

# Agritech and Fintech Providers in East and Southern Africa

**A LANDSCAPE ASSESSMENT**

**FULL REPORT**



May 2023

# Acknowledgements

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# Contents

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Foreword	2
Glossary	4
1. Introduction	5
2. Market analysis and barriers to scale	7
3. Ecosystem segmentation and analysis	14
4. Recommended business models for scaling	21
5. ESA country comparison and profiles	30
6. Examples of agritech and fintech solutions	36
7. Conclusions and recommendations	50
8. Appendix	57
A. Landscape assessment approach	58
B. Market landscape and enabling environment (expanded)	60
C. Ecosystem analysis (expanded)	67
D. Country profiles (expanded)	82
E. Stakeholder interviews concluded	89

# Foreword

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We are pleased to introduce this comprehensive landscape assessment, Agritech and fintech providers in East and Southern Africa, commissioned by the International Fund for Agricultural Development (IFAD) and the Smallholder and Agri-SME Finance and Investment Network (SAFIN). We extend our gratitude to the technical team of IFAD and Palladium, and all the private and public sector institutions that contributed and shared their experiences to inform this study.

This publication critically examines the dynamic and ever-evolving ecosystem of agriculture technology (agritech) and financial technology (fintech) in the region. East and Southern Africa (ESA) has long been recognized for its immense agricultural potential, starting from fertile lands and diverse climates, and its rich agricultural heritage. These provide a solid foundation for driving food security, economic growth and rural development. However, the agriculture sector has faced significant challenges, including limited access to infrastructure, financial services and market linkages.

In recent years, the emergence of agritech and fintech providers in ESA has brought about innovative solutions to address these challenges, paving the way for a remarkable transformation in the agricultural landscape in the region and across Africa. While the possibilities are promising, we must also acknowledge the unique challenges of adopting these solutions at scale. There need to be: more investment to address infrastructure gaps; conducive regulatory frameworks; and robust partnerships among various stakeholders, notably the public and private sectors, to unlock the full potential of agritech and fintech in the region.

This assessment delves deep into the current situation, analysing the myriad solutions available in the region and innovations that agritech and fintech providers have introduced to address the needs and challenges of the region's smallholder farmers and underserved groups. This landscape assessment not only offers a comprehensive overview of the diverse range of agritech and fintech providers operating in ESA, but also presents an in-depth analysis of the business models they have employed and helps us respond to the question of how these solutions can reach scale. The publication also provides key insights to financial institutions and investors working in the region to better understand the perceptions around technology adoption and use, especially when lending to agricultural small and medium-sized enterprises (agri-SMEs) and smallholder farmers.

The case studies and best practices highlighted in this publication provide invaluable insights for policymakers, investors and stakeholders eager to leverage the transformative power of digital technologies to promote food security and inclusive livelihoods and to mitigate climate change effects.

IFAD and SAFIN are pleased to join forces in building the evidence to support and influence this rapidly growing sector.

At IFAD, we envisage that this publication will support country teams in conducting policy dialogue, designing and leveraging agritech and fintech solutions, and partnering

with private sector actors to drive growth and impact. This approach is very much in line with IFAD delivering transformational country programmes.

SAFIN's members worldwide are committed to working individually and collectively to advance the understanding of technology's role in transforming agriculture and food systems, driving inclusive growth in Africa and beyond. The Network partnered on this initiative in the hope that this assessment will catalyse policymakers, investors and practitioners to collaborate, innovate and leverage the power of agritech- and fintech-driven solutions.

Let us embark on this enlightening journey, discovering the immense potential of agritech and fintech in ESA to shape a brighter future for the region's agricultural ecosystems, promote SME investments and improve small producers' livelihoods.



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# Glossary

<b>Agri-SME</b>	Agricultural small and medium-sized enterprise
<b>Agritech</b>	Agriculture technology
<b>B2C</b>	Business-to-consumer
<b>Blended capital</b>	Capital that combines different types of financing, such as grants, loans and equity investments, in a single package
<b>Bundled services</b>	Comprehensive range of services which can span agritech and fintech offerings and address multiple barriers across the agri value chain
<b>CCA</b>	Climate change adaptation
<b>Concessional capital</b>	Capital that is provided on favourable terms, such as low interest rates or long repayment periods, typically for the purpose of supporting development or social initiatives
<b>ESA</b>	East and Southern Africa
<b>FDI</b>	Foreign direct investment
<b>FI</b>	Financial institution
<b>Fintech</b>	Financial technology
<b>First loss capital</b>	Capital that is specifically designated to absorb losses in the event of a financial failure or downturn
<b>FO</b>	Farmers' organization
<b>FX</b>	Foreign exchange, refers to the buying and selling of foreign currencies to profit from fluctuations in their exchange rate
<b>Grant capital</b>	Capital that is provided in the form of a grant, which does not need to be repaid
<b>Human capital</b>	Knowledge, skills and experience of an individual, which can be invested in and developed over time to increase their value and productivity
<b>ICT</b>	Information and communications technology
<b>IoT</b>	Internet of Things
<b>MFI</b>	Microfinance institution
<b>Patient capital</b>	Capital that is provided with a long-term perspective and a willingness to accept lower returns in exchange for supporting the growth of a company or social enterprise
<b>Private capital</b>	Capital that is provided by private investors or firms, rather than by governments or other public entities
<b>R&amp;D</b>	Research and development
<b>SACCO</b>	Savings and credit cooperative organization
<b>SHF</b>	Smallholder farmer
<b>SME</b>	small- and medium-sized enterprise
<b>Tech provider</b>	Company or organization that provides technology-related products or services to other businesses or individuals
<b>Working capital</b>	Capital that is available to a company to fund its day-to-day operations, such as to purchase inventory or pay other expenses



# 1. Introduction

# Background and objectives

This report assesses the landscape of agritech and fintech providers that enable agri-small and medium-sized enterprises (SMEs), smallholder farmers (SHFs) and farmers' organizations (FOs) to access financing in the East and Southern African region.

## Background on the initiative

Digitization is expected to provide an important avenue for African economies to leapfrog across different sectors of the economy. In agriculture, which employs over 65% of the population across the region, we are increasingly seeing the transition from largely government-led service provision to the emergence and uptake of new digital solutions, services, platforms and business models to serve even the most remote locations.

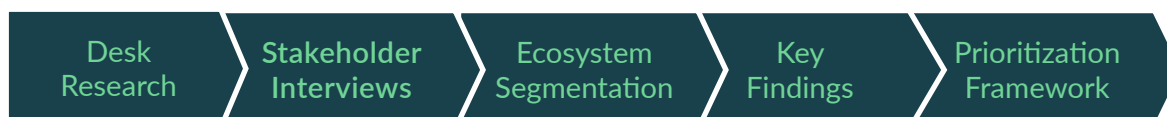
In alignment with IFAD's information and communication technology for development (ICT4D) strategy, the goal of this initiative is to improve access to **affordable finance and increase climate resilience** for SHFs, agri-SMEs and FOs through the support of agritech and fintech providers in the region.

## Objectives for this report

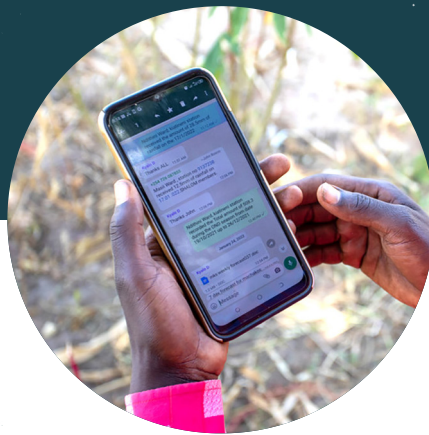
- » **Develop a deeper understanding of the agritech and fintech platforms** currently available in East and Southern Africa (ESA), including their business models, technological capabilities, barriers to scale, and success in getting financing to agri-SMEs and SHFs
- » **Understand financial institutions' (FI) perspectives regarding technology use** when lending to agri-SMEs and SHFs, barriers to uptake, and the type of solutions that reduce FIs transaction costs and improve farmers' and agri-SMEs' risk profile
- » **Identify target business models for IFAD and SAFIN to support**, considering their propensity for scale, commercial viability and potential to improve financial and climate resilience for agri-SMEs and SHFs and reduce risk and transaction costs for FIs
- » **Articulate the key drivers for successful integration and scalability of agritech businesses into financial intermediation** to accelerate affordable financing to agri-SMEs and SHFs, and in turn increase climate resilience and improve farmers' income and productivity.

## Methodology

Palladium leveraged a range of desk research, stakeholder interviews and prior studies' findings to identify the main business models that enable climate change adaptation (CCA) financing. Additional detail on methodology is included in the Appendix section of the report.














## 2. Market analysis and barriers to scale

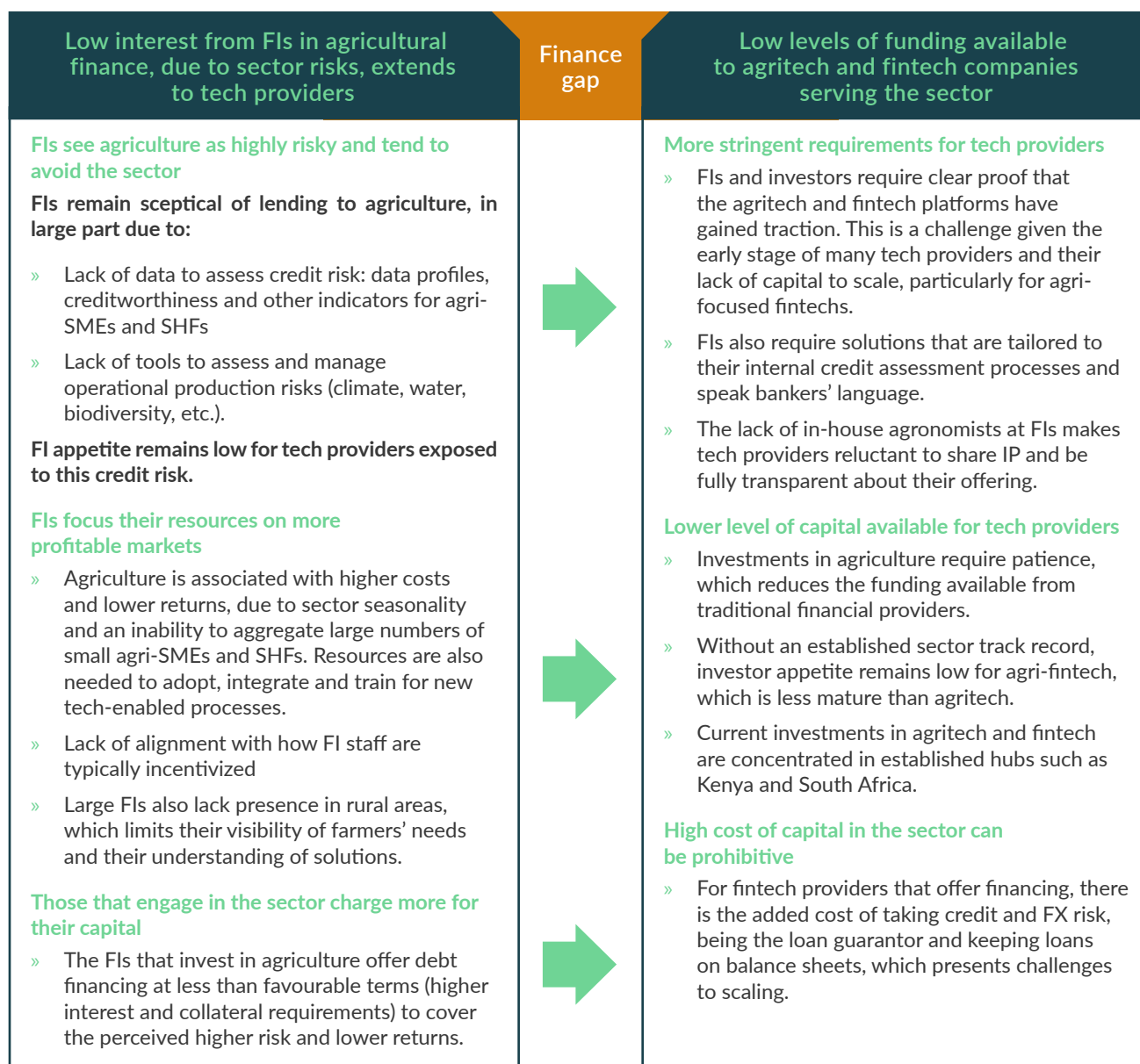
# Market challenges presenting opportunities

Agri-SMEs, SHFs and FOs are typically underserved by finance providers. Leveraging tech providers to unlock capital from local FIs presents an opportunity for IFAD to mobilize CCA financing across the ESA region.

Challenges	Opportunities
 <p><b>Financial Institutions</b></p> <ul style="list-style-type: none"> <li>» Higher <b>risk of lending to the agricultural sector</b> due to small-scale operations, seasonality, and volatility of cash flows</li> <li>» <b>Lack of resources and infrastructure</b> to monitor and assess farming risk in remote locations</li> <li>» Reluctance to adopt new technologies unless they unlock a <b>high-value customer</b> segment</li> </ul>	 <ul style="list-style-type: none"> <li>» <b>Reduce transaction costs</b> for financial institutions and mitigate risk when lending to agri-SMEs and SHFs</li> </ul>
 <p><b>Agritech/Fintech Providers</b></p> <ul style="list-style-type: none"> <li>» Limited opportunity to gain traction and scale due to lower density of user base and <b>challenges aggregating SHFs</b></li> <li>» <b>High customer acquisition costs</b>, especially for B2C</li> <li>» Funding lagging the broader tech industry due to <b>sector complexity</b> and <b>limited exit options</b></li> </ul>	 <ul style="list-style-type: none"> <li>» <b>Digitize the agricultural value chain</b> to promote data generation and advanced analytics, increasing transparency in the sector, improving farmers' efficiency and access to new buyers and formal markets</li> </ul>
 <p><b>Smallholder Farmers and Agri-SMEs</b></p> <ul style="list-style-type: none"> <li>» <b>Digital penetration is not universal</b>, with barriers to access for certain farmer groups, including lack of access to electricity, low level of digital literacy and high technology acquisition costs</li> </ul>	 <ul style="list-style-type: none"> <li>» <b>Increase SHFs' climate resilience</b> by offering better access to high-quality, real-time data that allow adaptation to climate impacts</li> </ul>
	 <ul style="list-style-type: none"> <li>» <b>Provide farmer-centred, digital agriculture solutions</b> that unlock financing, foster climate mitigation practices and enable equitable access to information</li> </ul>

# Access to financing – a key barrier for tech providers to scale

Agricultural tech providers are often seen by investors as more risky and less profitable than other business models, resulting in lower levels of investment being available for companies in this sector.



# Low product uptake by FIs limits tech providers' potential

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Products developed by agritech and fintech companies are typically in low demand by financial service providers due to misalignment of incentives and internal barriers limiting FIs' abilities to adopt and integrate new processes.

## Opportunities for FIs to leverage tech providers

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Products developed by agritech and fintech companies help **improve FIs' credit risk assessment and reduce their risk exposure, facilitating financing towards agri-SMEs and SHFs** by acting as intermediaries aggregating end-customers and addressing specific risks faced by them.

Products with integration potential by FIs include alternative credit scoring, agri-insurance, and offerings that mitigate lending risks leveraging data analytics from geolocation, weather and AI technology, better farm management systems, irrigation, or access to inputs and equipment to improve productivity and repayment ability.

Examples of partnerships with FIs include:

- » **Taimba** partnering with **Mastercard** and **Kenya Commercial Bank** in July 2022 to leverage data and deploy capital to SHFs through alternative lending models
- » **Green Agro Solutions** partnered with **Commercial Bank of Ethiopia** in January 2021 on its digital platform for SHFs to make secure and efficient financial transactions
- » **Standard Bank** partnered with agri-incubator **Timbali** in South Africa in July 2021 to offer low-cost loans to support local agri-SMEs and farmers on the programme
- » **gnuGrid** was licensed by **Bank of Uganda** in November 2021 as its first ever indigenous Credit Reference Bureau due to its credit data capabilities for customers.

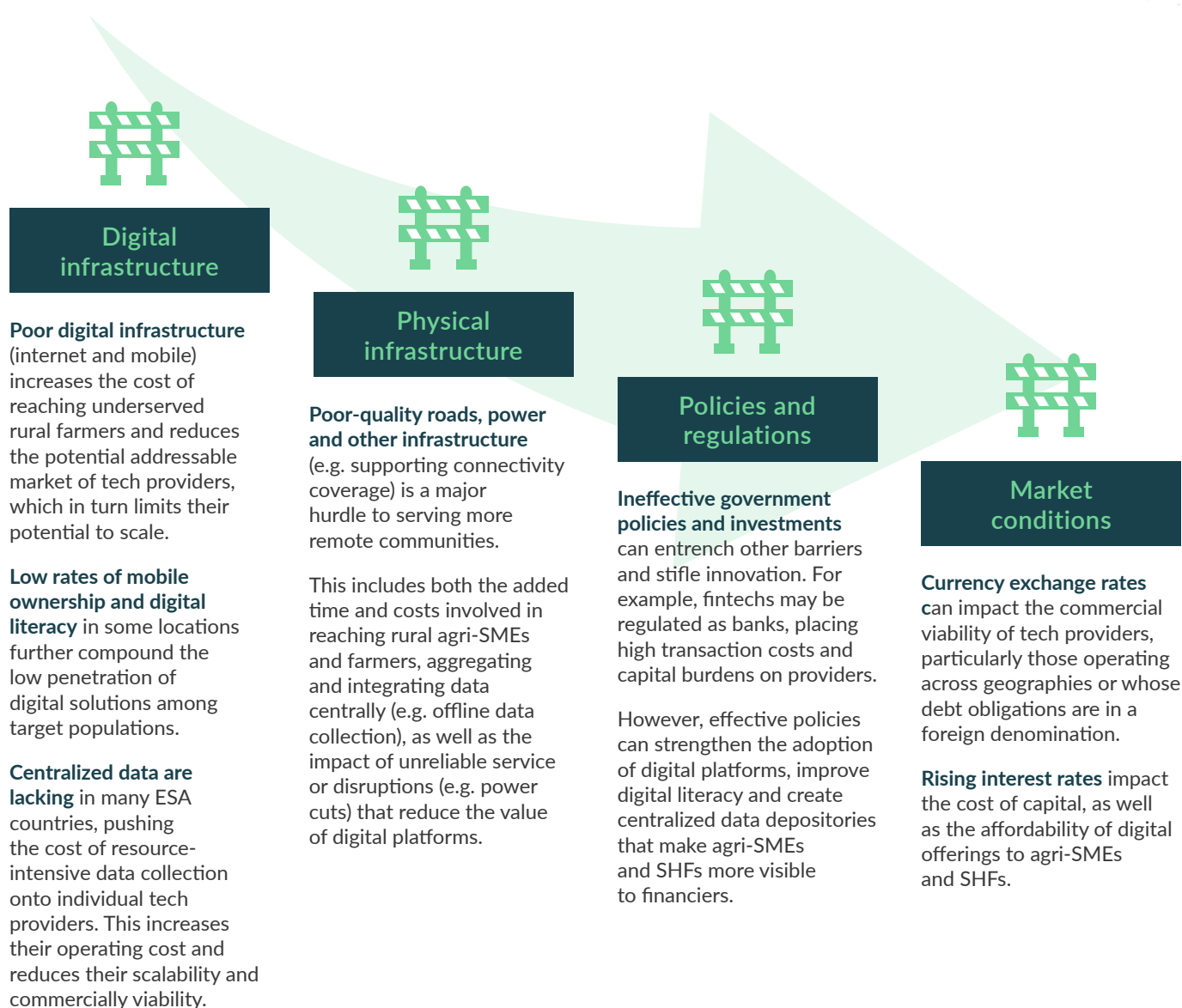
## Key barriers to agritech and fintech services uptake by FIs

However, there remain significant obstacles to greater uptake of tech providers' offerings by finance providers:



# The lack of an enabling environment can present barriers to scale for tech providers

Local contexts can present significant challenges for tech providers, thus matching business models to supportive markets will be key to increase their potential to scale and become commercially viable.



# Despite challenges, positive market trends towards collaboration to unlock capital flow

Despite challenges, there are emerging trends of collaboration between tech providers and FIs, as well as an expansion of service offerings across agricultural and financial products, aiming to unlock finance for the sector.

## Development of farmer-centred offerings

**Agri-tech and fintech providers are increasingly developing tailored services, addressing the unique needs of agri-SMEs and farmers.**

- » Tech providers are expanding operations and engaging more directly with agri-SMEs and SHFs, allowing for direct feedback and the design of tailored solutions.
- » Examples include providers employing local agents to serve as a gateway, enabling better data collection and exchange.
- » The result is a better understanding of agri-SMEs' and farmers' profiles, needs and creditworthiness, increasing their ability to access financing.
- » This is also driving the trend towards holistic bundled services and partnerships that address the full spectrum of customer pain points.

## Increased collaboration with SACCOs and FIs

**Savings and credit cooperative organizations (SACCOs) and FIs are increasingly open to collaborations with tech service providers.**

- » SACCOs operate as rural credit unions and are popular in ESA due to the lack of alternative financing options for farmers.
- » They traditionally viewed tech providers as competitors but are increasingly receptive of collaborations and adoption of tech services for their customers.
- » Adapta.Earth is one example of such collaboration, helping SACCOs unlock finance for agriculture by offering data and climate-smart technologies.
- » Despite scepticism, FIs are showing interest in tech providers that consolidate the large number of agri-SMEs and SHFs.

