategy (NFIDS)" (Republic of Ghana, 2018), https://mofep.gov.gh/sites/default/files/acts/NFIDs_Report.pdf.

12 Bank of Ghana, "Bank of Ghana Establishes Fintech and Innovation Office," May 5, 2020, https://www.bog.gov.gh/pressreleases/bank-of-ghana-establishes-fintech-and-innovation-office/. Government of Ghana Ministry of Finance, "Digital Financial Services Policy" (Ministry of Finance, May 18, 2020), https://mofep.gov.gh/sites/default/files/acts/Ghana_DFS_Policy.pdf.

AgTechs in Uganda are a mix of B2C and B2B providers, encompassing a diverse mix of business models.

Only a select few of AgTechs in the assessment appear to be scaling up and expanding into other markets in the region.

Regulatory Environment:

- Regulators follow a tiered approach for traditional FIs, but there is no tier for FinTechs. AgTechs facilitating mobile payments must apply for a license from the Central Bank.
- Unclear regulations lead to barriers for Digital Financial Service providers; recent efforts indicate movement towards increased flexibility.

Digital Financial Services Licensing Requirements[13]

The regulatory approach for digital financial service providers in Uganda remains unclear and rigid, largely due to multiple authorities having regulatory jurisdiction over these providers. Depending on the provider's offerings, they may fall under the jurisdiction of eight separate regulators. Regulators tend to take a "rules-based approach" setting strict standards on provider operations, leaving gaps for providers who employ more innovative approaches. Recent efforts, such as the introduction of a regulatory sandbox, indicate increased openness and flexibility from regulators, although the environment remains complex to navigate.

Regulators follow a tiered approach in licensing financial institutions. The Central Bank regulates commercial banks, credit institutions, and micro-finance deposit taking institutions, while the Uganda Microfinance Regulatory Authority regulates SACCOs, community based non-deposit taking MFIs. Digital providers do not fall under any specific regulatory body, but it is recommended that they engage with the Bank of Uganda. In addition, those that facilitate mobile payments between or among users must apply for a license from the Central Bank, as outlined in the National Payment Systems Act of 2020.

Market Analysis

The lack of clarity in regulations and overlapping jurisdiction is believed to lead to barriers to entry for AgTechs, especially the more innovative models. While Uganda has a diverse mix of B2C and B2B AgTech model types, the market is not as mature as others in the region, such as Kenya and Ghana (full list of AgTechs included in annex). FinTech: Credit+ and Product Marketplaces are the most common model types, and a select few models appear to be achieving a successful product market fit in country and eying international expansion.

AgTechs Headquartered in Uganda

B2B Model Type

Financial Access: Alternative Credit Scoring	1
Financial Access: FSP Digitalization	1
Supply Chain Management: Farm Management	1
Supply Chain Management: Production Planning & Decisioning	1

B2C Model Type

FinTech: Credit+	2
FinTech: Credit	1
Digital Platform: Product Marketplace	2
Digital Platform: Integrated Product & Services Marketplace	1

13 Cambridge Center for Alternative Finance and MicroSave, "FinTech in Uganda Implications for Regulation" (fsduganda and UKAID, November 2018), https://www.jbs.cam.ac.uk/wp-content/uploads/2020/08/2018-ccaf-fsd-fintech-in-uganda.pdf.

Regulatory Environment:

- The Bank of Tanzania is the primary regulatory authority for all FSPs, although there are no clear licensing requirements specifically for FinTechs.
- Recent attempts to improve financial inclusion will hopefully lead to an improved regulatory framework for the sector.

The majority of AgTechs headquartered in Tanzania appear to operate as a B2C marketplace model. They also appear to be in the start-up phase, and to be concentrating fully on domestic operations.

Digital Financial Services Licensing Requirements[14]

Regulators in Tanzania tend to employ a wait and see approach, relying on what has worked in other markets as opposed to establishing forward-thinking regulations. AgTechs are under the purview of various regulators, many of which have conflicting priorities or guidelines, making the regulatory environment complex to navigate. Furthermore, startups are heavily taxed, which can deter new companies from entering the market.