## Growing adoption of mobile phones and mobile money

**Growth in broader, mobile-enabled fintech providers paves the way for mobile-based financial offerings for the agriculture sector.**

- » There has been significant growth in financial innovation attributed to the rapid adoption of mobile money, predominantly concentrated in East Africa.
- » This has allowed fintechs to unlock access to finance for the difficult-to-reach, unbanked customer segment such as rural agri-SMEs and SHFs.
- » The proliferation of mobile platforms in these markets makes it easier for fintech and bundled services targeting the agriculture sector to follow suit.

## Shift to bundled services and consolidation of single-product providers

**Tech providers are beginning to shift from a single-product offering to multiple (bundled) services.**

- » Single-product providers face scaling challenges due to their narrow scope of offering and smaller addressable market.
- » By bundling services, providers (e.g. Pula Advisors) can address multiple pain points. This builds customer trust, increases and diversifies revenues while keeping client acquisition costs low.
- » Partnerships (e.g. between EzyAgric and Pezesha) are a low-cost, low-risk way of adding specialist capabilities and bundles, with lower funding risks.
- » A consolidation of tech providers is also anticipated to increase their competitiveness in the longer term.



# 3. Ecosystem segmentation and analysis



# Sector dynamics present opportunities for scalable tech solutions

Addressing obstacles to finance the agriculture sector and increase investment in agritech and fintech providers is key to improving agri-SMEs' and SHFs, productivity and alleviating climate vulnerability.

## ESA agricultural sector context

- » The agriculture sector is central to fostering economic growth, reducing poverty and improving food security in the ESA region and represents 25-35% of countries' GDP.
- » However, the accelerating pace of climate change, population growth, the global pandemic and conflicts have threatened the development of the sector. They put tremendous pressure on shifting focus onto more sustainable and resilient agriculture systems.
- » Financial institutions are ill prepared to finance that shift. Banks and MFIs have traditionally been providing very limited resources for the sector. Agriculture loans and investments portfolios are currently disproportionately low compared to the sector's share of GDP.



## Opportunity for scalable tech solutions

Tackling the challenges at hand requires tailored solutions that increase access to finance, digitization, mechanization, climate-smart technologies, processing and logistics to help agri-SMEs, SHFs and FOs increase productivity while reducing their environmental impact. The following types of businesses tackle these challenges:



### Agritech Providers

Innovative digital and technological platforms in the agriculture value chain aimed at improving yield, efficiency, profitability and sustainability



### Bundled Services Providers

Comprehensive range of service offerings which can span agritech and fintech solutions and address multiple barriers across the agriculture value chain

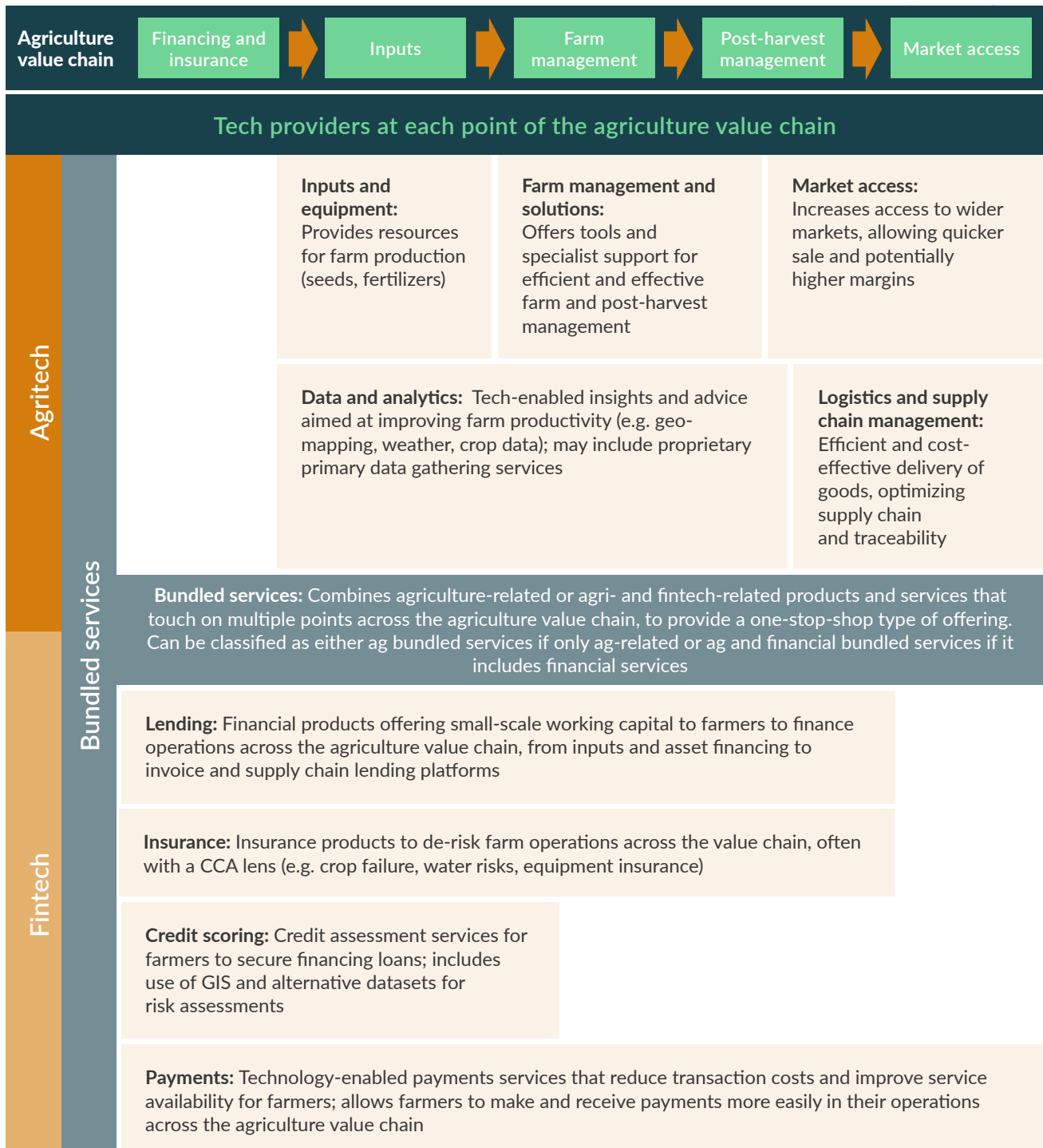


### Fintech Providers

Digital innovations focused on access to funding, allowing SHFs and agri-SMEs to invest in inputs, equipment and more efficient farming methods

# Agritech and fintech business models in the agriculture value chain

A segmentation of agritech, bundled services and fintech providers into business model categories reveals that businesses target different, and often multiple, stages of the agriculture value chain.



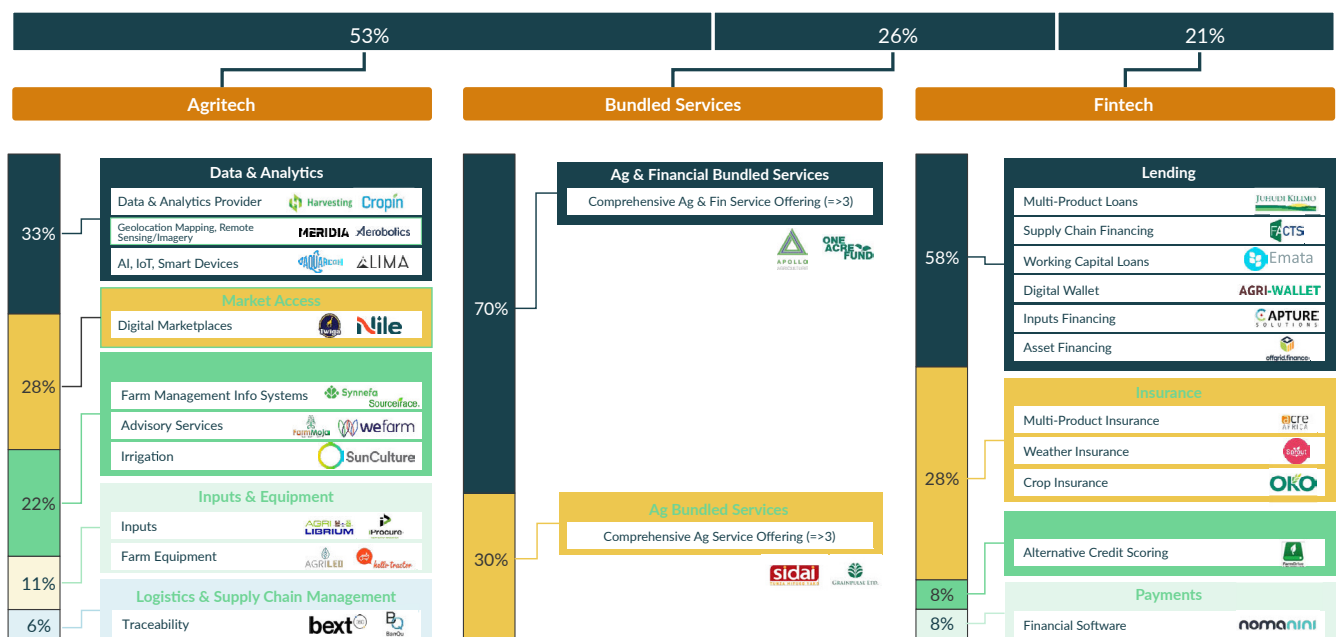
# Agritech and fintech providers

The tech providers landscape reveals that agri-SMEs and SHFs can increase access to financing previously unavailable to them, by leveraging products focused on data analytics, market access and bundled services.

53%	26%	21%
Agritech	Bundled Services	Fintech
<p><b>The agritech segment offers a breadth and depth of offerings geared towards the use of technological innovations to increase yield, efficiency, profitability and sustainability.</b></p> <ul style="list-style-type: none"> <li>» This is the most established segment, with the majority of activity focused on improving farmers' and agri-SMEs' productivity through data and analytics, farm management and solutions, and increasing access to markets.</li> <li>» Data insights and farm management offer SHFs and agri-SMEs increased revenue generation capabilities by helping them make better-informed decisions on produce price, quality and volume.</li> <li>» Market access providers enable SHFs and agri-SMEs to sell produce through efficient digital marketplace platforms, reach a wider range of local, regional and international buyers, access fair prices and secure the sale of farmers' produce.</li> </ul>	<p><b>Bundled services connect SHFs and agri-SMEs to services and solutions across the agriculture value chain, addressing multiple challenges.</b></p> <ul style="list-style-type: none"> <li>» This is an emerging segment, gaining traction by single-product providers expanding their offering or consolidating and leveraging services offered by others.</li> <li>» These include companies which can operate across both agritech and fintech segments.</li> <li>» The majority of the providers offer at least three service offerings across the agriculture value chain, including a combination of access to inputs, market linkages, credit and a range of other financial products, such as payments and insurance. In addition, some incorporate extension services as part of their offering, including training on sustainability practices that help increase climate resilience.</li> </ul>	<p><b>Fintech providers develop digital innovations focused on increasing access to financial products and services in the agriculture value chain.</b></p> <ul style="list-style-type: none"> <li>» The number of pure fintech providers focused on agriculture is smaller, due to the inherent risks of the agriculture sector and high operating costs as a result of a less mature market.</li> <li>» Regulatory burdens on financial services providers increase transaction costs and make commercially viable business models more difficult to achieve.</li> <li>» The most prevalent offerings in this segment are concentrated in lending and insurance – products that are also often offered as part of a bundled service.</li> <li>» Other models leverage data to provide alternative credit scoring, financial software for e-commerce and payment platforms to reduce transaction costs in reaching farmers and SMEs, improving their access to finance.</li> </ul>

# Agritech and Fintech landscape segmentation

A segmentation heatmap demonstrates that a greater number of companies focus on agritech, followed by the emerging segment of bundled services, while a smaller number of companies focus on fintech for agriculture.



Source: Palladium secondary research and analysis; sample size = 68 companies

# CCA offerings and financing

Data and analytics, farm management and solutions and bundled services business models can incorporate a strong CCA focus, to help agri-SMEs and SHFs manage climate risk and create more investable opportunities.

## Public funding alone cannot meet the CCA needs of agri-SMEs and SHFs

- » **CCA continues to be an underdeveloped area** within climate finance, compared to mitigation transactions, with only 14% of blended finance transactions (leveraging concessional capital for impact) having a pure adaptation focus.<sup>1</sup>
- » **The majority of climate finance flows in Africa in 2019 and 2020 came from public sources** such as governments, DFIs and multilaterals.<sup>2</sup> Only 7% went to agri-SMEs, and around half of that was tagged for CCA platforms. An estimated additional \$50 billion is needed for CCA in agriculture, forestry and land use across Africa.<sup>3</sup>
- » **Pervasive data gaps exist across actors and sectors.** Limited data on CCA needs by sector and geography available in the ESA region make it challenging to prioritize funding targets and tech provider types.
- » Despite the challenges facing ESA's enabling environment, **the international community has been working together with local governments and organizations.** Funds supporting CCA services include the Adaptation for Smallholder Agriculture Program, the Global Climate Change Alliance, the Least Developed Countries Fund and the Green Climate Fund, including projects aiming to strengthen climate information and early warning systems.

## CCA-focused tech providers can help agri-SMEs and SHFs adapt to climate change and create more viable business models

The landscape analysis Palladium conducted identified the business models with the highest levels of CCA-focused activity and investments in the sector, including:

	<b>Data and analytics</b>	<b>Farm management and solutions</b>	<b>Bundled services</b>
<b>CCA offerings</b>	<ul style="list-style-type: none"> <li>» Real-time, local weather forecasts and IoT monitoring allow agri-SMEs and SHFs to better manage climate risks, improve productivity and reduce losses (e.g. AgriCloud, Lima Labs).</li> </ul>	<ul style="list-style-type: none"> <li>» Training on CCA and sustainable farming techniques improves agri-SMEs' and farmers' climate change resilience and operational efficiency (e.g. Farmmoja, SourceTrace).</li> </ul>	<ul style="list-style-type: none"> <li>» Climate change is multifaceted. Bundling agritech or agri- and fintech services can address multiple climate risks along the agriculture value chain (e.g. EcoFarmer, Pula Advisors).</li> </ul>
<b>Business model potential to unlock CCA financing</b>	<ul style="list-style-type: none"> <li>» Availability of climate data for agri-SMEs and SHFs can help reduce their production risk and unlock working capital for CCA use.</li> <li>» Climate change data and analytics can help increase FIs' and investors' understanding of the sector and unlock further investment.</li> </ul>	<ul style="list-style-type: none"> <li>» More climate-resilient farms and agri-SMEs have greater potential to become financially viable and achieve scale.</li> <li>» Improving climate resilience of agri-SMEs and SHFs reduces risk for potential investors and enables more private capital to flow into the sector.</li> </ul>	<ul style="list-style-type: none"> <li>» Aggregating services allows for larger addressable markets to be reached and helps more agri-SMEs and SHFs become climate-resilient and access better financing options.</li> <li>» Bundling adaptation services can also help decrease transaction costs for finance providers.</li> </ul>

Source: 1. Convergence State of Blended Finance – Climate Edition 2022;  
 2. Climate Policy Initiative – The State of Climate Finance in Africa – 2022;  
 3. Examining the Climate Finance Gap in Small-Scale Agriculture – 2020.

# Key insights from ecosystem segmentation and analysis

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Palladium used a dataset of companies compiled through primary and secondary research to further understand the market dynamics of agritech and fintech providers in ESA. Key insights are highlighted below, and further details are provided in Appendix C.

- 1 Few companies focus solely on serving agri-SMEs as customers (7% of the total sample).**
  - » SHFs represent a more numerous and homogenous customer type, while agri-SMEs' needs are more diverse and difficult to tailor to.

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- 2 32% of companies in our sample have a CCA focus embedded in their offering.**
  - » Data and analytics companies with a CCA focus tend to be at a more mature stage than those without.
  - » Similarly, agricultural bundled services are also attracting more investment for CCA-related services.

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- 3 Agritech is the largest and most established segment in terms of funding activity in ESA.**
  - » Agritech businesses appear to have a clear road map for investment. Agritech businesses are likely to be larger than fintechs and those offering bundled services.
  - » Digital marketplaces, providing market access to SHFs and agri-SMEs, are especially attractive.

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- 4 Bundled services are receiving increasingly more funding.**
  - » A growing number of investors are focusing on business models that bundle multiple services across the agriculture value chain, attracting 33% of total funding, with agricultural and financial bundled services representing two thirds of that funding.

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- 5 Equity funding is the most commonly used instrument.**
  - » Equity represents 58% of transaction volume within our sample; however, both debt and equity are used throughout the investment cycle.
  - » Grant capital tends to be deployed during the early stages to fund pilots and innovation but is used less in later stages to support growth and scaling.

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- 6 Kenya is the largest hub in the ESA region across all three segments.**
  - » Kenya represents 30-50% of activity across agritech, bundled services and fintech, followed by South Africa, another major hub for agritech, and Uganda, an emerging hub for bundled services and fintech.

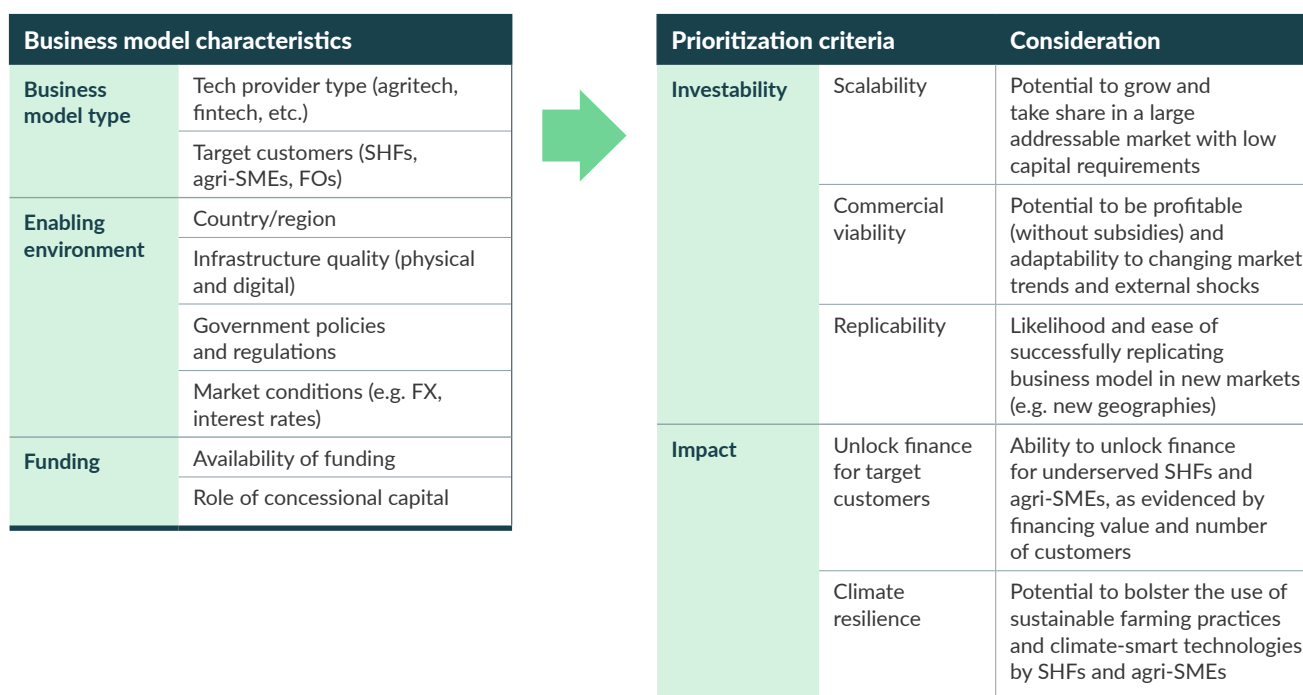


## 4. Recommended business models for scaling

# Business model prioritization criteria

To evaluate the business models within the agritech and fintech landscape, Palladium developed a framework that prioritizes investability and impact potential, in line with IFAD’s objectives, to assess the business models that could most effectively unlock financing for agri-SMEs and SHFs in ESA.

The framework considered a set of business model characteristics along with a set of other factors below, to determine **which models are most investable and impactful**.





# Business model ranking

Based on Palladium’s assessment against the prioritization framework of investability and impact, data and analytics, market access, and agricultural and financial bundled services are the recommended business models for scaling.

Business model prioritization criteria	Agritech					Bundled services		Fintech
	Data and analytics	Market access	Farm M&S	Inputs and equipment	Logistics and SCM	Ag and financial bundled services	Ag bundled services	
<b>Overall</b>	Priority	Priority	Secondary	Other	Other	Priority	Secondary	Other
<b>Investability</b>	High	High	Medium	Low	Low	High	Medium	Low
<b>Scalability</b>	High	High	Medium	Low	Low	High	Medium	Low
<b>Commercial viability</b>	High	Medium	Medium	Low	Low	High	Medium	Medium
<b>Replicability</b>	High	High	Medium	Low	Low	High	Medium	Low
<b>Impact</b>	Medium	Medium	Medium	Medium	Medium/Low	High	Medium/High	Medium
<b>Social</b>	Medium	High	Low	Low	Low	High	Medium	High
<b>Environmental</b>	Medium	Low	High	High	Medium/High	Medium/High	High	Low

Data and analytics and market access are the most proven business models for investability and potential to unlock finance for agri-SMEs and SHFs.

Agricultural and financial bundled services are emerging and attracting investors’ interest. Though a more complex model, it has the highest potential to scale.

Fintech in the agriculture value chain has so far struggled to prove its value proposition and scale.

# Recommended business model – ag and financial bundled services

Ag and financial bundled services offer the most compelling value proposition to customers by addressing multiple pain points for farmers and agri-SMEs across the agriculture value chain

## Ag and financial bundled services

### Business model overview

**Description:** Offers services across the agriculture value chain, combining agritech (e.g. access to inputs & equipment, technical assistance and market access) with fintech offerings (e.g. lending and insurance)

**Provider type:** Farmer-centred platform across agritech and fintech that helps increase productivity, efficiency and income through digital platforms, at scale

**Target customers:** SHFs, agri-SMEs and FOs with multiple pain points

**Value proposition:** Integrated approach in tackling multiple pain points, common digital platform, lower operating costs, complementarities of services

### Investment environment

**Transaction activity:** 14 companies within our sample

**Capital raised by companies within sample:** \$113 million

**Investment stage & type:** Most activity at earlier stages (Series A or earlier). Predominantly equity investments, with some early grants and debt capital

**Key geographies:** Kenya (5 of 14 companies) is the major hub for transaction activity in the space, with Uganda (3 of 14) also active, with additional activity across the ESA region

### Prioritization

#### Investability:

- » **Scalability:** High, with abundant examples of growth and value investments
- » **Commercial viability:** Larger addressable markets, proven investor interest
- » **Replicability:** Model with most investment activity across ESA countries

#### Impact:

- » **Social:** Addresses multiple financial, data, advisory and input challenges; improves accessibility and uptake of services by customers via aggregation, and risk profile of target customers to unlock additional financing
- » **Climate:** More likely to increase climate-related data collection and accessibility, improve production risk management and offer technical advisory, including sustainability practices and climate-smart technologies

### Example company

#### Pula Advisors – founded in 2015 (broader ESA, with focus on Kenya)

- » Tech-enabled agri-insurance products, with data feeding AI, weather forecast and farming practice advisory services that mitigate farmers' production risk and unlock access to finance. Field agents enable direct-to-farmers model.

*"Pula has insured over 4.7 million farmers ...giving SHFs access to insurance & agronomy advice increases their investment in their farms by up to 16% and yield up to 30%. This creates more climate resilient and profitable livelihoods, helping to lift farmers and their families out of poverty." (Investor interview)*

Source: AFN interview with Pula Advisors – October 2021.

# Recommended business model – market access

Platforms that offer market access look to drive connectivity between agricultural supply and demand, creating value for both sides and helping SHFs and agri-SMEs maximize the value of their products.

## Agritech – market access

### Business model overview

**Description:** Digital marketplaces that connect agricultural buyers and sellers

**Provider type:** Digital e-commerce platforms with payment functionalities, offering access to inputs, machinery, data analysis, logistics and markets

**Target customers:** SHFs and agri-SMEs with limited networks, typically accessing local markets only

**Value proposition:** Brings greater access to a wider range of buyers, better prices, as well as efficiency to the agri-food supply chain upstream and downstream of the farmer, helping improve cash flow of SHFs and agri-SMEs through more accessible platforms, efficient payments and product distribution.

### Investment environment

**Transaction activity:** 10 companies within our sample

**Capital raised by companies within sample:** \$111 million (includes \$100 million raised by Twiga Foods, which is a significant outlier)

**Investment stage & type:** Activity across the investment cycle. Mainly equity investments, though Twiga Foods has raised \$10 million in total debt.

**Key geographies:** South Africa (5 of 10 companies) is the biggest hub, followed by Kenya (3 of 10). There is also some activity in Uganda and the broader ESA.

### Prioritization

#### Investability:

- » **Scalability:** High, with abundant examples of growth and value investments
- » **Commercial viability:** Proven later-stage (Series B and C) companies
- » **Replicability:** Transactions across ESA demonstrate replicability

#### Impact:

- » **Social:** Increases target customers' access to regional and international buyers and better prices. This helps them secure sales, improve their credit scores from an FI's perspective, and provide more secure cash flow; it also enables a more open and inclusive market environment.
- » **Climate:** Data available to digital platforms can be used for activities that promote sustainable inputs/practices and motivate climate-friendly behaviour.

### Example company

#### Twiga Foods – founded in 2015 (Malawi)

- » B2B food distribution e-commerce platform; connects growers with retailers; significantly increases farmers' income and in turn creditworthiness

*"We're going to see more sophisticated marketplaces arise and be the perfect distribution channel for these deep tech and deep science companies like weather and others...we think there's still a big opportunity in that space." (Investor interview)*

# Recommended business model – data and analytics

Data and analytics providers aim to use and provide data insights to improve productivity, farming practices and efficiency, thereby increasing SHFs' and agri-SMEs' profitability and reducing the risk for finance providers.

## Agritech – data and analytics

### Business model overview

**Description:** Business models that collect, aggregate and analyse data and provide information to agri-SMEs and farmers about crop health, price, product availability, etc. to enable farmers to make more informed decisions

**Provider type:** Tech-enabled information platforms that collect proprietary data or leverage third-party data, intended to increase efficiency and productivity with data, and reduce farmers' cost of production and waste

**Target customers:** Predominantly SHFs in data-poor areas or lacking access

**Value proposition:** Enhanced information for decision-making to improve efficiency and productivity, e.g. lower cost, higher yield, lower risk

### Investment environment

**Transaction activity:** 12 companies within our sample

**Capital raised by companies within sample:** \$56 million

**Investment stage & type:** Most activity at earlier stages (seed or earlier). Mainly equity investments, with one example of a large debt round (CropIn 2020)

**Key geographies:** Kenya (4 of 12 companies) and South Africa (2 of 12) are the key geographies, though significant activity across the region

### Prioritization

#### Investability:

- » **Scalability:** High, with abundant examples of growth and value investments
- » **Commercial viability:** Proven later-stage (Series B and C) companies
- » **Replicability:** Plentiful transactions across ESA demonstrate replicability

#### Impact:

- » **Social:** Increased efficiency and decision-making with data can help improve target customers' productivity, reduce risk profile and increase access to finance; and allow FIs to better understand agricultural customers and help them increase offerings to the sector and better risk manage their loan portfolios
- » **Climate:** Accurate climate data enable adaptation to changing weather conditions, improving production efficiency and sustainable intensification.

### Example company

#### Meridia – founded in 2015 (Malawi)

- » Land ownership documentation for SHFs via GIS land surveys and boundary mapping, providing farmers with collateral to access financing

*"Data is very poor and fragmented or held with groups that won't share it. As a result, agtech start-ups have naturally had to go and gather data. GIS is an area to watch like Fieldly in Uganda, Meridia is doing more urban mapping... all these different layers of data that's incredibly valuable." (Investor interview)*

# Companies within priority business models in ESA

Data and analytics providers aim to use and provide data insights to improve productivity, farming practices and efficiency, thereby increasing SHFs' and agri-SMEs' profitability and reducing the risk for finance providers.

Provider Type	Business Model	Company	Geography	Last Round Raised	Customers	Short Description
Agritech	Data and analytics	Aquarech	Kenya	Accelerator: N/A	Agri-SME & SHF	Mobile app and IoT temperature sensor to reduce fish farmers' cost of production
		AgriCloud	South Africa	N/A	Agri-SME & SHF	IoT monitor for crop, vineyard, orchard and farm planting and spraying planning
		Lima Labs	Kenya	Seed: N/A	SHF	Online AI platform monitors crops in real time with IoT cameras
		AgriProject	Namibia	N/A	SHF	R&D and application of agricultural technologies to enhance farming
		Rural E-Market	Madagascar	N/A	SHF	Web and SMS online market with price and product availability data
		M-Farm	Kenya	Seed: N/A	SHF	Online platform offering market information and trading via a mobile app
		Harvesting	Broader ESA	Seed: \$4m	SHF	Crop risk assessment using remote sensing and data science, for FIs
		CropIn	Broader ESA	Series C: \$20m	SHF	Software integrates data to monitor farm produce to ensure the quality and safety of food
		Mavuno Technologies	Tanzania	Accelerator: \$0.02m	SHF	Crop health management platform using satellite images and AI in a mobile app
		Meridia	Malawi	Early-stage VC: \$1.6m	SHF	Digital boundary mapping technology and legal documentation offering
		Agri-Sense International	Kenya	N/A	SHF	Data collection and analysis for precision decision support and farm management
		Aerobotics	South Africa	Series B: \$16.3m	SHF	Satellite and drone imagery for orchid pest and disease, and yield management

## Companies within priority business models in ESA (continued)

Provider Type	Business Model	Company	Geography	Last Round Raised	Customers	Short Description
Agritech	Market access	AgriCool Finance	South Africa	Accelerator: \$0.035m	SHF	e-trading platform offers farmers access to finance, and aggregates demand from retailers
		HelloChoice	South Africa	Early-stage VC: N/A	Agri-SME & SHF	Direct online marketplace with bid, buy-it-now (BIN), and branded platforms
		FarmShine	Kenya	Early-stage VC: \$0.25m	Agri-SME & SHF	SHFs can aggregate and sell directly to large, global commodity companies
		FarmHut	Zimbabwe	Grant: \$0.1m	Agri-SME & SHF	AI-powered marketplace intended to connect farmers to markets
		Livestock Wealth	South Africa	Later-stage VC: \$0.55m	Agri-SME & SHF	Mobile crowd-funded, managed, share ownership platform for investing in cattle
		Nile.ag	South Africa	Seed: \$5.25m	Agri-SME & SHF	Food trading e-commerce platform focusing on nutritious food
		Khula!	South Africa	Seed: \$1.37m	Agri-SME & SHF	Connects small-scale farmers to the public to buy a range of produce directly from farms
		Taimba	Kenya	Seed: \$0.15m	SHF	Mobile-based, connecting rural small-scale farmers to urban retailers
		SwiftVee	Broader ESA	Series A: \$1.5m	SHF	Livestock trading/auction platform, with data on water scarcity and food security
		Twiga Foods	Kenya	Series C: \$50m	Agri-SME & SHF	Food distribution marketplace, uses a mobile-based, cashless supply platform for vendors

## Companies within priority business models in ESA (continued)

Provider Type	Business Model	Company	Geography	Last Round Raised	Customers	Short Description
Bundled services	Agricultural and financial bundled services	Akello Banker	Uganda	Angel: \$0.1m	Agri-SME & SHF	Allows farmers to access products and services on credit through mobile money (USSD)
		One Acre Fund*	Broader ESA	Grant: \$1.59m	SHF	Provides SHFs with financing and training: inputs, market access, training, insurance
		Farmers Pride	Kenya	Later Stage VC: \$1.09m	SHF	Digital marketplace to connect farmers with information, inputs and financial services
		M-Omulimisa	Uganda	N/A	SHF	Services include e-extension, insurance, loans and input distribution with mobile tech
		Radava Mercentile	Kenya	N/A	SHF	Agri commodity market, alternative financing, and post-harvest technology to SHFs
		Adapta Earth	Kenya	N/A	Agri-SME & SHF	Credit assessment, blended term loans, quasi-equity and equity, and CCA technical assistance
		EcoFarmer	Zimbabwe	N/A	Agri-SME & SHF	Weather insurance and advisory, market information, financial services over the phone
		Farmers Assistant	South Africa	N/A	SHF	Access to financial services, land, funding, insurance, education and skills through a tech platform
		KCB MobiGrow	Broader ESA	N/A	SHF	Mobile-based loans, savings and insurance for SHFs
		Digifarm	Kenya	Seed: \$3.3m	SHF	Free access to quality inputs, loans, learning on farming as well as access to market
		Akorion/EzyAgric	Uganda	Seed: \$2.5m+	Agri-SME & SHF	Agricultural inputs, farm data and analysis, collateral-free loans, extension and advisory, market linkage
		Good Nature Agro	Zambia	Series A: \$2.2m	SHF	Offers quality legume seeds, trains local agents and purchases the seeds back at harvest
		Pula Advisors	Broader ESA	Series A: \$6m	SHF	Insurance product using machine learning, crop cuts experiments and weather data
		Apollo Agriculture	Kenya	Series B: \$32.7m	Agri-SME & SHF	Uses technology to access credit finance, access to inputs, customized advice and markets

\*One Acre Fund is a non-profit organization – this number may not be representative of its actual operational revenue

+Pitchbook data does not fully align with interview feedback that EzyAgric is currently raising a \$1 million Series A round



## 5. ESA country comparison and profiles



# Country comparison based on key criteria of market development

Kenya, South Africa, Rwanda and Uganda are viewed as more developed markets based on the following criteria:

Enabling environment metrics	LEGEND									
	TOP 3				MID-RANGE			BOTTOM 3		
	Most developed countries				Indicative development scale			Least developed countries		
	Kenya	South Africa	Rwanda	Uganda	Tanzania	Zambia	Lesotho	Mozambique	Malawi	Angola
<b>Digital infrastructure</b>	Mobile phone ownership	58%	75%	55%	50%	46%	72%	49%	37%	56%
	Mobile subscriptions, %	114	162	82	61	82	73	49	52	45
	Secure internet access, per 1m people	240	11,422	82	34	38	70	29	17	20
	4G mobile internet coverage	64%	96%	99%	64%	28%	75%	12%	78%	50%
	Mobile broadband usage	41%	102%	42%	34%	10%	64%	18%	32%	21%
	Price per 1GB mobile data, \$	1.05	4.30	1.48	1.62	0.73	2.13	3.33	27.41	5.29
	Digital skills index*	4.55	3.27	3.96	3.42	3.87	3.50	2.74	2.84	2.45
	Rural access to electricity, %	62%	79%	26%	32%	19%	14%	32%	4%	7%
	Logistics performance index	2.81	3.38	2.97	2.58	2.99	2.53	2.28	2.68	2.59
	Road quality index	4.1	4.5	4.8	3.7	4.1	3.4	2.7	2.4	2.8
<b>Government policies and regulations</b>	Importance of ICT index*	4.83	3.22	5.77	4.15	3.59	3.31	3.57	3.16	2.84
	Legal index for digital business*	4.20	3.41	4.72	4.24	3.76	3.87	2.49	2.81	1.90
	ICT regulatory tracker*	88	71	82	86	85	16	58	87	65
	Ag research spend, % of AgGDP	0.48	2.78	0.44	0.62	0.17	0.94	0.36	0.53	N/A
<b>Market conditions</b>	Growth of innovative companies*	4.71	4.36	4.33	4.20	4.28	3.44	3.49	3.72	3.14
	Days to start business	23	40	4	24	30	15	17	37	36
	Latest poverty headcount, %	29.4	20.5	52.0	42.2	44.9	32.4	64.6	70.1	31.1
	Adult literacy rate, %	82%	95%	73%	77%	78%	77%	61%	62%	66%
<b>Availability of funding</b>	Foreign direct investments, \$m	1,332	4,624	420	1,266	1,112	118	2,212	98	-4,098
	Venture capital availability*	3.03	2.87	3.24	2.46	2.65	1.62	2.18	1.79	2.35
	Ease of access to loans*	4.01	3.95	4.06	3.86	3.29	1.52	2.92	2.60	2.16

\*Note: Indices are scored from 1-7, with 1 as poor and 7 as excellent.  
Source: FAO – Status of Digital Agriculture in 47 African Countries, World Economic Forum – Road Quality Index, World Bank – Poverty Headcount Ratio.

# Country profile – Kenya



Enabling environment		Kenya
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Mobile penetration is higher than in most countries in the region, with 99% mobile data subscription</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 4th</li> <li>Internet penetration is at 90%, with rapid advances in recent years, supported by low-cost phones and tablets</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>Strong growth has seen the introduction of a new digital services tax at 1.5% of transactional value on services provided through digital marketplaces</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>Mobile coverage is high across the country</li> <li>3G covers 96% of the country, while 4G covers 64%</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Kenya has invested in four undersea fibre optic cables that have improved internet speed and connectivity</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>75% of the population have access to electricity, with 62% having access in rural areas</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>18th in the African Infrastructure Development Index 2021: composite measure for electricity (28th), transport (19th), ICT (4th) and water and sanitation (39th)</li> </ul>
Government policies and regulations	D4Ag	<ul style="list-style-type: none"> <li>Digital for Agriculture project aims to shift farming activities online to lock out brokers, reduce loss of subsidized inputs and improve productivity</li> </ul>
	Kenya National ICT Policy (2019)	<ul style="list-style-type: none"> <li>Key policy focusing on national ICT strategy</li> <li>Focus is on: mobile first, market, skills and innovation, and public service delivery</li> </ul>
	Digital Economy Blue Print	<ul style="list-style-type: none"> <li>Goal of growing ICT's contribution to the economy by 10% by 2030. Five pillars of the policy are: digital government, infrastructure, innovation-driven entrepreneurship, digital skills and values</li> </ul>
	Agricultural Sector Transformation Growth Strategy 2019-2029	<ul style="list-style-type: none"> <li>Overarching goal of maximizing agriculture for food security and improving incomes</li> <li>Commits national agricultural research institutions to adopt data and technologies to support agriculture</li> <li>Envisages extensive opportunities for digital solutions and analytics in agriculture</li> </ul>
	National Broadband Strategy 2018-2023	<ul style="list-style-type: none"> <li>Aims to provide broadband for all and increase digital literacy and broadband access</li> <li>All counties have ICT road maps aligned with local county development plans and the National ICT Master Plan</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>56th in the Ease of Doing Business Index globally</li> <li>Note reforms in registering property, getting credit, resolving insolvency, protecting minority investors and tax payments</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture employs 54% of the population (70% of the rural population), although a challenge is providing digital content in local languages</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been one of the largest recipients of FDI in Africa, though ranked 19th in SSA in terms of FDI volume in 2020</li> <li>Kenya has a large presence of agro-processing companies</li> <li>Kenya has many financial institutions; however, lending to agriculture is still low, as it is seen as costly and risky</li> <li>Had the highest number of blended finance transactions in the world between 2019 and 2021 (13)</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – South Africa



Enabling environment		South Africa
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Mobile penetration is higher than in most countries in the region, with 95% mobile phone ownership</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 1st</li> <li>Internet penetration is at 56%, with mobile internet access more common in urban areas than rural areas</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>Roll-out has remained slow and staggered due to regulatory barriers and attitudes to mobile banking</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>Mobile coverage is high across the country</li> <li>Mobile network operators provide 80-90% 4G coverage, with 5G to eventually be rolled out to the rest of the country</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>South Africa is a regional leader in internet infrastructure, with telecoms operators investing in expanding fibre and LTE networks to rural communities</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>South Africa has high access to electricity, with 80% electricity distribution in rural areas</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>4th in the African Infrastructure Development Index 2021: composite measure for electricity (3rd), transport (7th), ICT (6th) and water and sanitation (7th)</li> </ul>
Government policies and regulations	SA Connect	<ul style="list-style-type: none"> <li>Implementation model aimed at delivering widespread broadband access to 90% of the country's population by 2020, and 100% by 2030</li> </ul>
	National Policy on Food and Nutrition Security	<ul style="list-style-type: none"> <li>Ensure the availability, accessibility and affordability of safe and nutritious food at national and household levels</li> </ul>
	National Development Plan	<ul style="list-style-type: none"> <li>Highlights the important role agriculture plays in eliminating poverty by 2030</li> </ul>
	South African Broadband Policy (2013)	<ul style="list-style-type: none"> <li>Expand broadband access to a critical mass of South Africans and provide access to broadband that is affordable</li> <li>Ensure demand-side skills are developed to ensure usage as well as supply-side skills</li> <li>Four-pronged approach to close the access gap and roll out broadband: digital readiness, digital development, digital future and digital opportunities</li> </ul>
	The National Broadband Policy	<ul style="list-style-type: none"> <li>Core policies which collectively prioritize three pillars: digital transformation of the public sector, digital access and digital inclusion</li> <li>Bundled together with Cybersecurity Policy framework and Integrated ICT Policy documents, which guide investment in digital agriculture</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>84th in the Ease of Doing Business Index globally</li> <li>Foreign and domestic investors can participate in most economic sectors thanks to constitutional protections for private property ownership, investments and dispute resolution</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture contributed only 2% to GDP in 2019, compared to 26% from industry and 61.2% from services</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been one of the largest recipients of FDI in Africa, ranked 2nd in SSA in terms of FDI volume in 2020</li> <li>Aspects of the agricultural value chain identified as potential areas for digital investments include inputs, production, processing, distribution and purchasing</li> <li>To unlock financing, the agriculture sector must acknowledge the benefits of digitalization in agriculture</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – Rwanda



Enabling environment		Rwanda
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Mobile phone subscriptions have increased to 82%, up from 35.3% 10 years ago</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 15th</li> <li>Internet subscriptions per 100 inhabitants increased to 62.3% as of June 2020</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>Six mobile money services available, three offered by mobile network operators, and three by banks</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>3G and 4G services have high coverage of 90.3% and 99%, respectively</li> <li>First communication satellite successfully launched in 2019</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Broadband expansion project under way to increase rural connectivity</li> <li>Local broadband provider Liquid Telecom launched a new range of fibre broadband products in selected areas of the capital city, Kigali</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>As of 2019, 37.8% of Rwanda's population had access to electricity, with access in rural areas at 26.2%</li> <li>Compared to below 10% years ago, the improved access is largely due to government interventions</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>26th in the African Infrastructure Development Index 2021: composite measure for electricity (47th), transport (15th), ICT (30th) and water and sanitation (14th)</li> </ul>
Government policies and regulations	Connect Rwanda (2019)	<ul style="list-style-type: none"> <li>To further increase the penetration of smartphones as a basic tool to access digital services and bridge the digital divide in rural areas from their current level below 20%, a campaign was launched to pledge smartphones for vulnerable households and individuals who cannot afford them</li> </ul>
	Smart Rwanda Master Plan 2015-2020	<ul style="list-style-type: none"> <li>Outlines the government's strong ambition to go cashless and paperless as well as to offer 24-hour self-service</li> <li>Highlights the importance of ICT in terms of generating job opportunities driven by the private sector</li> </ul>
	2017 National Agriculture Policy	<ul style="list-style-type: none"> <li>Demonstrates that overall digitalization brings opportunities for agriculture, which could be integrated into skills development, data collection and analysis</li> </ul>
	The National ICT4Ag Strategy (2016-2020)	<ul style="list-style-type: none"> <li>Aligned with the national ICT strategy as well as the Smart Rwanda Master Plan, jointly illustrating the importance of enhancing farmer-centric agriculture and rural development through concrete implementation plans</li> <li>Pursuing a poverty reduction goal of less than 30% by 2020</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>38th in the Ease of Doing Business Index globally</li> <li>Favourable policies for investors in agriculture include: two-year exemption for tax trading licences for SMEs, protection of intellectual property rights for investors, duty-free importation of inputs, tax exemption for equipment, reduction in corporate income tax, as well as a one-stop centre for process facilitation</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture remains a strategic sector in Rwanda, employing approximately 70% of the population and contributing 31% of GDP</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been a large recipient of FDI in Africa, though ranked 29th in SSA in terms of FDI volume in 2020</li> <li>Subsectors such as food processing, horticulture, livestock, distribution and cold chain also offer huge investment opportunities</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – Uganda