Regulators are attempting to evolve and in 2015 launched the Information and Communications Technologies Commission to coordinate national initiatives regarding digital financial services. The government also entered into a MOU with the Financial Sector Deepening Trust, establishing that the government will issue regulatory frameworks for the financial sector while the Trust provides financial and technical support to promote innovation.

The Bank of Tanzania is the primary regulatory authority for all financial services providers, although there are no clear licensing requirements for digital providers. Mobile money operators also fall under the purview of the Bank of Tanzania, but some indicated that they are mandated to pay licensing fees to the Communications Regulatory Authority, causing further complexity.

Market Analysis

Despite government initiatives to reduce regulatory complexities, licensing requirements remain unclear. Out of the 7 countries of focus, Tanzania ranks fifth in number of AgTechs headquartered in the country (full list of AgTechs included in annex). The vast majority of models are B2C models, with Digital Platforms accounting for 80% of the total AgTechs. Recently, there has been a government push to improve financial inclusion in the country which will hopefully result in an improved regulatory framework in coming years.

AgTechs Headquartered in Tanzania

B2B Model Type

Supply Chain Management: Traceability	1

B2C Model Type

FinTech: Credit+	2
FinTech: Credit	1
Digital Platform: Product Marketplace	2
Digital Platform: Integrated Product & Services Marketplace	1

14 UNCDF, "The FinTech Start-up Landscape in Tanzania," May 10, 2021, https://www.uncdf.org/article/6759/the-fintech-start-up-landscape-in-tanzania.

Over 20 AgTechs operate in country, but few are headquartered in Côte d'Ivoire.

The regulatory environment is characterized by the following:

- *Absence of regulation for a competitive environment*
- *Lack of regulatory oversight and reporting to regulators*
- *Lack of regulatory guidance on e-signatures and e-contracts*
- *Interoperability is not yet established in the West African Economic and Monetary Union (WAEMU)*

source: https://www.lafinancedigitale.com/infographies/le-paysage-des-fintechs-au-senegal-en-2022

Regulatory Environment:

- FinTechs are under the purview of the Central Bank of West African States.
- Mobile money providers must apply for a license with the bank, but digital FSPs are not considered FIs and therefore cannot issue credit or savings accounts.
- Regulatory barriers are compounded by high taxes on mobile money transactions.

Digital Financial Services Licensing Requirements

Digital financial service providers are largely under the purview of the Central Bank of West African States. Financial services licensing requirements are largely the same as those in Senegal, in which providers using mobile money must apply for a license with the BCEAO, which grants a license to operate in the larger region (consisting of 8 countries), therefore reducing barriers for regional expansion.[18]

Under current guidelines, digital financial service providers are not considered financial institutions, and therefore this license does not allow them to issue credit or savings accounts, except for products that are provided by a bank or MFI using mobile money.

There does not appear to be much initiative taken on the part of the domestic government to promote a strong enabling environment for these digital financial service providers.

Market Analysis

High taxes on mobile money transaction, in addition to regulatory barriers, have historically made it difficult for innovative digital financial service providers to launch in the market. This has led to a reliance on incumbents and large banks or telecom companies, as opposed to innovative startups.

As a result, Côte d'Ivoire has a very limited number of AgTechs headquartered in the country (full list of AgTechs included in annex). However, recent efforts by the BCEAO prompt optimism for future support and growth of the digital financial services sector.

AgTechs Headquartered in Côte d'Ivoire

B2B Model Type

Supply Chain Management: Traceability	1

B2C Model Type

Digital Platform: Integrated Product & Services Marketplace	1
Digital Platform: Farm Services Rental Marketplace	3

18 MicroSave Consulting and mastercard foundation, "Inclusive FinTechs in Francophone Africa: Côte d'Ivoire Country Report," July 2020, https://www.microsave.net/wp-content/uploads/2020/07/Inclusive-FinTechs-in-Francophone-Africa-C%C3%B4te-d%E2%80%99Ivoire-country-report.pdf.