Enabling environment		Uganda
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Over half of the population own a mobile phone</li> <li>However, many Ugandans face affordability constraints despite comparatively low subscription prices</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 9th</li> <li>Overall internet penetration 24% in 2019, up from 10% in 2010</li> <li>Only 9% of rural people have access to the internet</li> <li>Low levels of digital literacy overall in the country</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>Reached 30 million customers in 2020 (66% of the population) despite a 0.5% tax on mobile withdrawal transactions</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>3G and 4G networks growing as mobile ownership grows; China's ZTE and MTN Uganda started 5G trials in 2020</li> <li>Uganda Communications Commission is seeking to expand rural broadband access and 3G coverage, supported by Intelsat and Gilat</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>National Backbone Infrastructure policy has invested over \$105 million to lay 5,110 km of fibre optic cables</li> <li>Facebook partners with BCS Group and Airtel to deploy 770 km of fibre across northwest Uganda</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>41% electricity access: 71% in urban areas, 32% in rural areas</li> <li>SEforALL initiative aims to achieve 99% electricity access by 2030</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>27th in the African Infrastructure Development Index 2018: composite measure for electricity (37th), transport (26th), ICT (33rd) and water and sanitation (31st)</li> </ul>
Government policies and regulations	Digital Uganda Vision	<ul style="list-style-type: none"> <li>Guides Uganda's ICT development and implementation for: universal inclusion, sustainable development, economic progress and poverty eradication through digital innovation</li> </ul>
	Ugandan National Development Plan III	<ul style="list-style-type: none"> <li>Aims to increase ICT penetration and services through its Digital Transformation Programme</li> <li>2018 Broadband Policy indicates the development of a universal service and access fund</li> <li>Enhance and increase digital technologies in agri-industry and agricultural extension systems</li> </ul>
	National Agricultural Policy	<ul style="list-style-type: none"> <li>Country's foundational documents for the agriculture sector: a main outcome is improving agricultural research, technology dissemination and adoption</li> <li>Extension Guidelines and Standards targeting youth groups to consider ICT opportunities and technologies</li> </ul>
	Digital literacy	<ul style="list-style-type: none"> <li>eGranary Digital Portable Library, Leave No One Behind and similar initiatives provide digital access and training to women and trainees to access jobs</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>116th in the Ease of Doing Business Index globally</li> </ul>
		<ul style="list-style-type: none"> <li>Has consistently improved economic and political stability – relatively liberalized and regulated business environment</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture employs 72% of the workforce and contributes 25% of Uganda's GDP</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Ranked 10th in SSA in terms of FDI volume in 2020</li> <li>Incentives for investments include 75% import duty discount on factory equipment, 100% tax reduction on research and training, depreciation start-up costs over 4 years and a 10-year tax break for export-orientated production</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.



## 6. Examples of agritech and fintech solutions

# Examples of agritech, bundled services and fintech companies in ESA

Agritech		
Business model	Company	Geography
Data and analytics	Aquarech	Kenya
	AgriCloud	South Africa
	Lima Labs	Kenya
	AgriProject	Namibia
	Rural E-Market	Madagascar
	M-Farm	Kenya
	Harvesting	Broader ESA
	CropIn	Broader ESA
	Mavuno Technologies	Tanzania
	Meridia	Malawi
	Agri-Sense International	Kenya
	Aerobotics	South Africa
	Farm management and solutions	Skudu
Farmmoja Limited		Kenya
WeFarm		Broader ESA
Synnefa		Kenya
Bulrush Agritech		South Africa
SourceTrace		Broader ESA
Esus Farm		Eswatini
SunCulture		Kenya
Inputs and equipment	Hello Tractor	Broader ESA
	AgriLED	South Africa
	AgriIbrium	South Africa
	iProcure	Kenya
Logistics and SCM	Bext360	Broader ESA
	BanQu	Broader ESA
Market access	AgriCool Finance	South Africa
	HelloChoice	South Africa
	FarmShine	Kenya
	FarmHut	Zimbabwe
	Livestock Wealth	South Africa
	Nile.ag	South Africa
	Khula!	South Africa
	Taimba	Kenya
	SwiftVee	Broader ESA
	Twiga Foods	Kenya

Bundled services		
Business model	Company	Geography
Agricultural and financial bundled services	Akello Banker	Uganda
	One Acre Fund	Broader ESA
	Farmers Pride	Kenya
	M-Omulimisa	Uganda
	Radava Mercentile	Kenya
	Adapta Earth	Kenya
	EcoFarmer	Zimbabwe
	Farmers Assistant	South Africa
	KCB MobiGrow	Broader ESA
	Digifarm	Kenya
	Akorion/EzyAgric	Uganda
	Good Nature Agro	Zambia
	Pula Advisors	Broader ESA
	Apollo Agriculture	Kenya
Agricultural bundled services	Komaza	Kenya
	Grainpulse	Uganda
	Jaguza	Uganda
	Cinch	Kenya
	Lentera Africa	Kenya
	Sidai Africa Ltd.	Kenya

Fintech		
Business model	Company	Geography
Credit scoring	FarmDrive	Kenya
Insurance	Oko Finance	Uganda
	Acre Africa	Broader ESA
	SproutInsure	Kenya
Lending	Offgrid Finance	Kenya
	Agri-Wallet	Kenya
	Capture Solutions	Kenya
	Juhudi Kilimo	Kenya
	FACTS Africa	Broader ESA
	ZuriCap Limited	Kenya
	Emata	Uganda
Payments	Nomanini	South Africa

# Company profile – Grainpulse



At a glance	
<b>Company description:</b>	Integrated agribusiness offering inputs, agronomy and market access services as a local one-stop shop to customers
<b>Customer type:</b>	Connecting buyers (agri-SMEs) and sellers (SHFs) Over 90% of customers are SHFs, as Grainpulse's local services are more relevant for smaller accounts
<b>Business model:</b>	Agricultural bundled services
<b>Products and services:</b>	Inputs and equipment: specialized fertilizers and feeds Farm management and solutions: agronomy, advisory training services Market access: aggregation and off-take of outputs
<b>Countries:</b>	Uganda (HQ)
<b>Incorporation:</b>	2018
<b>Founders:</b>	Hannington Karuhanga, Founder and Chairman
<b>Customers:</b>	36,000 SHFs in 2019

Funding	
<b>Total funding:</b>	\$11 million
<b>Latest round:</b>	\$11 million later-stage VC debt
<b>Investors:</b>	IFC, GAFSP K&S majority (70%) shareholder

Partners
IFC and GASFP provided a \$11 million loan to in 2019 to support its expansion

Value proposition and outlook
<p>Grainpulse's <b>crop-specific fertilizers</b> increase crop yields, which increases SHF incomes. It also <b>bundles soil testing</b>, other agronomy advisory and <b>financial skills training</b> to support customers' access to traditional financing and helps them to transition to more sustainable and regenerative farming practices.</p> <p>The company <b>guarantees purchase of crops</b> at harvest time, providing <b>market access</b> and reducing working capital needs for its customers.</p> <p>It operates through a <b>network of community hubs</b>: i.e. hub agents and partners provide inputs and agronomy services locally and bring back harvested crops for Grainpulse to aggregate, process, store and sell to larger buyers.</p> <p>Grainpulse operates a limited online platform, supported by its partners such as EzyAgric.</p>



# Company profile – Pula Advisors



At a glance	
<b>Company description:</b>	Provider of agricultural index insurance for SHFs through a digital platform, with bundling of value-add services such as advisory and analytics as standard
<b>Customer type:</b>	SHFs through partners/local aggregators Significant proportion of end customers are women
<b>Business model:</b>	Agricultural and financial bundled services
<b>Products and services:</b>	Data and analytics: field monitoring, remote sensing Farm management and solutions: agronomy advisory, farm analytics Inputs and equipment: seeds and fertilizers Insurance: crop and livestock index insurance
<b>Countries:</b>	Kenya (HQ), Uganda, Senegal, Ghana, Mali, Nigeria, Ethiopia, Madagascar, Tanzania, Rwanda, Zambia, Malawi, Mozambique
<b>Incorporation:</b>	2014
<b>Founders:</b>	Thomas Njeru, Co-Founder and CEO Rose Goslinga, Co-Founder and President
<b>Customers:</b>	1.1 million in 2019, for insurance

Funding	
<b>Total funding:</b>	\$9 million to date
<b>Latest round:</b>	\$6 million Series A in January 2021
<b>Investors:</b>	<b>Grant:</b> CDC, ADFI, Mastercard Foundation <b>Equity:</b> TLcom Capital, Women's World Banking; Accion Venture Lab, Rocher Participations, Omidyar Network, Mercy Corp Ventures

Partners
<ul style="list-style-type: none"> <li>▪ IFAD: KCEP-CRAL pilot in Kenya in 2020</li> <li>▪ World Food Programme: Three-year crop insurance programme for 100,000 SHFs, Kenya</li> <li>▪ Central Bank of Nigeria: 500,000+ SHFs insured in 2020 for the wet season</li> <li>▪ Governments of Kenya, Zambia, Malawi and Ethiopia: National programme to support SHFs</li> <li>▪ One Acre Fund (customer): Service bundling for farm supplies and training</li> <li>▪ Apollo Agriculture and APA Insurance: Services provided to Apollo's customers</li> <li>▪ Flour Mills and Export Trading Group: Seed and fertilizer providers</li> </ul>

Value proposition and outlook
<p>B2B model, working with banks and agri-SMEs, who subsidize Pula's services at low or no cost to end customer SHFs. Partners gain access to Pula's aggregated data on their customer base, reducing their portfolio risks.</p> <p>Bundling of extension services, such as provision of inputs, farm monitoring, data, analytics and advisory services, improves farm yield and climate resilience, which adds further value for SHFs and further reduces partners' risks.</p> <p>Services are accessible through feature phones.</p>

# Company profile – EzyAgric



At a glance	
<b>Company description:</b>	An end-to-end solution for farmers through a digital platform that provides easy access to inputs, farm records and analysis, agronomy advisory, market linkages and collateral-free loans. Usage primarily through web portal or smartphone app but can receive USSD updates on info and prices
<b>Customer type:</b>	Agri-SMEs (300 total to date): bank risk tolerance limits loans to agri-SMEs due to their shorter (3-month) repayment period SHFs (300,000 total reached to date): >80% of users are women
<b>Business model:</b>	Agricultural and financial bundled services
<b>Products and services:</b>	Data and analytics: track farm expenses and incomes Farm management and solutions: agronomy advisory and practices Inputs and equipment: quality inputs Market access: digital marketplace Lending: including buy-now-pay-later loans Credit scoring through partnerships
<b>Countries:</b>	Uganda (HQ)
<b>Incorporation:</b>	2015
<b>Founders:</b>	Esther Karwera, Co-Founder and Chief Business Development Officer George William Luyinda, Co-founder and CEO

Funding	
<b>Total funding:</b>	\$2.5 million
<b>Latest round:</b>	\$2.5 million seed in January 2021
<b>Investors:</b>	Ellon Holdings, MFS Africa, K&S

Partners
<ul style="list-style-type: none"> <li>▪ <b>Pezesha:</b> Fintech platform for agri-SMEs allows EzyAgric to offer buy-now-pay-later services for agro-inputs, extending working capital to customers</li> <li>▪ <b>Airtel:</b> Telecoms partner enabling USSD function for regular price, agronomy advice and buyer updates to customers – 30,000 subscribers in Uganda</li> </ul>

Value proposition and outlook
<p>EzyAgric provides a one-stop shop locally, from inputs (including climate-resilient seeds) to market access and loans. Extension services are offered free of charge and are fully accessible offline (e.g. record-keeping, training and information services).</p> <p>It aggregates orders from customers to achieve economies of scale in the purchase of inputs and sale of produce, using its own warehousing and logistics operations to better manage seasonal demand for customers.</p> <p>The company works through around 300 local agricultural shops, 600 village agents and 100 farmer associations as local hubs and agents.</p>

# Company profile – SunCulture



At a glance	
<b>Company description:</b>	Designs, manufactures, sells and finances solar-powered water pumping and drip irrigation systems
<b>Customer type:</b>	SHFs (B2C) – majority of clients, SMEs (B2B) – limited, used as a way to pilot and reach customers in new markets; however, offers limited margins and less control of customer journey
<b>Business model:</b>	Farm management and solutions
<b>Products and services:</b>	Farm management and solutions: solar drip irrigation systems
<b>Countries:</b>	Kenya (HQ), Uganda, Côte d'Ivoire; B2B pilot/distribution partnerships in Mali, Togo, Nigeria, Ethiopia and Tanzania
<b>Incorporation:</b>	2012
<b>Founders:</b>	Samir Ibrahim, Co-Founder and CEO

Funding	
<b>Total funding:</b>	\$40 million
<b>Latest round:</b>	\$11 million debt round in February 2021, \$14 million Series A in December 2020
<b>Investors:</b>	<p><b>Debt:</b> SunFunder, Nordic Development Fund, ADB, FEI-OGEF, Alphamundi, Triodos Investment Management</p> <p><b>Equity:</b> Dream Project Incubators, EDF Group, Energy Access Ventures</p>

Partners
<ul style="list-style-type: none"> <li>▪ <b>EdF (investor):</b> EdF joins SunCulture's existing institutional investors and will assist in setting up financing vehicles and expanding the impact of its off-grid solutions across the continent</li> <li>▪ <b>BBOX:</b> Partnered with SunCulture and EdF to assist the Government of Togo to accelerate access to sustainable solar-powered farming</li> <li>▪ <b>Microsoft:</b> SunCulture's AgOptimized app uses Microsoft Azure to compare sensor data about current conditions against historical climate models, then provides detailed forecasts and recommendations for each farm plot</li> </ul>

Value proposition and outlook
<p>SunCulture's products help improve crop yield, increase farm efficiency and make it easier for SHFs to grow higher-value crops. It also provides <b>affordable access to clean, renewable electricity</b> for household appliances when the system is not in use. Its <b>pay-as-you-go model</b> for equipment purchase helps with affordability and increasing irrigation adoption, currently limited to a low single-digit percentage across ESA countries.</p>

# Company profile – OKO Finance



At a glance	
<b>Company description:</b>	Provider of mobile-centric micro-insurance products using satellite imagery and weather forecasting, offering crop insurance at affordable prices and instant claims processing, increasing SHFs' climate resilience
<b>Customer type:</b>	SHFs
<b>Business model:</b>	Fintech
<b>Products and services:</b>	Insurance: crop index insurance* *Index insurance is an innovative new approach that pays out benefits on the basis of a predetermined index (e.g. rainfall levels) for loss of assets and investments due to weather and other events – source: IFC
<b>Countries:</b>	Mali (HQ), Côte d'Ivoire and Uganda
<b>Incorporation:</b>	2018
<b>Founders:</b>	Simon Schwall, Founder and CEO

Funding	
<b>Total funding:</b>	\$1.7 million* <i>*The latest available financial data from PitchBook. The company raised an undisclosed amount of Series A venture funding from Harlem Capital Partners on an undisclosed date</i>
<b>Latest round:</b>	Undisclosed amount Series A in 2022; \$0.5 million seed in June 2022 and \$1.2 million seed in April 2021
<b>Investors:</b>	Katapult, Newfund, ResiliAnce, Mercy Corp Ventures, Techstars, Impact Assets, RaSa

Partners
<ul style="list-style-type: none"> <li>▪ <b>Orange:</b> Mobile network operator, allowing automated mobile payments of premiums and claim payouts</li> <li>▪ <b>AB InBev:</b> Selected OKO as part of its 100+ accelerators to bring crop insurance to its suppliers</li> <li>▪ <b>InsuResilience Solutions Fund:</b> Provider of financial support</li> <li>▪ <b>Agro Insurance Consortium:</b> Manages a crop insurance scheme in Uganda</li> <li>▪ <b>Allianz:</b> Insurance underwriter for OKO's insurance products in local markets</li> <li>▪ <b>eLeaf:</b> Provider of product design and index monitoring</li> </ul>

Value proposition and outlook
<p>OKO partners with <b>satellite weather data</b> and <b>mobile payment</b> providers to design and deliver <b>climate index insurance</b> products underwritten by locally licensed insurance companies. It sells policies via a direct-to-consumer (B2C) sales strategy, using a trained agent network and a strategic partnership with Orange, which helps build trust with first-time insurance buyers and own the customer experience.</p> <p>SHFs can use <b>feature phones or smartphones</b> to pay premiums and receive <b>payouts automatically</b>, in local languages, through WhatsApp or Orange Money. This enables greater insurance adoption in a market where insurance penetration is still at less than 3%.</p>

# Company profile – Apollo Agriculture



At a glance	
<b>Company description:</b>	Developer of a bundled service agriculture platform offering a comprehensive suite of services for SHFs, including access to credit, farm inputs, customized advice, insurance and markets, enabling farmers to improve productivity and increase their income
<b>Customer type:</b>	SHFs
<b>Business model:</b>	Agricultural and financial bundled services
<b>Products and services:</b>	Data and analytics: field monitoring, remote sensing Farm management and solutions: agronomy advisory, farm analytics Inputs and equipment: seeds and fertilizers Insurance: crop and livestock insurance Market access: and access to credit
<b>Countries:</b>	Kenya (HQ)
<b>Incorporation:</b>	2015
<b>Founders:</b>	Eli Pollak, Co-Founder and CEO Earl Sauver, Co-Founder and CTO Benjamin Njenga, Co-Founder and Director of Operations

Funding	
<b>Total funding:</b>	\$85.5 million
<b>Latest round:</b>	\$32.7 million Series B in February 2022, \$40 million Series A in February 2022
<b>Investors:</b>	<b>Debt:</b> Agri-Business Capital Fund (ABC Fund, managed by Bamboo Capital) <b>Equity:</b> Breyer Capital, Bidra Innovation Ventures, Anthemis Group, Leaps by Bayer, Accion Venture Lab, Flourish Ventures, Softbank and others

Partners*
<ul style="list-style-type: none"> <li>▪ <b>Pula Advisors and APA Insurance:</b> Provide Apollo Agriculture's customers with insurance products</li> <li>▪ <b>Kiva:</b> Underwriter of customized input packages</li> <li>▪ <b>Input agro-dealers</b></li> </ul> <p><i>*Note: There is limited public information about Apollo's partnerships, and Palladium was unable to conduct an interview with the company to obtain further information.</i></p>

Value proposition and outlook
<p>Apollo Agriculture operates as a <b>one-stop-shop</b> for farmers. Farmers apply for “<b>bundles of services</b>” such as <b>seeds, fertilizers, location-specific advice and crop insurance</b>. Once approved, Apollo issues a voucher for SHFs to redeem at local agro-dealers, which Apollo then pays off its own balance sheet. Farmers repay the value of their bundles once they sell their products after harvest.</p> <p>It uses <b>machine learning</b> and <b>satellite imaging</b> to remote monitor farms and <b>build credit profiles</b> of SHFs.</p>

# Company profile – eSusFarm



At a glance	
<b>Company description:</b>	Developer and provider of a data mining tool designed to offer advanced agricultural statistical data to SHFs, enabling them to increase productivity, and other stakeholders, such as governments, to access farming data and digitize their programmes
<b>Customer type:</b>	SHFs and agri-SMEs
<b>Business model:</b>	Farm management and solutions
<b>Products and services:</b>	Data and analytics: field monitoring, remote sensing Farm management and solutions: agronomy advisory, farm analytics
<b>Countries:</b>	South Africa (HQ), Eswatini, Uganda
<b>Incorporation:</b>	2019
<b>Founders:</b>	Watson Matsa, Co-Founder and CEO Thula Dlamini, Co-Founder and Chairman

Funding	
<b>Total funding:</b>	N/A <i>*Note: There is limited public information about eSusFarm's funding history, and Palladium was unable to conduct an interview with the company to obtain further information.</i>
<b>Latest round:</b>	N/A
<b>Investors:</b>	N/A

Partners*
<ul style="list-style-type: none"> <li>▪ Insurance and financial partners</li> <li>▪ Governments</li> <li>▪ Buyers and sellers</li> <li>▪ Researchers</li> </ul> <p><i>*Note: There is limited public information about eSusFarm's partnerships, and Palladium was unable to conduct an interview with the company to obtain further information.</i></p>

Value proposition and outlook
eSusFarm collects real-time <b>food production data</b> , such as soil and crop characteristics from SHFs, using <b>mobile feature phones</b> . It also provides <b>access to markets</b> through an eSusFarm virtual farm which pools output. Leveraging the aggregated data, it <b>partners with financial institutions</b> to provide <b>pre-approved credit</b> to SHFs and help unlock financing.