Regulatory Environment:

- FinTechs are under the purview of the Central Bank of West African States.
- The Government is promoting financial services innovation (e.g., the Startup Act and Regulatory Authority for Telecommunications and Post).
- There are no specific licensing requirements for FinTechs.

19 AgTechs operate in the market, but only a select few are headquartered in country.

The regulatory environment is characterized by the following:

- *Absence of regulation for a competitive environment*
- *Lack of regulatory oversight and reporting to regulators*
- *Lack of regulatory guidance on e-signatures and e-contracts*
- *Senegal is a signatory of the StartUp Act*
- *Interoperability is not yet established in the West African Economic and Monetary Union (WAEMU)*

source: https://www.lafinancedigitale.com/infographies/le-paysage-des-fintechs-au-senegal-en-2022

Digital Financial Services Licensing Requirements

There are currently no AgTech specific guidelines in Senegal; digital financial service providers are largely under the purview of the Central Bank of West African States (BCEAO). Historically, BCEAO, the primary FinTech regulator in the West African region, lacked a regulatory framework for digital financial services providers.[15] In April 2022, BCEAO announced the creation of a FinTech Promotion Bureau to oversee development of FinTech regulatory guidelines.[16] Shortly thereafter, the BCEAO issued the first e-money license to a non-bank and non-telecom FinTech. Domestically, the Senegalese government is attempting to drive innovation. Senegal was the second African country to pass a Startup Act, which includes a framework to assist FinTechs.[17]

The regulatory environment remains complex, compounded by high costs of mobile money licenses and taxes. Providers using mobile money must apply for a license with BCEAO, which grants licenses to operate in the West African region. Under current guidelines, digital financial service providers are not considered financial institutions, therefore this license does not allow them to issue credit or savings accounts, except for products provided by a Bank or MFI. Beyond this, there are no additional regulations for digital financial services providers operating in Senegal.

Market Analysis

The Senegalese government is keen to promote financial services innovation, demonstrated through the Startup Act and creation of the Regulatory Authority for Telecommunications and Post. Despite this, the regulatory environment remains complex for digital financial services providers. As a result of this, Senegal has limited AgTechs headquartered in country (full list of AgTechs included in annex).

AgTechs Headquartered in Senegal

B2C Model Type

Digital Platform: Integrated Product & Services Marketplace	1
Digital Platform: Farm Services Rental Marketplace	1

15 MicroSave Consulting and mastercard foundation, "Inclusive FinTechs in Francophone Africa: Senegal Country Report," July 13, 2020, https://www.microsave.net/wp-content/uploads/2020/07/MSC_SE_Landscape-study-1.pdf.

16 Ecofin Agency, "WAEMU: Central Bank BCEAO Sets up Fintech Promotion Bureau," Making Finance Work for Africa, April 26, 2022, https://www.mfw4a.org/news/waemu-central-bank-bceao-sets-fintech-promotion-bureau.

17 Tech Hive, "Start-Up Laws in Africa: Highlights and Comparisons," March 8, 2021, https://techhiveadvisory.org.ng/wp-content/uploads/2022/01/Start-Up-LAws.pdf.

photo credit: World Bank

AgTechs demonstrate great potential to increase financial service provision to smallholder farmers and agri-SMEs—though there is no one-size-fits-all approach.

The model types landscaped, and the individual business models within each category, provide varying competencies to enable financial services directly and indirectly.

5. Sector Outlook

Key Insights

AgTechs demonstrate great potential to increase financial service provision to smallholder farmers and agri-SMEs—though there is no one-size-fits-all approach. The model types landscaped, and the individual business models within each category, provide varying competencies to enable financial services directly and indirectly.