# Company profile – Farmers Pride



At a glance	
<b>Company description:</b>	Developer of an online-to-offline digital marketplace platform designed to connect SHFs with relevant agricultural and financial services to ensure sustainable increased farm production and mitigate the effects of climate change
<b>Customer type:</b>	SHFs and agri-SMEs
<b>Business model:</b>	Agricultural and financial bundled services
<b>Products and services:</b>	Inputs and equipment: quality seeds and fertilizers Data and analytics: soil testing Farm management and solutions: agronomy and business management education and advisory, record-keeping and inventory management Logistics management: trucking marketplace Insurance: crop and livestock index insurance Financing
<b>Countries:</b>	Kenya (HQ)
<b>Incorporation:</b>	2016
<b>Founders:</b>	Seedstars Africa Ventures, Gray Matters Capital, UK Aid Direct: \$200,000 award received as part of the Climate Information Prize competition

Funding	
<b>Total funding:</b>	\$1.32 million
<b>Latest round:</b>	\$1.1 million pre-Series A in October 2021
<b>Investors:</b>	N/A

Partners*
<ul style="list-style-type: none"> <li>▪ Insurance and financial partners</li> <li>▪ Input buyers and sellers</li> <li>▪ Trucking/last-mile transportation providers</li> </ul>

Value proposition and outlook
<p>Farmers Pride solves last-mile supply chain challenges in the agriculture value chain by connecting input manufacturers, agri-retailers and SHFs through a digital commerce platform, DigiShop.</p> <p>The platform aims to remove reliance on many intermediaries and significantly lower the cost of farming for SHFs by offering <b>access to quality inputs, data, farm management solutions, access to financing and market linkages</b>.</p> <p>To access the platform, farmers and service providers can register through text message or by downloading the DigiShop app on their smartphones.</p> <p>Through Farmers Pride, <b>agro-dealers</b> and <b>cooperatives</b> are able to digitize their operations and offer SHFs tailored products and services.</p>

# Company profile – ADAPTA Earth



At a glance	
<b>Company description:</b>	Climate-focused fintech, using agricultural data for alternative credit assessments, with the goal of unlocking capital for farmers and agri-SMEs to improve their climate resilience
<b>Customer type:</b>	SHFs and agri-SMEs
<b>Business model:</b>	Agricultural and financial bundled services
<b>Products and services:</b>	Data and analytics: CCA-based credit assessment Lending: Blended term loans (+5 years), quasi-equity (convertible debt and revenue-based loans) and equity
<b>Countries:</b>	Kenya (HQ)
<b>Incorporation:</b>	2021
<b>Founders:</b>	German Vegarra, Founder and CEO

Funding	
<b>Total funding:</b>	\$1.95 million
<b>Latest round:</b>	N/A
<b>Investors:</b>	Bill and Melinda Gates Foundation, USAID Kenya Investment Mechanism

Partners
<ul style="list-style-type: none"> <li>▪ <b>Bill and Melinda Gates Foundation:</b> Funded Adapta's Phase I launch in Kenya, Africa's first climate adaptation credit facility for agriculture</li> <li>▪ <b>USAID:</b> Supported Adapta's mobilization of local financial advisors and the strengthening of their sustainable finance expertise</li> <li>▪ <b>Alliance of Biodiversity International and CIAT:</b> Assisted Adapta in the development and testing of a loan underwriting platform for farmers and agri-SMEs, incorporating agricultural technologies and climate-smart agriculture, and implementing climate scoring algorithms to transform the assessment of agricultural risk for financing</li> </ul>

Value proposition and outlook
<p>ADAPTA uses <b>data and climate-smart technologies</b> to <b>facilitate lending</b> decisions and help increase financing for SHFs and agri-SMEs. It works with <b>cooperatives, SACCOs and aggregators</b> to enable financing for the agriculture sector, as well as <b>extending loans directly</b> to end customers.</p> <p>ADAPTA's <b>climate and sustainability scores</b> assess the level of risk and facilitate efficient credit approval processes. It also provides <b>CCA advice</b> to customers to mitigate their risks.</p>



# Company profile – Emata



At a glance	
<b>Company description:</b>	Developer of a financial platform intended to digitize the agriculture sector. The company provides affordable digital loans to invest in the productivity of farms, enabling farmers to get financing efficiently.
<b>Customer type:</b>	SHFs (through cooperative partners)
<b>Business model:</b>	Fintech
<b>Products and services:</b>	Lending: digital loans for farm productivity Data and analytics: management information system with advanced risk analytics for tailored loans Logistics and management: delivery registry, pricing updates and payment schedules
<b>Countries:</b>	Uganda (HQ)
<b>Incorporation:</b>	2020
<b>Founders:</b>	Bran Willem van den Bosch, Co-Founder and CEO; Timothy Musoke, Co-Founder and Advisor

Funding	
<b>Total funding:</b>	\$0.75 million
<b>Latest round:</b>	\$0.59 million pre-seed in March 2022, undisclosed amount pre-seed in November 2021, \$0.06 million pre-seed in June 2021
<b>Investors:</b>	Plug and Play Tech Center, CATAPULT: Inclusion Africa, Dutch Embassy in Uganda

Partners
<ul style="list-style-type: none"> <li>▪ <b>Laboremus:</b> Ugandan fintech company that developed Emata's platform and provided initial capital for its revolving structured debt fund used to fund loans</li> <li>▪ <b>United Nations Capital Development Fund:</b> Providing capital for the revolving structured debt fund used to fund loans</li> <li>▪ <b>Dairy Development Authority:</b> Partnered to roll out Emata's solution to dairy cooperatives across Uganda</li> <li>▪ <b>Dutch Embassy in Uganda:</b> Provided a \$590,000 grant to fund loans for thousands of smallholder dairy farmers across Uganda</li> <li>▪ Other <b>cooperatives</b> and <b>aggregators</b></li> </ul>

Value proposition and outlook
<p>Emata offers affordable <b>digital loans</b> to increase the productivity and profitability of farmers through <b>cooperative</b> and <b>aggregator</b> partners.</p> <p>Its AI-powered <b>alternative credit scoring</b> using partners' data allows it to tailor loans, minimize its risk and provide low-cost financing to farmers. Default rates are low, with guarantees in place for all loans through insurance partners.</p> <p>Loan repayments are tied to harvest, reducing cash flow pressures on farmers.</p>

# Company profile – Aerobotics



At a glance	
<b>Company description:</b>	Uses a combination of satellite and drone imagery coupled with machine learning algorithms that help in orchard management, problem tree identification, pest and disease management and yield management, enabling farmers to scan their farms, analyse captured information, reduce costs and increase yields
<b>Customer type:</b>	SHFs
<b>Business model:</b>	Data and analytics
<b>Products and services:</b>	Data and analytics: geolocation mapping, remote sensing and imagery Insurance: precision crop insurance
<b>Countries:</b>	18+ countries, including South Africa, Mozambique, Zimbabwe, United States, United Kingdom, Germany, France, Russia, Spain, Portugal and Australia
<b>Incorporation:</b>	2014
<b>Founders:</b>	James Paterson, Co-Founder and CEO Benji Meltzer, Co-Founder and CTO

Funding	
<b>Total funding:</b>	\$20.91 million
<b>Latest round:</b>	\$16.31 million Series B in December 2020
<b>Investors:</b>	Africinvest, Alter Global, Bantam Group, Bossanova Investimentos, Cathay Innovation, Endeavour Catalyst, FMO, Naspers, AgFunder, NedBank, Savannah Fund, 4Di Capital, Platform Investment Partners, Google for Startups Accelerator, Startupbootcamp

Partners
<ul style="list-style-type: none"> <li>▪ <b>Drone partner programme:</b> Aerobotics offers drone pilots equipment, certification and training to grow their business and earn income flying for their clients around the world.</li> </ul>

Value proposition and outlook
<p>Aerobotics uses <b>drone and satellite technology</b> to provide farmers with data-driven insights that <b>optimize crop yields and minimize waste</b>. The company also provides <b>precision crop insurance</b>, helping to <b>mitigate risk and provide financial protection</b> to farmers.</p> <p>Through these efforts, Aerobotics also demonstrates <b>positive CCA impact</b>, building resilience to changing weather patterns and minimizing the carbon footprint of farming operations.</p>

# Company profile – Khula!



At a glance	
<b>Company description:</b>	Developer of an online marketplace platform intended to connect small-scale farmers to the public. The company's platform allows users to order agrochemicals, fertilizers and seeds, as well as purchase fruits and vegetables directly from the farm, and offers an e-commerce platform, data analytics services and logistic services to farmers.
<b>Customer type:</b>	SHFs and agri-SMEs
<b>Business model:</b>	Market access
<b>Products and services:</b>	Market access: digital marketplace app for inputs and services, e-commerce platform Logistics: logistics management and analytics Financing: connects institutional investors with farmers who meet their funding mandates
<b>Countries:</b>	South Africa
<b>Incorporation:</b>	2016
<b>Founders:</b>	Karidas Tshintsholo, Co-Founder and CEO Matthew Piper, Co-Founder and CPO Jackson Dyora, Co-Founder and CTO
<b>Customers:</b>	3,000+ farmers, 100+ suppliers

Funding	
<b>Total funding:</b>	\$1.39 million
<b>Latest round:</b>	\$1.37 million seed round in August 2021
<b>Investors:</b>	AECI, E Squared, Google for Startups Accelerator, Chivas Ventures

Partners
<ul style="list-style-type: none"> <li>▪ <b>AECI Plant Health:</b> Invested in Khula! to help address SHFs' pain points via technology, strengthen relationships with suppliers and enhance product stewardship. Provided access to its wide distribution network of 132+ depots across South Africa to scale Khula's inputs app</li> <li>▪ <b>Input suppliers, sellers and manufacturers</b></li> </ul>

Value proposition and outlook
Khula is committed to the mission of creating an <b>inclusive mobile marketplace</b> that connects farmers to agricultural supply and marketplaces, driving the success and growth of farmers while disrupting the wholesale food market.



## 7. Conclusions and recommendations

# Key learnings from the landscape assessment

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The study found the following key determinants and business models driving the commercial viability and scalability of digital innovations that improve access to finance for agri-SMEs, SHFs and FOs:

1

## Limited access to capital

- » **Access to capital is the top driver of agritech and fintech's ability to achieve commercial viability and scale.** Working capital is needed for input purchases and direct on-lending to the agriculture sector, as well as growth capital to reach more customers and design better products. Attracting capital is a key barrier to scale for these providers.
- » **Targeted deployment of concessional capital can help reduce risk** for tech providers and allow them to scale, while mobilizing traditional financial institutions to increase their uptake of digital innovations and financing to the sector.

2

## Growth in bundling services

- » **Bundled business models with farmer-centric offerings addressing multiple needs** are an emerging necessity to enable scale. Through expansion of service offerings, partnerships with other providers or consolidation of single-product businesses (vertical integration), tech providers can become more competitive, serve target customers better, reduce business risks, and reach scale and commercial viability.
- » **An increasing number of opportunities in bundled services and agritech** is shown by the growing amounts of funding, primarily in the form of equity, for these categories of tech providers. The debt capital gap continues to expand, as companies scale and their needs increase, stifling growth.
- » **Tailored products to meet FIs' and farmers' needs** allow ease of integration and wider customer adoption and are a key success factor for digital innovations.

3

## Development of digital and physical infrastructure needed

- » **Infrastructure is an integral part of the enabling environment for scalability.** When comparing mobile adoption and digital infrastructure across countries of operation, companies operating in places with stronger digital infrastructure were more likely to succeed.
- » **Access to consolidated data that enable analysis and integration** into FIs' and investors' risk evaluation process is key to address the current poor and fragmented data held with a limited number of stakeholders. Creating centralized databases, incentives and mechanisms for sharing data can allow increased investment in the sector and enable tech providers to scale.

## 4

### **Insufficient awareness and adoption of CCA offerings**

- » **CCA services including sustainable inputs and farming practices and agricultural insurance are needed** to increase farmers' climate resilience; however, they remain limited.
  - » **CCA offerings were present in only a third of companies in the project sample**, with most mature providers in data and analytics, and agricultural bundled services.
  - » **Lack of education and training is a critical barrier to adoption of sustainable agriculture practices**, and addressing that gap can clear misconceptions and increase adoption of CCA platforms.
- 

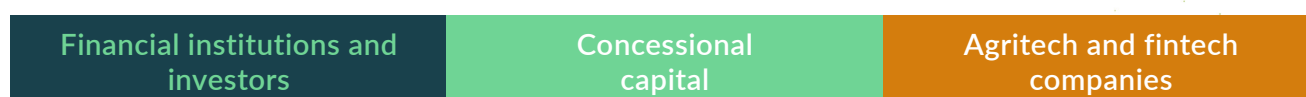
## 5

### **Additional factors for scale and business model prioritization**

- » Availability of a large addressable market, unit economics to enable financial sustainability without reliance on subsidies, ability to adapt to external shocks, replicability in new markets, and ability to unlock finance for customers impact tech providers' scalability and commercial viability.

# Use of concessional capital is key to enabling effective solutions to scale

Targeted deployment of concessional capital can help reduce risk for tech providers and allow them to scale, while mobilizing traditional financial providers to increase their uptake of tech offerings and financing to the sector.



## Concessional capital can help bridge the financing gap by:

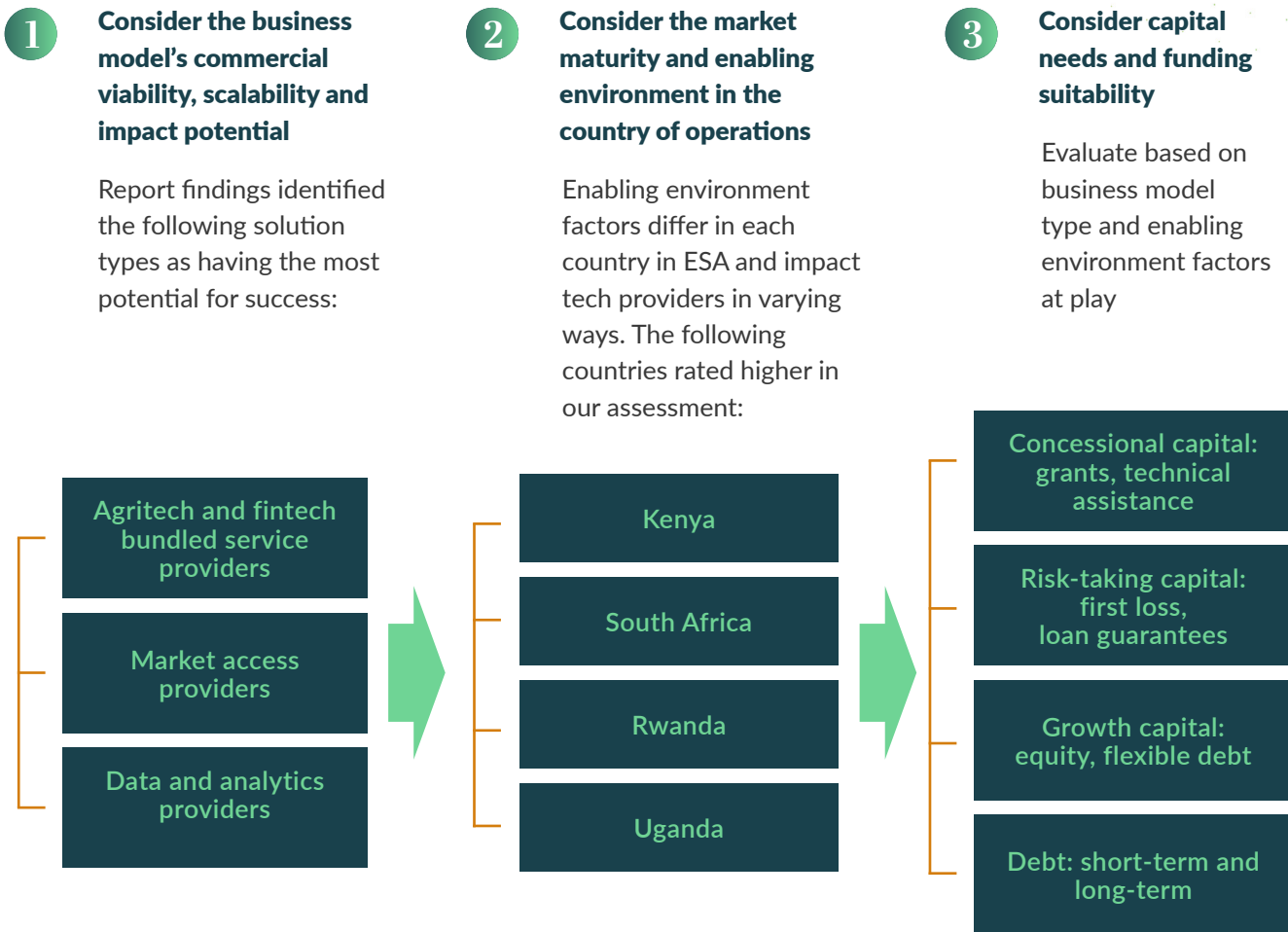
Catalysing commercial capital	Reducing risk and cost for tech providers	Offering long-term capital for scaling	Funding more accessible datasets
<p>Concessional first loss capital reduces risk for commercial investors, making agricultural investments more attractive.</p> <p>This is likely to improve the availability of capital flows into both FIs lending to the agriculture sector and tech providers designing digital solutions that address challenges for agri-SMEs and SHFs, including driving CCA-focused financing.</p>	<p>Loan guarantees unlock financing for agri-SMEs and SHFs by reducing the risk of lending for FIs and freeing up agritech/fintech companies' balance sheets from loan exposure of lending directly and taking on more risk.</p> <p>This can increase providers' ability to improve their digital platforms, scale operations on the ground and reach a larger customer base.</p>	<p>Concessional capital can be deployed to allow long-term growth for tech providers, reducing pressure on businesses to create exit opportunities, typically expected by commercial venture capital equity investors.</p> <p>This gives companies more time and flexibility to fully build out their offerings, scale and become commercially viable.</p>	<p>Concessional funding towards technical assistance can help build foundational databases to improve data accessibility and analytics (e.g. of farm registries, soil mapping, agronomic data, weather data).</p> <p>Centralizing data can reduce providers' costs for their own data collection, improve investors' understanding of the sector, and increase comfort and investment appetite.</p>

## IFAD and partners may use the following options to enable success of tech solutions:

Blended capital structures	Loan guarantees	Patient capital deployment	Grants for data projects
<p>Concessional first loss capital blended with commercial capital reduces risk for commercial investors and catalyses more investment in the sector, including to tech providers with a strong CCA focus.</p>	<p>Loan guarantees can mitigate key risks faced by providers, particularly those with lending and insurance offerings, reduce their operating costs and enable finance to agri-SMEs and SHFs.</p>	<p>Flexible capital with grace periods and long maturity terms better supports early-stage tech company needs, particularly with a climate and impact lens, allowing them to better serve target customers and prove product viability and scale.</p>	<p>Government subsidies and grants to service providers can be used to support data gathering efforts, define standards and create taxonomies for agriculture-related databases.</p>

# Funding decision framework for agritech and fintech solution providers (1/2)

The following framework can be applied as a guide to funding decisions by partners.





# Funding decision framework for agritech and fintech solution providers (2/2)

The following framework can be applied as a guide to funding decisions by partners:

	Funding type	Business model applicability			Use of proceeds
		Agritech and fintech bundled services	Market access	Data and analytics	
	Technical assistance	X	X		Educate on sustainable inputs and practices to increase adoption, affordability and awareness of solutions that aim to increase farmers' climate resilience
		X	X	X	Provide technical assistance support for FIs to integrate solutions and for tech providers to better design products tailored to their needs – help banks digitize and embed data in credit analysis of the agriculture sector
	Grants	X	X	X	Grants to support creation of taxonomies and standardized definitions to ease integration with financial institutions
		X	X	X	Grants to improve data gathering efforts, centralize fragmented datasets and ease access to higher-quality data
		X			Grants that subsidize climate risk insurance premiums to improve affordability and access
	First loss capital	X	X	X	Provide concessional first loss capital to funds developed by members of SAFIN or other partners that target investment into recommended business models, to reduce risk and attract commercial investors, including to solutions with a strong CCA focus
	Guarantees	X			Provide loan guarantees to mitigate key risks faced by these tech providers, particularly those with lending and insurance offerings, to improve their liquidity and reduce operating costs, as well as mitigate FX risks
	Flexible debt	X	X		Patient loans with grace periods and repayment tied to success milestones allow providers to service customers more effectively and prove product viability before traditional debt is available
	Equity	X	X	X	Early growth equity is needed by all providers to enable scaling of solutions and access to debt
	Working capital debt (short-term)	X	X		Working capital for input and inventory purchases and payments to farmers
Capex debt (long-term)	X			Long-term debt for equipment, machinery and CCA-related investments	

# Coordinated action by IFAD, SAFIN and partners is needed to unlock capital flow to the sector

## Recommendations for IFAD



### Foster partnerships between tech providers and FIs

- Advocate for and offer direct facilitation of collaboration through workshops and other events where both stakeholders can develop solutions together.
- Consider launching a **Challenge Fund** that would incentivize tech providers and FIs to find solutions that best address farmers' needs and can be integrated into FI operations.



### Drive policy advocacy to improve digital infrastructure and mobile adoption

- Influence the regulatory environment to create better incentives for FIs to adopt and integrate tech platforms, including in the areas of digital payment regulation, access to centralized data in the agriculture sector, and regulation of insurance licences, all levers that can help increase CCA financing and impact in the sector.