On the B2C side, there are dozens of models operating in the space, but only a few commercial players (e.g., AFEX, Apollo Agriculture) have successfully proven a product-market fit. Challenges including weak infrastructure and reliance on field agents create barriers for these AgTechs to scale. Furthermore, a dearth of debt funding has forced AgTechs to provide loans to clients using costly equity which lead to high costs passed down to the end user. Partnerships between commercial banks and AgTechs hold potential to reduce costs and capitalize on AgTechs' ability to reach and de-risk rural consumers, however partnership models are not yet widespread in the region.

On the B2B side, the number of providers that directly enable financial services is only scratching the surface. A few standout players (e.g., SatSure, CropIn) are successfully tailoring their services for financial service providers; however, many others are only just beginning to think through how their data can enable agricultural financing.

For both B2B and B2C models, there are a number of emerging model types—many with a climate focus—coming out of other markets, especially Southeast Asia. These include carbon monetization and precision agriculture automation. These models will almost certainly gain traction in sub-Saharan Africa within the next few years.


photo credit: IFC/World Bank

Looking Ahead

This landscape assessment demonstrates the dynamic, yet still nascent, AgTech sector in sub-Saharan Africa. Throughout all seven focus markets, the sector remains underdeveloped—except for a few mature players and the international B2B models now operating in this space.

During the last decade, the AgTech sector has experienced significant growth, as demonstrated by high-ticket investments (e.g., Apollo's $40 million Series B round and John Deere's investment in Hello Tractor). Despite this growth, AgTechs continue to face barriers, including complex regulations, lack of debt funding, and hesitancy on the part of financial service providers to partner with AgTech models.

Despite these challenges, AgTechs remain a promising channel to facilitate the provision of financial services for smallholder farmers and agri-SMEs in sub-Saharan Africa. Over the coming decade, the sector will likely continue to grow, both in the number and maturity of individual AgTechs—as well as the types of innovative business models operating on the continent.

6. Annexes

ANNEX 1

LIST OF AGTECHS HEADQUARTERED IN EACH COUNTRY

ANNEX 2

ALPHABETICAL LIST OF AGTECHS

OPERATING IN SEVEN COUNTRIES OF FOCUS,

BY COUNTRY AND MODEL TYPE

ANNEX 3

ABOUT THE AUTHORS

LIST OF AGTECHS HEADQUARTERED IN EACH COUNTRY

(note: this is based on publicly available information and has not been verified with all providers)

Kenya	
ACRE Africa	Financial Access: Insurance
Annona	Supply Chain Management: Farm Management
Apollo Agriculture	FinTech: Credit +
Connected Farmer (Vodacom)	Digital Platform: Integrated Product & Services Marketplace
Copia	Digital Platform: Integrated Product & Services Marketplace
DigiFarm	Digital Platform: Integrated Product & Services Marketplace
eProd	Supply Chain Management: Farm Management
Farm to Market Alliance (FtMA)	Digital Platform: Integrated Product & Services Marketplace
FarmDrive	Financial Access: Alternative Credit Scoring
Farmers Pride	Digital Platform: Integrated Product & Services Marketplace
Farmshine	Digital Platform: Integrated Product & Services Marketplace
Hello Tractor	Digital Platform: Farm Services Rental Marketplace
iProcure	Supply Chain Management: Production Planning & Decisioning
Juhudi Kilimo	FinTech: Credit
Kwara	Financial Access: FSP Digitalization
M-Shwari	FinTech: Credit
mKopa	PayGo Asset Service Provider
MobiGrow	FinTech: Credit
Myfugo	FinTech: Credit +
One Acre Fund	FinTech: Credit +
Selina Wamucii	Digital Platform: Product Marketplace
SokoFresh	Supply Chain Management: Digital Infrastructure Solution
Solar Freeze	Supply Chain Management: Digital Infrastructure Solution
Sunculture	PayGo Asset Service Provider
Synnefa (formerly Illuminum Greenhouses)	Supply Chain Management: Farm Management
Taimba	Digital Platform: Product Marketplace
TruTrade	Digital Platform: Integrated Product & Services Marketplace
Twiga	Digital Platform: Integrated Product & Services Marketplace
UjuziKilimo	Supply Chain Management: Farm Management
Usomi	Digital Platform: Integrated Product & Services Marketplace
VirtualCity	Supply Chain Management: Production Planning & Decisioning
Zuricap	FinTech: Credit

Nigeria	
AFEX Nigeria	Digital Platform: Integrated Product & Services Marketplace
Afrimash	Digital Platform: Product Marketplace
AgroMall (Financial Services)	FinTech: Credit +
AgroMall (Marketplace)	Digital Platform: Product Marketplace

Agrorite	Digital Platform: Integrated Product & Services Marketplace
Babban Gona	FinTech: Credit +
CoAmana	Digital Platform: Integrated Product & Services Marketplace
Crop2Cash	FinTech: Credit
Farmcrowdy	Digital Platform: Product Marketplace
FarmX	Digital Platform: Integrated Product & Services Marketplace
Kitovu	FinTech: Credit +
Novus Agro	Supply Chain Management: Farm Management
Pricepally	Digital Platform: Product Marketplace
Releaf	Supply Chain Management: Logistics Optimization
Social Lender	Financial Access: Alternative Credit Scoring
Thrive Agric	FinTech: Credit +
Tractor on the Go	Digital Platform: Farm Services Rental Marketplace
TradeBuza	Supply Chain Management: Farm Management
Zenvus	FinTech: Credit +
Zowasel	Digital Platform: Product Marketplace

Ghana	
Agrisolve	Digital Platform: Integrated Product & Services Marketplace
AgroInnova	Supply Chain Management: Farm Management
Complete Farmer	Digital Platform: Integrated Product & Services Marketplace
CowTribe	Supply Chain Management: Logistics Optimization
Esoko	Supply Chain Management: Farm Management
Kwidex	FinTech: Credit
Mergdata (Farmerline)	Supply Chain Management: Traceability
Nocofio	Supply Chain Management: Farm Management
Sesi Technologies	Supply Chain Management: Digital Infrastructure Solution
Syecomp	Financial Access: Remote Field Monitoring
TechShelta	Digital Platform: Integrated Product & Services Marketplace
Trade Ghana	Digital Platform: Product Marketplace
TROTRO Tractor	Digital Platform: Farm Services Rental Marketplace

Uganda	
Agro Supply Uganda	FinTech: Credit +
AgroMarket Day	Digital Platform: Product Marketplace
Akellobanker (Quest Digital Finance)	Financial Access: Alternative Credit Scoring
CTI Africa	FinTech: Credit +
Emata	FinTech: Credit
Ensibuuko	Financial Access: FSP Digitalization

Ezy Agric	Supply Chain Management: Farm Management
Famunera	Digital Platform: Integrated Product & Services Marketplace
Metajua	Supply Chain Management: Production Planning & Decisioning
Minute5	Digital Platform: Product Marketplace

Tanzania	
Digital Mobile Africa	Digital Platform: Integrated Product & Services Marketplace
eHakiki	Supply Chain Management: Traceability
Kilimo Fresh	Digital Platform: Product Marketplace
Ninanyo	Digital Platform: Integrated Product & Services Marketplace
Phema Agri	Digital Platform: Integrated Product & Services Marketplace

Senegal	
Afrikamart	Digital Platform: Product Marketplace
Mlouma	Digital Platform: Integrated Product & Services Marketplace

Côte d'Ivoire	
Seekewa	FinTech: Credit

Other SSA (HQ in other SSA country)	
Greenfingers Mobile	Supply Chain Management: Farm Management
Jumo	Financial Access: Alternative Credit Scoring
Manobi	Supply Chain Management: Traceability
MyAgro	FinTech: Credit +
OKO Crop Assurance	Financial Access: Insurance