### Focus on bundled services in IFAD programmes

- Drive programme support to scalable businesses prioritized in this study, including agricultural and financial bundled services, market access, and data and analytics.
- Design results-based programmes and projects in country, focused on strategic opportunities that integrate these types of agritech and fintech providers with financial institutions, developing long-term incentives for both.



### Continue research, publications and learning tools

to drive capital from philanthropic funders and investors, and influence behaviour of tech providers and FIs (several interviewees from our project mentioned following IFAD's research work).

## Recommendations for SAFIN



### Influence private-led investment

Although concessional capital is needed, commitment from private funders is essential to unlock scalability for tech providers. SAFIN can influence them by reframing risks and raising awareness of opportunities and needs at hand to drive more private capital to the sector, but also serve as a lever to incentivize collaboration among players.



- **Convene:** SAFIN has the power to convene private sector players, including FIs and tech providers. Enabling action through focused workshops and webinars between capital providers and tech providers can alleviate current barriers, particularly by including FIs in the conversation. Attracting more fintech and agritech companies to the network and convening at larger mainstream conferences to bring these issues and opportunities to the surface is likely to unlock solutions from new players.



- **Focus and align members on issues outlined:** Address knowledge gaps by disseminating and discussing this work via publications, conference panels, webinars or other marketing materials disseminated across the network. Launching a series of workshops for SAFIN members to better equip them to identify scalable, commercially viable businesses and design investment instruments that are better aligned with the capital needs of agritech and fintech providers can unlock greater investment.



### Track progress

By furthering the work of this report, SAFIN can map specific opportunities for innovative collaborations between its members, set measurable goals, track and promote progress, and incentivize collaboration among players.



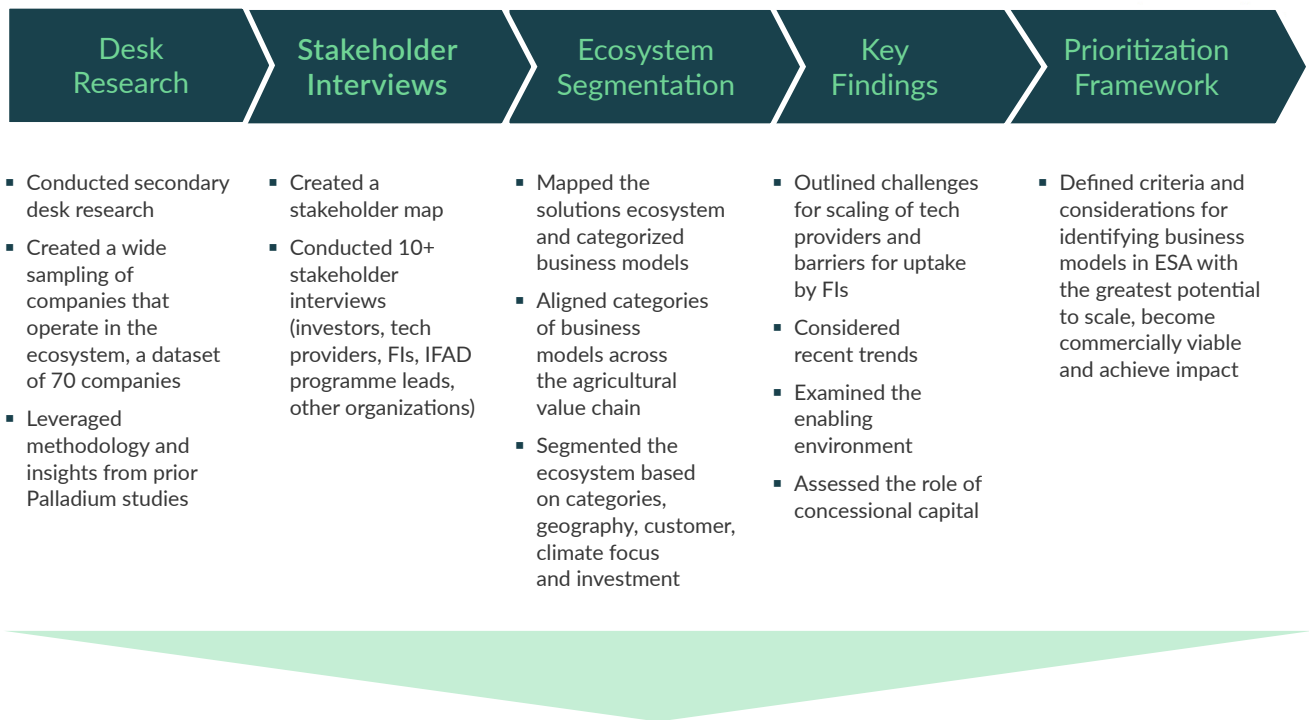
## 8. Appendix



## *A. Landscape assessment approach*

# Landscape assessment approach

To deliver a comprehensive assessment of the agritech and fintech ecosystem in ESA, Palladium used a combination of desk research, stakeholder interviews and findings of prior studies to identify the main models that enable CCA financing.



## Target business models

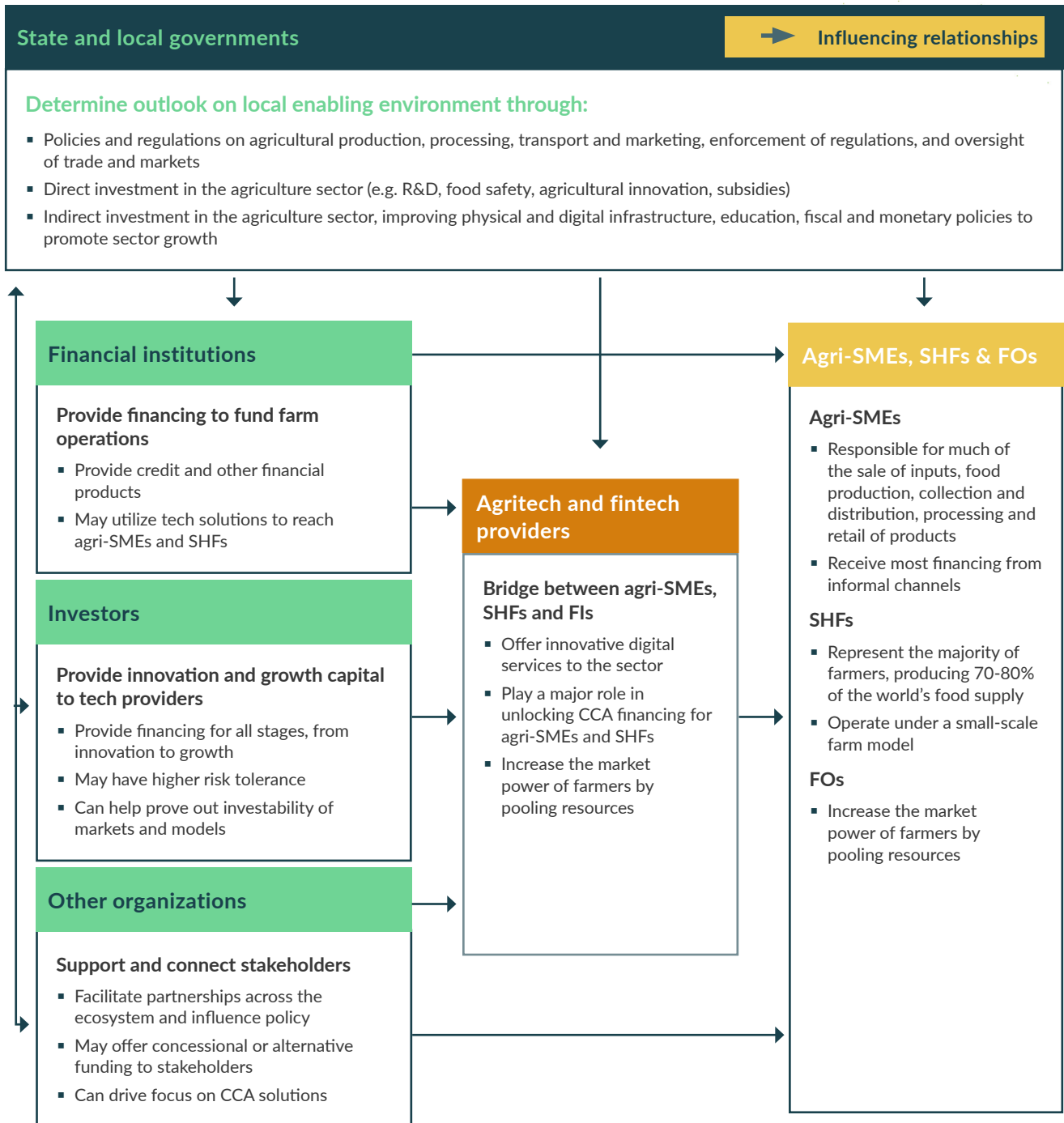
- » Identified core agritech and fintech business models with the greatest potential to unlock CCA financing for agri-SMEs, SHFs and FOs, scale and be commercially viable



## *B. Market landscape and enabling environment (expanded)*

# Ecosystem stakeholder map

Agritech and fintech providers are key stakeholders in the agriculture ecosystem, offering solutions to address the finance gap for agri-SMEs, SHFs and FOs and connect them to traditional financial institutions.



# Lack of financing for SHFs, agri-SMEs and FOs across the value chain

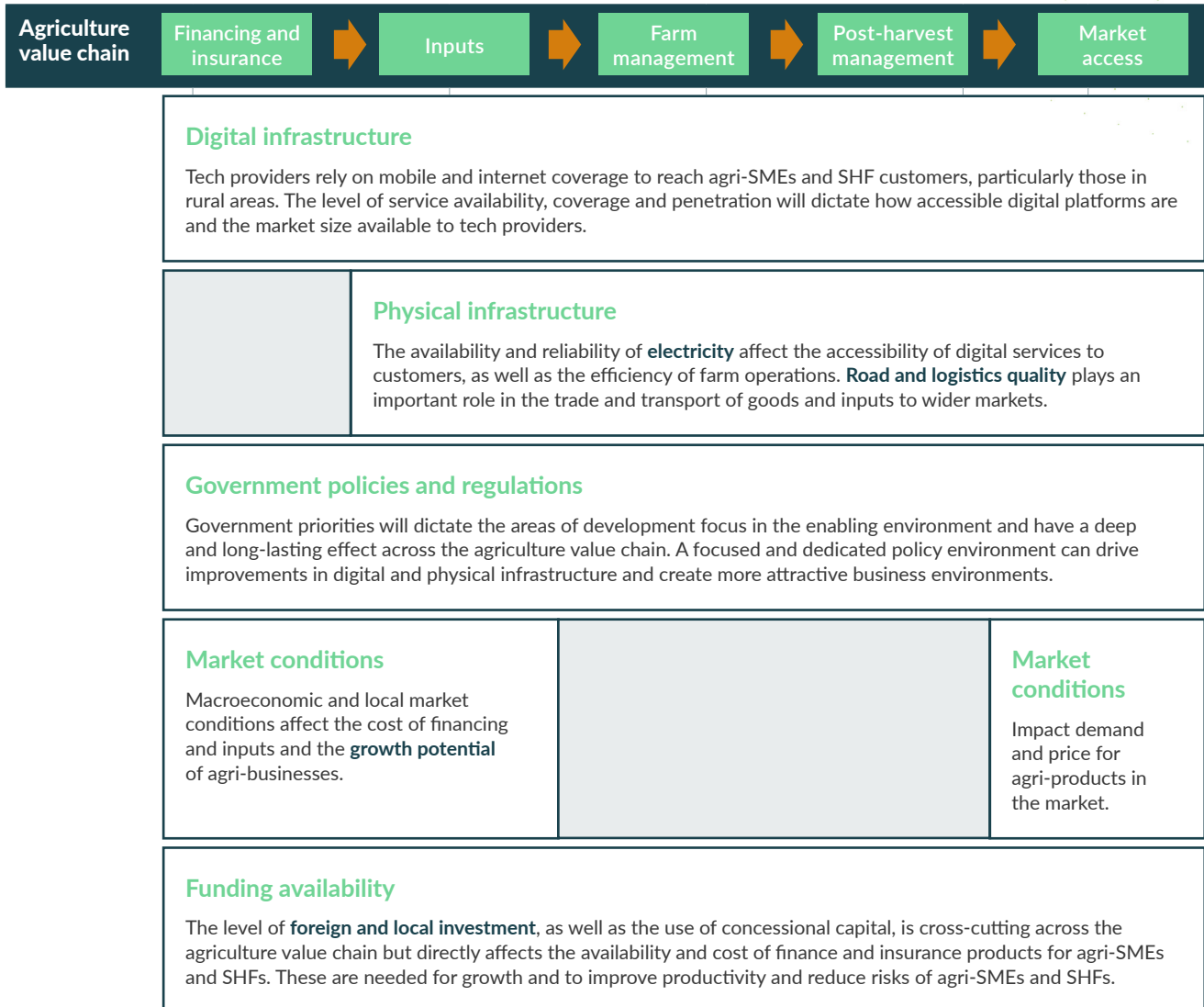
Agri-SMEs and SHFs face multiple challenges in accessing finance across the different points of the agriculture value chain

Agriculture value chain	Financing and insurance	Inputs	Farm management	Post-harvest management	Market access
Agri-SME and SHF activities	<ul style="list-style-type: none"> <li>Applications for loans and management of working capital needs</li> <li>Purchase of insurance for crops, equipment, farm operations</li> </ul>	<ul style="list-style-type: none"> <li>Design of farm set-up and operations</li> <li>Purchase of seeds, fertilizers and equipment</li> <li>Borrowing of working capital</li> </ul>	<ul style="list-style-type: none"> <li>All aspects of crop production, such as land preparation, planting, irrigation, fertilizers, monitoring and harvesting</li> </ul>	<ul style="list-style-type: none"> <li>Processing, packaging and storage (including inventory/warehouse management)</li> </ul>	<ul style="list-style-type: none"> <li>Contracting with buyers</li> <li>Transactions and invoicing for sale of goods</li> <li>Managing transport and distribution of goods sold</li> <li>Loan payment with CF</li> </ul>
Key challenges	<ul style="list-style-type: none"> <li><b>Data on farmer profiles</b> are poor, resulting in incomplete credit scores and few financing options</li> <li>Stringent financing <b>credit requirements</b> due to perceived risk</li> </ul>	<ul style="list-style-type: none"> <li><b>High capital needs</b> for inputs</li> <li><b>Access to better-quality inputs and knowledge about sustainable</b> input options may be limited</li> </ul>	<ul style="list-style-type: none"> <li><b>Access to knowledge and data</b> for better decision-making and use of sustainable farming practices is limited</li> </ul>	<ul style="list-style-type: none"> <li><b>Access to digital tools</b> that maximize resource and inventory efficiency and improve cash management capabilities is lacking</li> </ul>	<ul style="list-style-type: none"> <li><b>Access to larger and more diverse buyers</b> is limited</li> <li><b>Access to fair market prices</b> is challenging</li> </ul>
Impact on access to financing	<ul style="list-style-type: none"> <li><b>Finance gap:</b> Direct access to financing for agri-SMEs and SHFs is challenging</li> <li><b>High financing costs and fewer loans</b> extended to the agriculture sector</li> </ul>	<ul style="list-style-type: none"> <li>Higher-value inputs, such as cash crops, cost more and <b>require more financing</b> but could provide <b>better financial returns</b> to agri-SMEs and farmers</li> </ul>	<ul style="list-style-type: none"> <li>Low-quality data and poor production operations <b>increase production risk</b> and reduce lenders' appetite to offer finance</li> <li><b>Lower profitability</b> for agri-SMEs and SHFs decreases their creditworthiness</li> </ul>	<ul style="list-style-type: none"> <li>Losses generated from inefficient inventory and cash management <b>increase farmers' working capital</b> needs and make them riskier to lenders</li> </ul>	<ul style="list-style-type: none"> <li>Delays in selling produce or selling to a limited number of buyers (at below market prices) <b>reduces</b> agri-SMEs' and SHFs' <b>ability to repay loan obligations</b></li> </ul>



# Enabling environment across the agricultural value chain

The barriers and enablers to scale can affect multiple points within the agriculture value chain.



# Market development based on factors of enabling environment

More-developed markets tend to be leaders in multiple areas of the enabling environment. Rural electrification, business growth potential and funding availability are the strongest indicators of market maturity.

More-developed markets	Less-developed markets
The spectrum of more-developed vs less-developed markets is based on the local enabling environment, as well as the level of agriculture-related investments within our database.	

Overall conditions	<ul style="list-style-type: none"> <li>More-developed markets tend to be advanced or leading across multiple criteria described below.</li> <li>However, no particular criteria stand out as fundamentally necessary.</li> <li>The overall maturity helps to offset any particular weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>Less-developed markets may have particular pockets of relative strength.</li> <li>However, these tend not to extend across the enabling environment.</li> </ul>
Digital infrastructure	<ul style="list-style-type: none"> <li>More-developed markets tend to have higher internet coverage.</li> <li>Higher mobile penetration and use of mobile data are also common.</li> </ul>	<ul style="list-style-type: none"> <li>Some less-developed markets may have relatively high mobile or internet coverage, but often not both.</li> <li>Technology penetration is clustered around key urban centres.</li> </ul>
Physical infrastructure	<ul style="list-style-type: none"> <li>Access to electricity in rural areas seems to be a key enabler.</li> <li>Road quality also tends to be correlated with more-developed markets.</li> </ul>	<ul style="list-style-type: none"> <li>Less-developed markets tend to struggle with rural electrification, which makes digital solutions less viable for many agri-SMEs and SHFs.</li> <li>Poor road quality further exacerbates the lack of market linkages.</li> </ul>
Government policies and regulations	<ul style="list-style-type: none"> <li>Well-coordinated regulatory and legal support for ICT and digital businesses</li> </ul>	<ul style="list-style-type: none"> <li>Policy support and adaption to accommodate digital businesses is usually less coordinated than in developed markets.</li> <li>Strong investment in ICT may not be backed by regulatory change.</li> </ul>
Market conditions	<ul style="list-style-type: none"> <li>Growth of innovative companies and ease of starting a business indicate more advanced development.</li> <li>Human capital potential seems to have less of an impact on the level of market development.</li> </ul>	<ul style="list-style-type: none"> <li>Growth of innovative companies is comparatively lower than in more-developed markets.</li> <li>Lower literacy rates and higher poverty levels impact market conditions.</li> </ul>
Funding availability	<ul style="list-style-type: none"> <li>FDI and access to loans are markers of more-developed markets.</li> <li>However, this may be as a result of market maturity, rather than factors driving it.</li> </ul>	<ul style="list-style-type: none"> <li>The investment environment for agri-related opportunities in less-developed markets has lower funding volumes and availability.</li> <li>This is typical for both foreign investment and local financing.</li> </ul>

# Business model to enabling environment suitability matrix

Local enabling environments affect the most suitable priority business models based on their characteristics. The matrix below can help identify these business models for a given market and the types of funding needed.

- » Comparing enabling environment metrics provides a view of a target market's characteristics and challenges.
- » These characteristics and challenges are considered in deciding which business models are most suited to the local context and recommended for investment, as in the matrix below:

Enabling environment characteristics and challenges	Most suitable business model characteristics		Agritech				Bundled services			Fintech			
			Data and analytics	Market access	Farm M&S	Inputs and equipment	Logistics and SCM	Ag and financial	Ag	Lending	Insurance	Credit scoring	Payments
<b>Digital infrastructure</b>	Low digital penetration	Solutions that can leverage local networks and real assets	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
	Poor internet coverage	Less complex technological solutions (e.g. USSD-based)	Lower	Lower	Lower	Higher	Higher	Higher	Higher	Lower	Lower	Lower	Lower
<b>Physical infrastructure</b>	Low access to electricity	Less need for fast data transfer or "always on" connectivity	Lower	Lower	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher
	Poor road quality index	Services less reliant on physical movement of goods	Higher	Higher	Higher	Lower	Higher	Higher	Higher	Higher	Higher	Higher	Higher
<b>Government policies and regulations</b>	Low ICT focus	Solutions that rely less on connectivity and technology	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
	Low agricultural policy focus	Fintech/other services that can transfer to the agriculture sector	Lower	Lower	Lower	Lower	Higher	Higher	Higher	Higher	Higher	Higher	Higher
<b>Market conditions</b>	Inefficient markets	More digital-based, scalable solutions for market efficiency	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher
	Low farmer incomes	Lower-cost (often lower-tech) solutions due to affordability	Lower	Higher	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
	Low agricultural productivity	Solutions that can unlock quick productivity gains at low cost	Higher	Lower	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher	Higher
<b>Availability of funding</b>	Low venture capital availability	Suggests poor equity funding availability (see below)	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
	Difficulty in accessing loans	Suggests poor debt funding availability (see below)	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower

# Enabling environment analysis case study: Uganda

Uganda is at the lower end of the group of more-developed countries. Rural infrastructure is inconsistent, though a government priority. Reaching the young agricultural workforce is likely to be driven by mobile means. Further analysis of how this may impact ARCAFIM's strategy is explored in the next section.