International (HQ in country outside SSA)	
6thGrain	Financial Access: Remote Field Monitoring
Advans	FinTech: Credit
AgriTask	Supply Chain Management: Production Planning & Decisioning
AgroCenta	Financial Access: Alternative Credit Scoring
Agroclimatica	Financial Access: Alternative Credit Scoring
Azuri	PayGo Asset Service Provider
Bboxx	PayGo Asset Service Provider
Capture Solutions	Supply Chain Management: Traceability
CropIn	Supply Chain Management: Production Planning & Decisioning
FarmERP	Supply Chain Management: Production Planning & Decisioning
Farmforce	Supply Chain Management: Production Planning & Decisioning
Farmster	Digital Platform: Product Marketplace

JMR Agrinet	Digital Platform: Integrated Product & Services Marketplace
Koltiva	Supply Chain Management: Traceability
MasterCard Farmer Network (MFN) Community Pass	Digital Platform: Integrated Product & Services Marketplace
Mkulima Young	Digital Platform: Product Marketplace
Musoni	Financial Access: FSP Digitalization
NKG Bloom	Fintech: Credit
Olam Farmer Information System	Supply Chain Management: Farm Management
Opportunity International's Agricultural Finance Program	Financial Access: FSP Digitalization
Pula	Financial Access: Insurance
Rainforest Alliance Marketplace 2.0	Supply Chain Management: Traceability
SAP Rural Sourcing Management	Supply Chain Management: Traceability
Satelligence	Climate Risk Intelligence
SatSure	Financial Access: Remote Field Monitoring
SCOPEinsight	Supply Chain Management: Production Planning & Decisioning
Source Trace	Supply Chain Management: Production Planning & Decisioning
TaroWorks	Supply Chain Management: Farm Management
Tingo Group	Digital Platform: Integrated Product & Services Marketplace
Weather Impact	Climate Risk Intelligence
WeFarm	Digital Platform: Integrated Product & Services Marketplace
Yapu	Financial Access: Remote Field Monitoring

ALPHABETICAL LIST OF AGTECHS OPERATING IN SEVEN COUNTRIES OF FOCUS, BY COUNTRY AND MODEL TYPE

(note: this is based on publicly available information and has not been verified with all providers)

AgTech	HQ Country	AgTech Model Type
Agro Supply Uganda	Uganda	FinTech: Credit +
6thGrain	United States	Financial Access: Remote Field Monitoring
ACRE Africa	Kenya	Financial Access: Insurance
Advans	France	FinTech: Credit
AFEX Nigeria	Nigeria	Digital Platform: Integrated Product & Services Marketplace
Afrikamart	Senegal	Digital Platform: Product Marketplace
Afrimash	Nigeria	Digital Platform: Product Marketplace
Agrisolve	Ghana	Digital Platform: Integrated Product & Services Marketplace
AgriTask	Israel	Supply Chain Management: Production Planning & Decisioning
AgroCenta	United States	Financial Access: Alternative Credit Scoring
Agroclimatica	Denmark	Financial Access: Alternative Credit Scoring
AgroInnova	Ghana	Supply Chain Management: Farm Management
AgroMall (Financial Services)	Nigeria	FinTech: Credit +
AgroMall (Marketplace)	Nigeria	Digital Platform: Product Marketplace
AgroMarket Day	Uganda	Digital Platform: Product Marketplace
Agrorite	Nigeria	Digital Platform: Integrated Product & Services Marketplace
Akellobanker (Quest Digital Finance)	Uganda	Financial Access: Alternative Credit Scoring
Annona	Kenya	Supply Chain Management: Farm Management
Apollo Agriculture	Kenya	FinTech: Credit +
Azuri	United Kingdom	PayGo Asset Service Provider
Babban Gona	Nigeria	FinTech: Credit +
Bboxx	United Kingdom	PayGo Asset Service Provider
Capture Solutions	United Kingdom	Supply Chain Management: Traceability
CoAmana	Nigeria	Digital Platform: Integrated Product & Services Marketplace
Complete Farmer	Ghana	Digital Platform: Integrated Product & Services Marketplace
Connected Farmer (Vodacom)	Kenya	Digital Platform: Integrated Product & Services Marketplace
Copia	Kenya	Digital Platform: Integrated Product & Services Marketplace
CowTribe	Ghana	Supply Chain Management: Logistics Optimization
Crop2Cash	Nigeria	FinTech: Credit
CropIn	India	Supply Chain Management: Production Planning & Decisioning
CTI Africa	Uganda	FinTech: Credit +
DigiFarm	Kenya	Digital Platform: Integrated Product & Services Marketplace
Digital Mobile Africa	Tanzania	Digital Platform: Integrated Product & Services Marketplace
eHakiki	Tanzania	Supply Chain Management: Traceability
Emata	Uganda	FinTech: Credit
Ensibuuko	Uganda	Financial Access: FSP Digitalization