Uganda		
Digital infrastructure	Mobile ownership	50%
	Mobile subscriptions per 100	61
	Secure internet access per 100	34
	4G coverage	64%
	Mobile broadband to population	34%
	Price per 1GB mobile data, \$	1.62
	Digital skills index*	3.42
Physical infrastructure	Rural access to electricity, %	32%
	Logistics performance index	2.58
	Road quality index	3.7
Government policies and regulations	Importance of ICT index*	4.15
	Legal index for digital business*	4.24
	ICT regulatory tracker*	86
	Ag research spend, % of AgGDP	0.62
Market conditions	Growth of innovative companies*	4.20
	Latest poverty headcount, %	42.2
	Days to start business	24
	Adult literacy rate, %	77%
Availability of funding	Foreign direct investments, \$m	1,266
	Venture capital availability*	2.46
	Ease of access to loans*	3.86

## Youthful agricultural workforce: low skill and knowledge levels

- Young population – 54% below 18 years
- Agriculture employs 72% of the workforce
- Women make up 75% of the agriculture workforce but own only 7% of the land, with low digital literacy
- 75% of the population are in rural areas

## Inconsistent but improving digital infrastructure

- Telecoms and internet coverage are inconsistent, with strong clusters around Kampala, but agritech providers have struggled with value propositions and revenue models for rural customers.
- However, government focus on ICT investment and improvement is strong and focused (see Appendix for more details).
- As a result, the outlook for digital infrastructure is positive: Uganda shows the highest growth in the use of digital payments/mobile money in the ESA region (12% between 2014 and 2017), though so far this is mainly in urban areas.
- Improved digital penetration and infrastructure coverage can support more digital solutions adoption.

## Uneven quality of physical infrastructure

- Physical infrastructure, including electricity access, is also uneven, with rural areas lagging.
- Improving rural electrification may have the biggest impact on the rural accessibility of digital solutions.

## Relatively strong funding environment

- Availability of finance is comparatively good, supporting a growing agritech and fintech early-stage start-up ecosystem with strong growth potential.

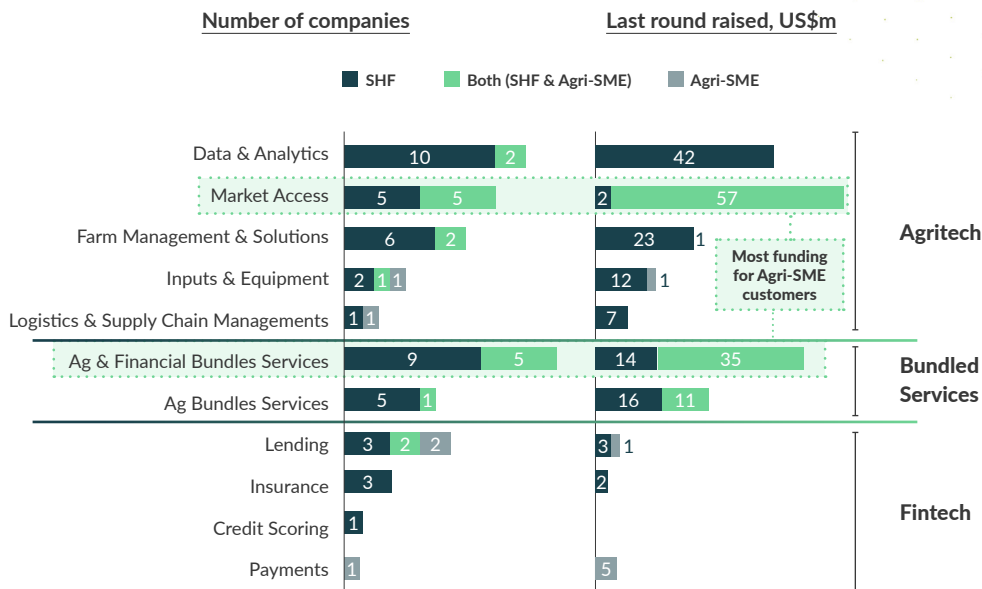
Source: FAO – Status of Digital Agriculture in 47 African Countries. World Economic Forum – Road Quality Index, World Bank – Poverty Headcount Ratio.



## *C. Ecosystem analysis (expanded)*

# Activity by customer type

Companies that target SHFs as customers dominate, followed by those that serve both agri-SMEs and SHFs, mostly via market access and agricultural and financial bundled services models, and only a handful focus on agri-SMEs.



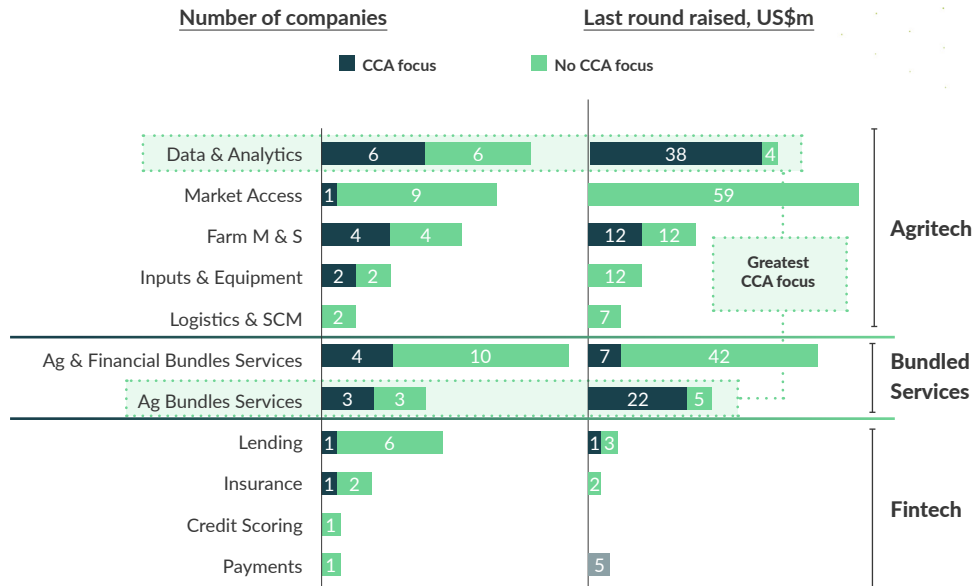
- » **Very few companies focus solely on serving agri-SMEs as customers** (5 out of 68 in the sample, or 7% of the total) – for example, AgriLED, Bext360, Offgrid Finance, FACTS Africa and Nomanini. This is in part due to the diversity of types and needs of agri-SMEs, which makes targeted services more challenging.
- » **SHFs represent a more numerous and homogenous customer type**, making it easier to offer standardized solutions with better margins. Hence, most tech providers, such as Agricool Finance, SwiftVee and DigiFarm, target SHFs as customers (45 within the sample, or 66% of the total).
- » SHFs also tend to be more predictable repeat customers than agri-SMEs, which tend to hold more purchasing power.
- » 18 (26% of the total) serve both customer types, including AgriCloud, FarmHut and EzyAgric.
- » Data and analytics and farm management and solutions are receiving the highest level of investments for SHF-focused offerings.

Note: The number of companies includes those that have closed transactions but where public data on funding are not available. This accounts for the difference between the chart and the commentary.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Activity by climate change adaptation focus

The highest investment activity in companies with a CCA focus tends to be across data and analytics and agricultural bundled services; however, most companies in the region lack a CCA focus in their offering.



» **Only 32% of companies within our sample have a CCA focus embedded in their offering:**

- 36% of agritech companies (e.g. AgriProject)
- 35% of bundled services companies (e.g. Komaza)
- 17% of fintech companies (e.g. Offgrid Finance)

» These companies provide a service or product that enables customers to address specific climate change risks, such as weather events, or to operate in more climate-friendly ways, such as through regenerative farming.

» **Data and analytics** companies with a CCA focus tend to be at a more mature stage than those without:

- With a CCA focus, Aerobotics raised \$16 million Series B and CropIn raised \$20 million Series C, vs. no CCA-focus Harvesting's \$4 million seed round.

» Similarly, **agricultural bundled services** are also attracting more investment for CCA-related services:

- Komaza, Grainpulse and Lentera Africa together raised \$22 million in their last rounds with a CCA focus.
- Cinch and Sidai Africa (no-CCA focus) only raised \$5 million in their last rounds at seed and Series A.

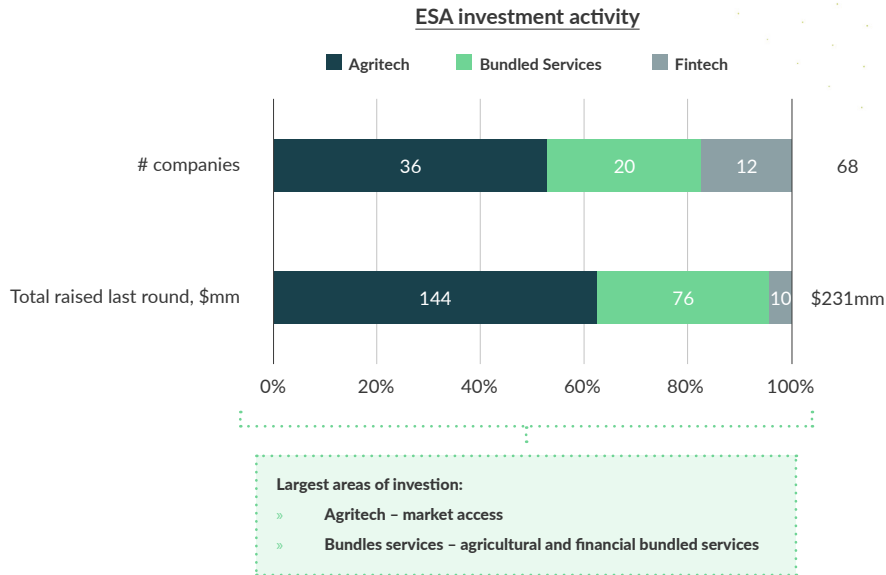
» Conversely, **market access** companies attracting investment typically do not have a specific CCA focus indicated in their product offering.

Note: The number of companies includes those that have closed transactions but where public data on funding are not available. This accounts for the difference between the chart and the commentary.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Investment activity by industry

Agritech is the most established segment in terms of business activity and funding in the region, though investors' appetite for bundled service offerings is also gaining traction.



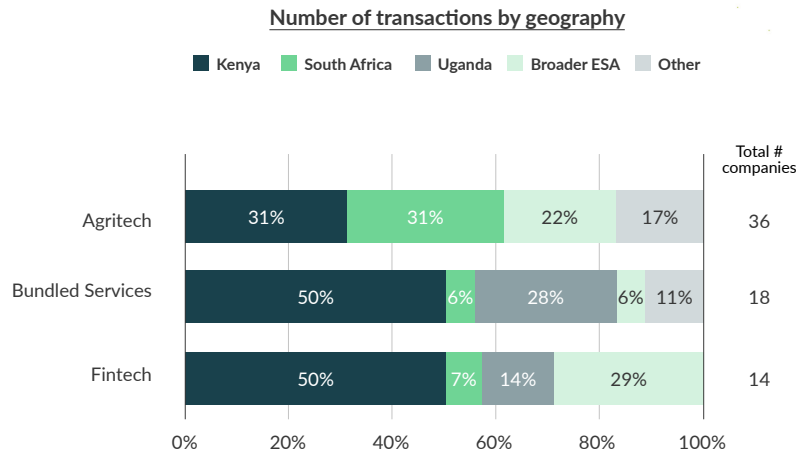
- » **Agritech is the largest and most established segment in terms of activity and funding in ESA.** Investors' appetite for this segment is strong: its companies (53% of the total) draw in proportionally more investment (62% of funding).
  - Digital marketplaces providing **market access** to SHFs and agri-SMEs are especially attractive, representing 30% of the agritech segment and attracting 41% of the funding, though predominantly driven by Twiga Foods, securing a large \$50 million Series B round.
- » **Bundled services** are also increasingly starting to receive funding – 33% of total funding across 29% of the companies in the sample.
  - **Agricultural and financial bundled services** (three or more services) are attracting comparatively high levels of investment (70% of bundled services companies and 65% of the segment funding).
- » Agriculture-related **fintech** companies tend to be at an earlier stage and less established, with lower levels of total funding – only 5% of total funds raised in the last round.
- » Agriculture-focused **fintechs** have generally struggled to offer a compelling value proposition to their many small and geographically dispersed customers, and in turn develop viable business models.
- » Both **agritechs** and **fintechs** require a combination of equity and debt financing:
  - Equity is needed to facilitate growth (product improvement, expansion to new markets, talent acquisition, etc.) and to leverage equity investors' expertise/advice.
  - Debt is needed for working capital, capex (**agritechs**) and balance sheet (**fintechs** or **bundled services providers** that offer lending).

Source: Palladium secondary research and analysis; sample size = 68 companies.



# Activity by country

Kenya is the largest hub across all three segments, with the highest number of companies concentrated in the country, followed by South Africa and Uganda, while activity in the rest of the ESA region is more limited.

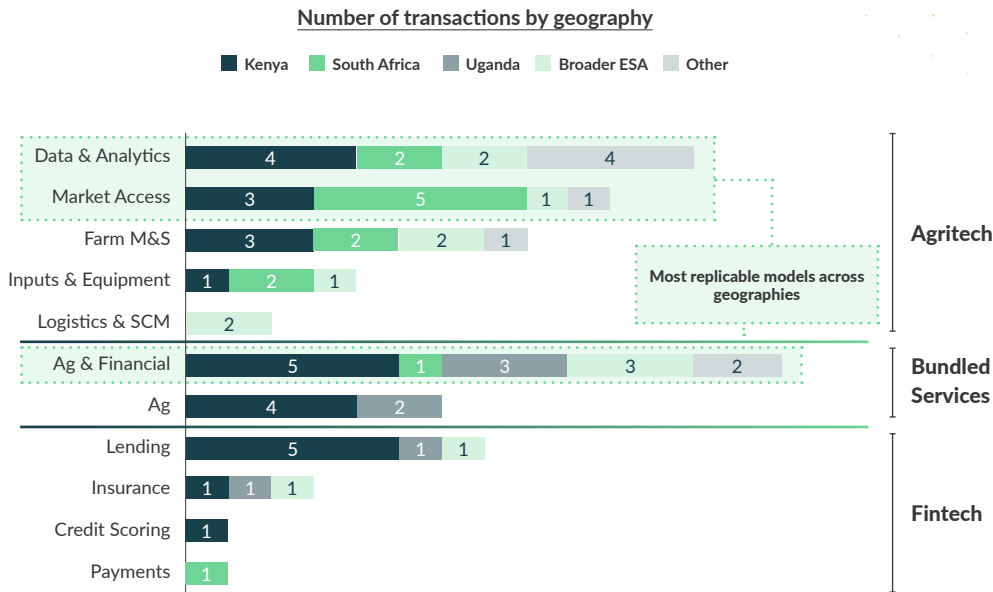


- » **Kenya** is the largest hub in the region across all three segments, with
  - **9 bundled services** and **7 fintech** companies. It represents 50% of all activity across those segments.
  - **11 agritech** companies, representing 31% of the total sample
- » **South Africa** is another major hub for agritech, with 30% of companies operating in the country. However, it holds far less focus on bundled services and fintech, with only 6-7% of companies in those segments.
- » **Uganda** is emerging as another hub, with activity concentrated in bundled services and fintech.
- » Transaction activity across the remaining countries in ESA is more limited. The **broader ESA** category, which includes companies that operate across multiple countries, has a strong focus on fintech (29% of fintech transactions), though the sector is comparatively small.
- » 82% of the companies in the sample are headquartered locally in the ESA region.
- » The level of activity depends on the maturity of a country’s enabling environment (see later for more detailed country profiles). These local market characteristics also impact the potential of new businesses to enter and scale in the country.
- » **Agritech** tends to be easier to transfer across countries than fintech platforms, due to more stringent regulatory requirements and approvals processes imposed on the financial sector, with significant variation across countries.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Activity by country and business model

Agricultural and financial bundled services, data and analytics, and market access business models show the most potential for scaling and replicability across the ESA region.

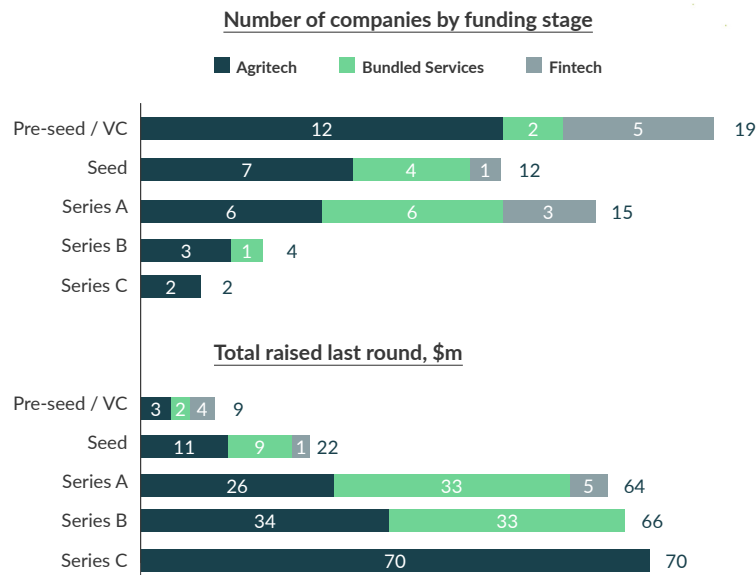


- » **Agricultural and financial bundled services** have the most transaction activity across different geographies within the region. This is indicative of the business model's replicability and scalability across different contexts.
- » **Data and analytics** and **market access** business models also show relatively high levels of transaction activity across geographies.
- » Similar trends can be observed based on total investment transaction value across geographies for these three business models (raising around 65% of overall investment during the last funding round), confirming not only customer demand but also investment interest in these businesses across multiple locations.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Investment activity by industry and stage

Agritech has a more mature investment pipeline, with companies spanning the full investment lifecycle, while bundled services and fintech are lagging behind and have raised mostly early-stage/seed capital.

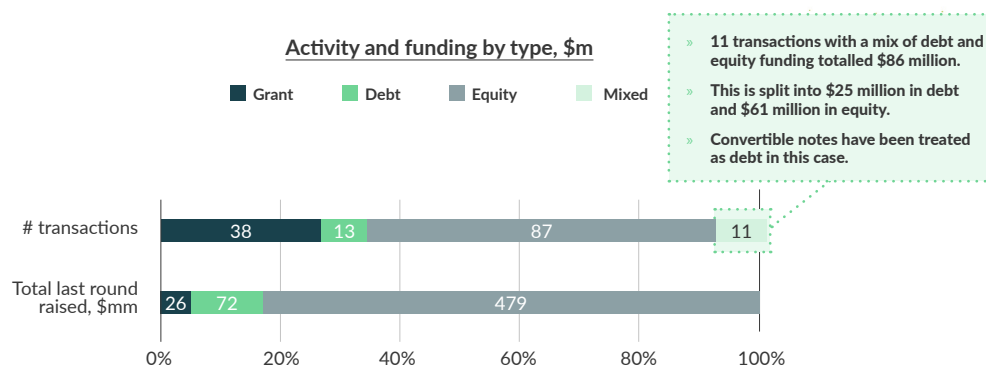


- » **Agritech businesses are likely to be larger than bundled services and fintechns**, with agri-focused fintechns likely to be the smallest based on the latest funding rounds and size of investments.
- » **Agritech** businesses appear to have a clear road map for investment, with companies operating throughout the investment lifecycle, from pre-seed (e.g. Bulrush Agritech) through Series C (e.g. Twiga Foods), raising increasingly larger sums.
- » There is significant early-stage business activity in **bundled services**, such as Cinch and Lentera Africa at seed stage. Follow-on investments at later stages can also be seen, such as with Good Nature Agro and Apollo Agriculture at Series A and B, respectively.
- » This demonstrates the **growing trend of investors focusing on business models that bundle multiple services across the agriculture value chain**.
- » However, pre-Series A stage investment in fintechns is comparatively low at only \$5 million in total among six companies and lacking investment at more mature stages in our sample, with only Nomanini having raised at later-stage venture capital/Series A.
- » The scalability and commercial viability of **fintech** models strongly depend on their ability to link financial offerings to agricultural production that helps tech providers diversify revenue streams and address multiple challenges for target customers.

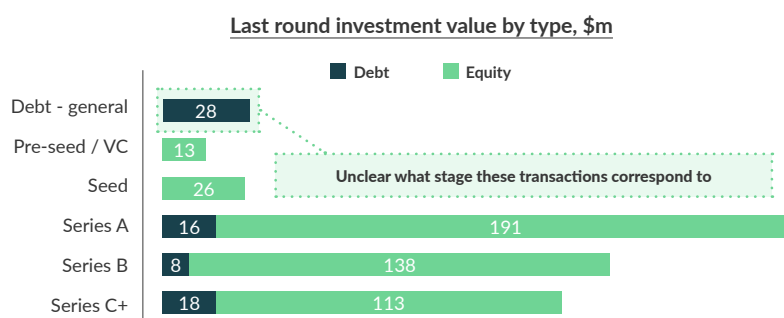
Source: Palladium secondary research and analysis; sample size = 68 companies.

# Investment activity by investment instrument

Equity investments appear to be the most common instrument used in scaling providers, representing the majority of funding value, especially at later stages, though some of those transactions also include a debt component.



Note: Mixed transaction types include sizeable debt and equity funding. If either funding type is below 5% of the total round size, the classification will instead be either Debt or Equity only.