AgTech	HQ Country	AgTech Model Type
eProd	Kenya	Supply Chain Management: Farm Management
Esoko	Ghana	Supply Chain Management: Farm Management
Ezy Agric	Uganda	Supply Chain Management: Farm Management
Famunera	Uganda	Digital Platform: Integrated Product & Services Marketplace
Farm to Market Alliance (FtMA)	Kenya	Digital Platform: Integrated Product & Services Marketplace
Farmcrowdy	Nigeria	Digital Platform: Product Marketplace
FarmDrive	Kenya	Financial Access: Alternative Credit Scoring
FarmERP	India	Supply Chain Management: Production Planning & Decisioning
Farmers Pride	Kenya	Digital Platform: Integrated Product & Services Marketplace
Farmforce	Norway	Supply Chain Management: Production Planning & Decisioning
Farmshine	Kenya	Digital Platform: Integrated Product & Services Marketplace
Farmster	Tel Aviv	Digital Platform: Product Marketplace
FarmX	Nigeria	Digital Platform: Integrated Product & Services Marketplace
Greenfingers Mobile	South Africa	Supply Chain Management: Farm Management
Hello Tractor	Kenya	Digital Platform: Farm Services Rental Marketplace
iProcure	Kenya	Supply Chain Management: Production Planning & Decisioning
JMR Agrinet	India	Digital Platform: Integrated Product & Services Marketplace
Juhudi Kilimo	Kenya	FinTech: Credit
Jumo	South Africa	Financial Access: Alternative Credit Scoring
Kilimo Fresh	Tanzania	Digital Platform: Product Marketplace
Kitovu	Nigeria	FinTech: Credit +
Koltiva	Switzerland	Supply Chain Management: Traceability
Kwara	Kenya	Financial Access: FSP Digitalization
Kwidex	Ghana	FinTech: Credit
M-Shwari	Kenya	FinTech: Credit
Manobi	Mauritius	Supply Chain Management: Traceability
MasterCard Farmer Network (MFN) Community Pass	United States	Digital Platform: Integrated Product & Services Marketplace
Mergdata (Farmerline)	Ghana	Supply Chain Management: Traceability
Metajua	Uganda	Supply Chain Management: Production Planning & Decisioning
Minute5	Uganda	Digital Platform: Product Marketplace
mKopa	Kenya	PayGo Asset Service Provider
Mkulima Young	Australia	Digital Platform: Product Marketplace
Mlouma	Senegal	Digital Platform: Integrated Product & Services Marketplace
MobiGrow	Kenya	FinTech: Credit
Musoni	Netherlands	Financial Access: FSP Digitalization

AgTech	HQ Country	AgTech Model Type
MyAgro	Mali	FinTech: Credit +
Myfugo	Kenya	FinTech: Credit +
Ninanyo	Tanzania	Digital Platform: Integrated Product & Services Marketplace
NKG Bloom	Germany	Fintech: Credit
Nocofio	Ghana	Supply Chain Management: Farm Management
Novus Agro	Nigeria	Supply Chain Management: Farm Management
OKO Crop Assurance	Mali	Financial Access: Insurance
Olam Farmer Information System	Singapore	Supply Chain Management: Farm Management
One Acre Fund	Kenya	FinTech: Credit +
Opportunity International's Agricultural Finance Program	United States	Financial Access: FSP Digitalization
Phema Agri	Tanzania	Digital Platform: Integrated Product & Services Marketplace
Pricepally	Nigeria	Digital Platform: Product Marketplace
Pula	Switzerland	Financial Access: Insurance
Rainforest Alliance Marketplace 2.0	United States	Supply Chain Management: Traceability
Releaf	Nigeria	Supply Chain Management: Logistics Optimization
SAP Rural Sourcing Management	United States	Supply Chain Management: Traceability
Satelligence	Netherlands	Climate Risk Intelligence
SatSure	India	Financial Access: Remote Field Monitoring
SCOPEinsight	Netherlands	Supply Chain Management: Production Planning & Decisioning
Seekewa	Ivory Coast	FinTech: Credit
Selina Wamucii	Kenya	Digital Platform: Product Marketplace
Sesi Technologies	Ghana	Supply Chain Management: Digital Infrastructure Solution
Social Lender	Nigeria	Financial Access: Alternative Credit Scoring
SokoFresh	Kenya	Supply Chain Management: Digital Infrastructure Solution
Solar Freeze	Kenya	Supply Chain Management: Digital Infrastructure Solution
Source Trace	United States	Supply Chain Management: Production Planning & Decisioning
Sunculture	Kenya	PayGo Asset Service Provider
Syecomp	Ghana	Financial Access: Remote Field Monitoring
Synnefa (formerly Illuminum Greenhouses)	Kenya	Supply Chain Management: Farm Management
Taimba	Kenya	Digital Platform: Product Marketplace
TaroWorks	United States	Supply Chain Management: Farm Management
TechShelta	Ghana	Digital Platform: Integrated Product & Services Marketplace
Thrive Agric	Nigeria	FinTech: Credit +
Tingo Group	New York	Digital Platform: Integrated Product & Services Marketplace
Tractor on the Go	Nigeria	Digital Platform: Farm Services Rental Marketplace
Trade Ghana	Ghana	Digital Platform: Product Marketplace

AgTech	HQ Country	AgTech Model Type
TradeBuza	Nigeria	Supply Chain Management: Farm Management
TROTRO Tractor	Ghana	Digital Platform: Farm Services Rental Marketplace
TruTrade	Kenya	Digital Platform: Integrated Product & Services Marketplace
Twiga	Kenya	Digital Platform: Integrated Product & Services Marketplace
UjuziKilimo	Kenya	Supply Chain Management: Farm Management
Usomi	Kenya	Digital Platform: Integrated Product & Services Marketplace
VirtualCity	Kenya	Supply Chain Management: Production Planning & Decisioning
Weather Impact	Netherlands	Climate Risk Intelligence
WeFarm	United Kingdom	Digital Platform: Integrated Product & Services Marketplace
Yapu	Germany	Financial Access: Remote Field Monitoring
Zenvus	Nigeria	FinTech: Credit +
Zowasel	Nigeria	Digital Platform: Product Marketplace
Zuricap	Kenya	FinTech: Credit

About the Authors

This report was authored by ISF Advisors, the strategic and financial advisory group committed to mobilizing capital for a more sustainable, equitable, and productive global food system. In putting together this report, the ISF Advisors team blended experience from top-tier strategy, investment banking, and corporate finance firms and in-house research on agriculture and food systems, in order to provide a sound guide for investment strategies for public and private funders. ISF Advisors has become a trusted advisor and partner to leading institutions involved in food systems, including many of the world's largest investors, donors, companies, NGOs, and foundations. ISF Advisors has worked exclusively on the fundamental question of food and agriculture system transformation in over 50 country contexts from a number of different angles.

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