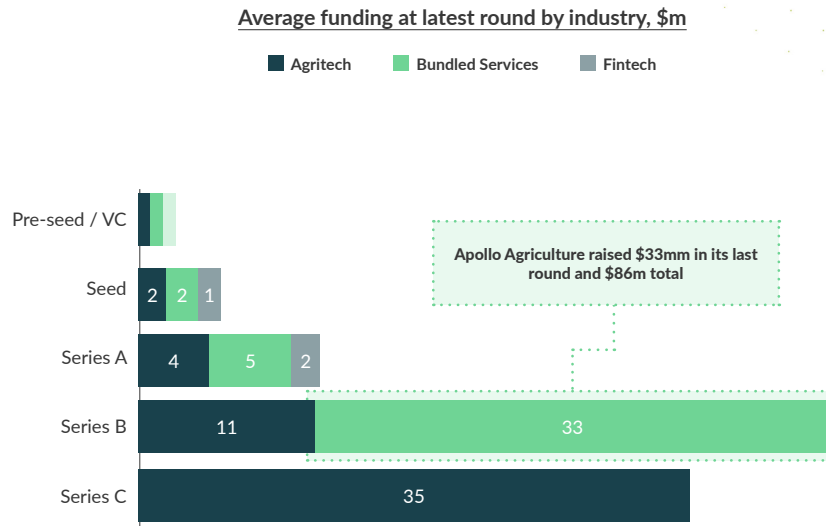


- » **Equity** funding was the most commonly used instrument within our sample of transactions, representing 58% of transaction volume (based on 87 transactions) and 83% of transaction value raised during the latest funding round.
  - However, the nature of grant and debt investments means they are often less well reported and captured by databases such as Pitchbook, and our sample may not accurately capture all grant and debt transactions for all companies.
- » The value of equity investment is most prominent from Series A onwards, representing \$441 million of the total of \$479 million raised (92%).
- » Both **debt** and **equity** are used throughout the investment cycle.
  - Earlier rounds tend to use single instruments, i.e. only grant, debt or equity.
  - They are more likely to be combined in later rounds.
- » Grant capital tends to be deployed during the early stages to fund pilots and innovation. It is used less in later stages to support growth and scaling, due to restrictions on the use of proceeds for grants and the for-profit nature of the majority of our sample.
- » Early-stage debt may be difficult to find, with better availability after Series A, though much of the debt capital raised within the sample cannot be attributed to any particular stage based on the available data.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Average investment

Agritech businesses have shown the strongest evidence of value growth and scaling, based on average ticket size, so far, with similar emerging growth trends also starting to appear in the bundled services segment.



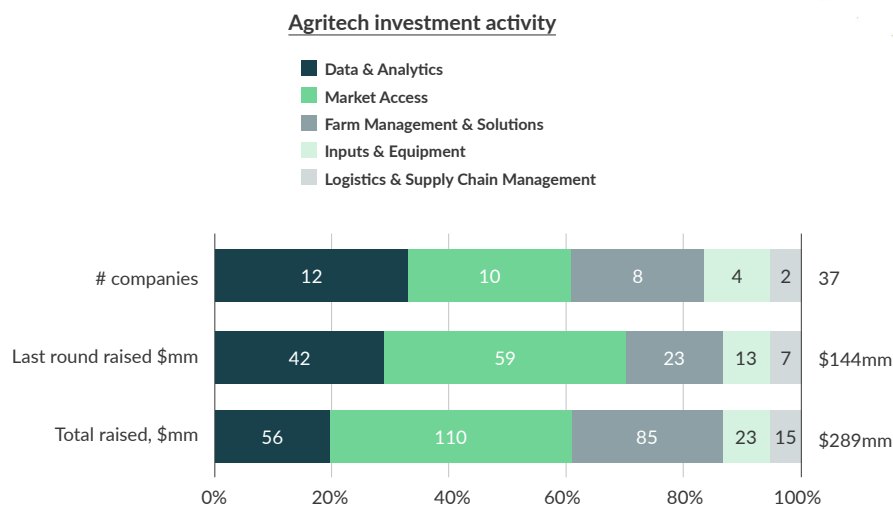
- » **Agritech** businesses show a more established pathway in company valuation growth and scaling by securing larger funding rounds.
- » A handful of agritech companies have raised Series C funding, with an average ticket size of \$35 million, mostly with operations in Kenya:
  - **Data and analytics** (CropIn)
  - **Digital marketplaces** (Twiga Foods)
- » This has been mostly replicated by **bundled services**, though primarily by a single company, Apollo Agriculture, which raised a \$33 million Series B round.
- » The average total investment at **seed** stage is between **\$1 million and \$2 million**, suggesting an average investor ticket size of between about \$0.5 million and \$1 million.
- » This increases significantly by **Series B** stage, where Aerobotics, iProcure and BanQu in the agritech segment each raised an **average of \$11 million**, and Apollo Agriculture raised an outsized round of \$33 million in bundled services.

Note: Pre-seed / VC includes grants, angel, incubator / accelerator and early VC investments. Later stage VC investments have been included with Series A.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Agritech investment activity by business model

Market access, data and analytics, and farm management and solutions have attracted the largest amounts of investment within the agritech segment, though opportunistic interest also exists in other business models.

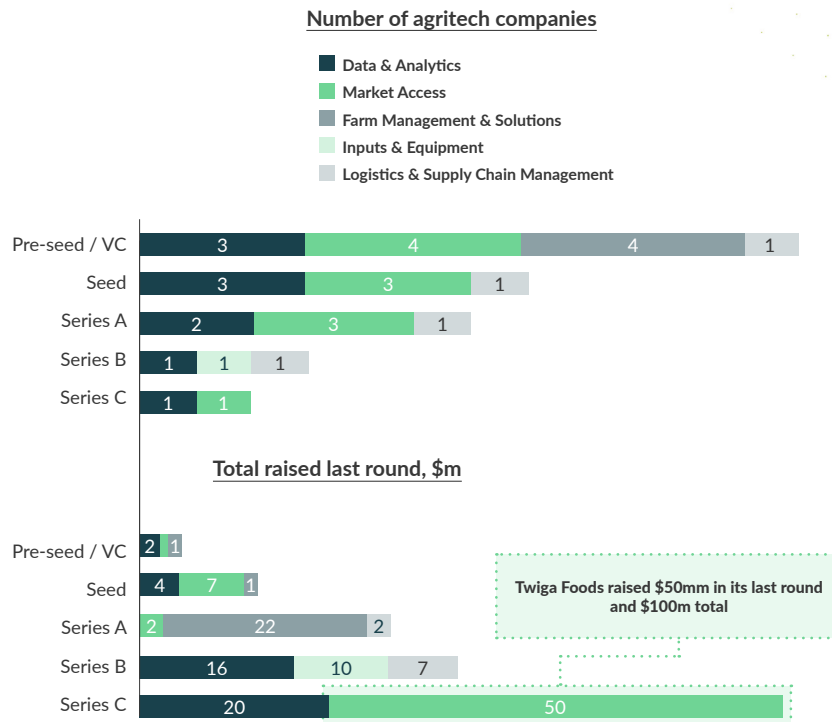


- » Within agritech, **market access** business models are attracting comparatively high levels of investment, raising 41% of the total capital in the latest funding round. These are typically **digital marketplace** businesses such as FarmShine, Livestock Wealth, Nile.ag and Khula!
- » However, most of the funding is raised by Twiga Foods: \$50 million in Series C funding and a total of \$100 million overall. If Twiga Foods is excluded, there is significantly lower investment remaining in market access.
- » Excluding Twiga Foods, the main business models attracting funding are:
  - **Data and analytics** (44% of last round total, 23% of total funding)
  - **Farm management and solutions** (25% of last round total, 45% of total funding)
- » These companies include:
  - Geolocation mapping, remote sensing and imagery (e.g. Aerobotics and Meridia)
  - Data and analytics providers (e.g. CropIn)
  - Farm management information systems (e.g. Synnefa)
- » Note that 6 of the 37 agritech companies within our sample do not have public data on their investment rounds, including Rural E-Market, Agri-sense International and Agrilibrium.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Agritech investment activity by stage

Market access and farm management and solutions within agritech are the most prevalent business models in early-stage investment rounds, while data and analytics show ability to scale by raising later-stage, larger rounds.



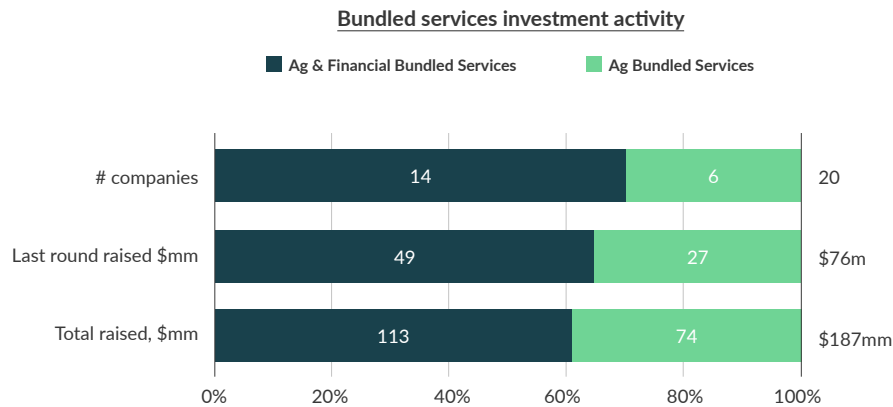
- » The agritech investment pipeline spans the full spectrum of business models, with **market access** and **farm management and solutions** representing the largest subcategories of models in the earlier stages of capital raised, when combined (8 of 12 companies in the pre-seed/VC round fall into those subcategories, 4 companies each).
- » For **market access**, Twiga Foods has proven the potential for scaling digital marketplaces business models through its Series C round of \$50 million.
- » Digital marketplaces can offer a strong value proposition to farmers as an easy and accessible way to increase their incomes. They also tend to have lower adoption costs than other digital agritech.
- » Currently many farmers are short of cash at harvest time and pay extortionate fees to local brokers to access markets. Digital marketplaces would reduce their transaction costs and improve their access to cash.
- » **Data and analytics** companies are slightly fewer in number but have successfully closed larger funding rounds at the Series B (Aerobotics) and Series C (CropIn) stage. This demonstrates the ability of such business models to scale and become commercially viable.

Note: Pre-seed / VC includes grants, angel, incubator / accelerator and early VC investments. Later stage VC investments have been included with Series A.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Bundled services investment activity by business model

Investor interest in bundled services appears to be focused on comprehensive offerings that bundle multiple agricultural and financial services together to address a number of barriers for SHFs and agri-SMEs.



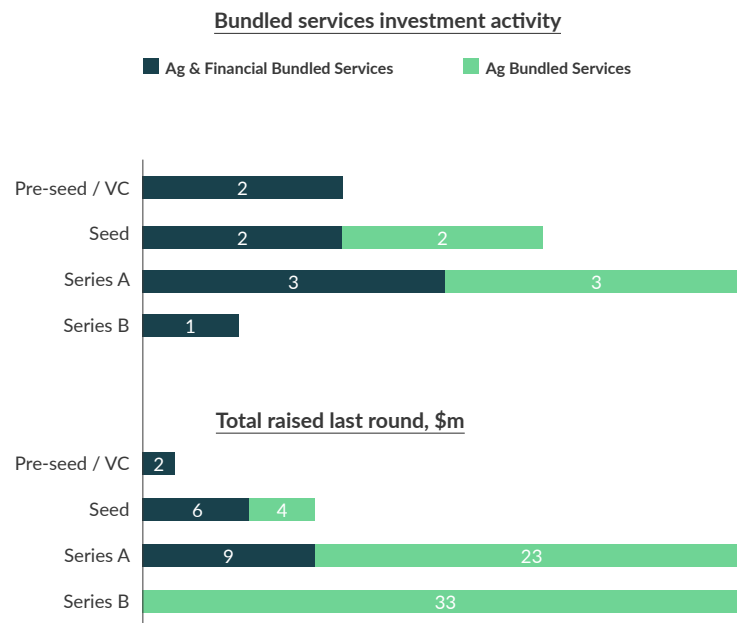
- » **Agricultural and financial bundled services** (three or more services) have the largest number of companies and the highest level of investment within bundled services (65% of total raised in the last funding round), suggesting a strong appetite among investors.
- » However, most of the investment is accounted for by Apollo Agriculture, which secured \$33 million in its latest Series B round and \$86 million in total investment so far, with the next largest transaction at only \$3.3 million seed for DigiFarm.
- » **Agricultural bundled services** also span multiple points across the agriculture value chain. However, they focus mainly on market access and advisory, often with a CCA angle.
- » Examples of this business model include Grainpulse, Lentera Africa and Sidai Africa.
- » Note that 7 of the 20 bundled services companies within our sample do not have public data on their investment rounds.

Source: Palladium secondary research and analysis; sample size = 68 companies.



# Bundled services investment activity by stage

Agricultural bundled services appear a more established business model within bundled services; however, investors' preferences may be starting to shift towards more comprehensive offerings that include financial products.



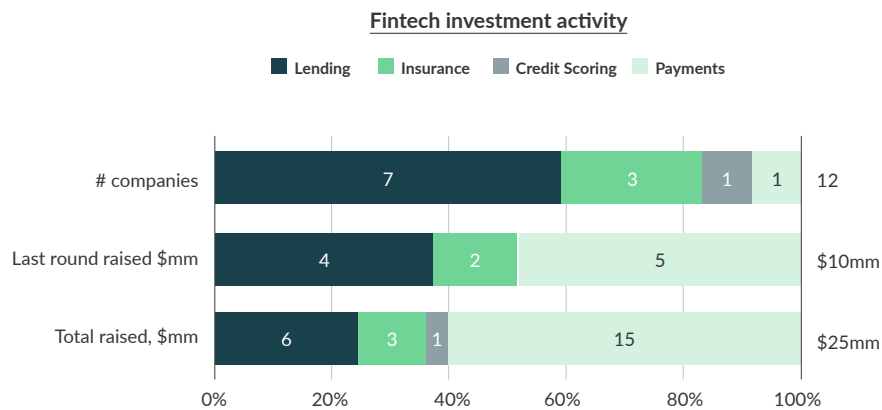
- » Bundled services are less well established than agritech in terms of funding environment, with lower volumes of transactions and very few later-stage transactions at Series B and beyond.
- » Within bundled services, combining agritech and fintech offerings together (**agricultural and financial bundled services**) is demonstrating growing investor interest and evidence of scaling.
- » A case in point is Apollo Agriculture's \$33 million Series B round.

Note: Pre-seed / VC includes grants, angel, incubator / accelerator and early VC investments. Later stage VC investments have been included with Series A.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Fintech investment activity by business model

Agriculture-related fintech has the lowest number of transactions and funding in the region, with challenges in proving its value proposition; lending and insurance are the most common business models in the segment.

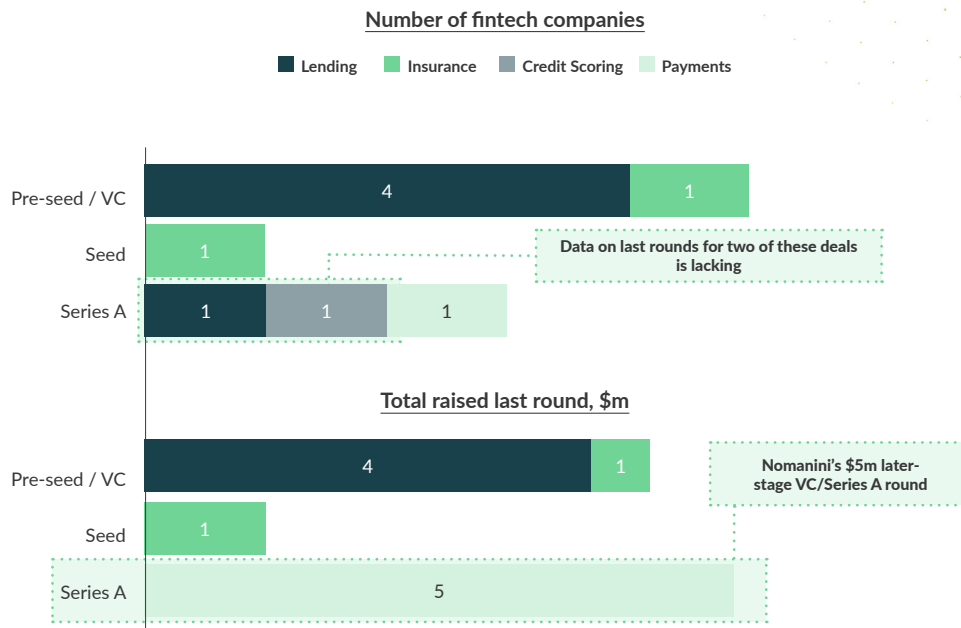


- » Agriculture-related fintech appears to be the most nascent of the three segments, with the fewest transactions completed and lowest levels of funding.
- » Total funding raised is also comparatively small at \$25 million vs. \$289 million for agritech and \$187 million for bundled services. This indicates the challenges for pure fintech models to prove their value proposition.
- » Within fintech, different types of **lending** platforms (e.g. ZuriCap, invoice supply chain financing; Emata, working capital loans; Offgrid Finance, asset financing) are the most prevalent business models, representing over half of companies raising capital.
- » **Insurance** is the next largest subcategory in terms of number of companies and includes business models offering crop, weather or multi-product insurance, looking to address climate-related production risks.
- » The comparatively large investment amount directed towards payments companies is due to one company, Nomanini, raising \$5 million in a later-stage venture capital round.
- » Note that 3 of the 12 fintech companies within our sample do not have public information on their investment rounds, and a further 4 have limited data available.

Source: Palladium secondary research and analysis; sample size = 68 companies.

# Fintech investment activity by stage

The funding environment for agriculture-related fintech is underdeveloped and less mature, with a smaller transaction pipeline and few later-stage investments.



- » Within our sample, no company is raising capital beyond Series A (Nomanini's later-stage venture capital/Series A round comes closest), though the average investment size of \$5 million is a significant increase on the average of \$1 million for seed or earlier-stage rounds.
- » Growth in the pure fintech market has not been replicated by fintechs focused on the agriculture sector. These business models need to be better aligned with the multiple challenges in serving agri-SMEs and SHFs.
- » Challenges include, for example, a lack of data for assessing and underwriting credit risk, which increases operating costs. This in turn increases the cost of credit and lowers returns for providers, making commercial scalability challenging.
- » Serving many small, geographically disperse customers also poses logistical challenges in reaching customers for services and collections.

Note: Pre-seed / VC includes grants, angel, incubator / accelerator and early VC investments. Later stage VC investments have been included with Series A.

Source: Palladium secondary research and analysis; sample size = 68 companies.



## *D. Country profiles (expanded)*

# Country profile – Tanzania



Enabling environment		Tanzania
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Mobile phone subscriptions stand at 52.8 million, of which 56% are based on 2G broadband technology</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 14th</li> <li>Internet penetration stands at 49%, with about 86% of the urban population connected to the internet, compared to just 44.6% in rural areas</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>As of March 2021, there were an estimated 32.7 million mobile money accounts</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>As of March 2021, 2G, 3G and 4G networks covered around 93%, 68% and 45% of the country's population, respectively</li> <li>Mobile operators have invested roughly \$2.6 billion in network infrastructure and new platforms that enable digital services such as mobile money and M2M</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Six Internet Exchange Points have been deployed, and two submarine cables have been landed in key urban centres (EASSy and SEACOM)</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>19% electricity access in rural areas, compared to 73.2% in urban areas as of 2019; 11,070 public institutions electrified in 2019, up from 3,200 in 2015</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>40th in the African Infrastructure Development Index 2021: composite measure for electricity (36th), transport (39th), ICT (31st) and water and sanitation (43rd)</li> </ul>
Government policies and regulations	Rural Development Strategy	<ul style="list-style-type: none"> <li>Supports ICT in rural areas through the creation of telecentres that offer a wide variety of public and private information-based goods and services</li> </ul>
	Universal Communications Service Access Act	<ul style="list-style-type: none"> <li>Promotes the participation of both the public and private sectors to ensure the availability of ICT services in underserved rural and urban areas</li> <li>Established the Universal Communication Access Fund and five mobile phone operators to construct microwave towers to facilitate ICT services in rural areas</li> </ul>
	National ICT Policy	<ul style="list-style-type: none"> <li>Revised in 2016 to provide more affordable access to a range of ICT services to as many people as possible in urban and rural areas</li> </ul>
	Rural Micro, SME Support Programme	<ul style="list-style-type: none"> <li>Helps improve rural employment opportunities across the regions of Iringa, Manyara, Mwanza, Pwani, Ruvuma and Tanga</li> <li>Provides rural entrepreneurs with improved skills training, knowledge and access to markets, to help increase productivity, profitability and off-farm incomes</li> </ul>
	East African Agricultural Productivity Programme	<ul style="list-style-type: none"> <li>Regional centres of excellence to increase agricultural productivity and growth by scaling regional cooperation in technology, training and dissemination</li> </ul>
	National Strategy for Youth Involvement in Agriculture	<ul style="list-style-type: none"> <li>Aimed at facilitating and building youth capacity for self-employment and creating an enabling environment for attracting youth to participate in agricultural economic activities along the value chain</li> </ul>
	Agricultural Sector Development Programme Phase II	<ul style="list-style-type: none"> <li>Developed to propel the country's economic development and guide the implementation of prioritized interventions for the Tanzania Development Vision 2025</li> <li>Complemented by the National Strategy for Growth and Reduction of Poverty I and II, known as MKUKUTA I and II and Kilimo Kwanza</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>141st in the Ease of Doing Business Index globally</li> <li>Introduced favourable conditions for enabling digital agriculture, including eliminating import duties on agricultural project capital goods and expenditure</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture employs 65% of the workforce (80% of whom are small farmers, of which 42% are youth) and contributes 24.1% to GDP</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been a large recipient of FDI in Africa, ranked 13th in SSA in terms of FDI volume in 2020</li> <li>Tanzanian agricultural technology is attracting investment from non-traditional sources: wealthy individuals and private entrepreneurs invested \$25.5 million between 2015 and 2017</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – Zambia



Enabling environment		Zambia
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>The number of mobile phone subscriptions in Zambia increased to 19.1 million in 2020, increasing the mobile penetration rate from 96 to 104 per 100 inhabitants between 2019 and 2020</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 26th</li> <li>As of January 2022, there were 5.47 million internet users (internet penetration rate of 28.5% of the total population)</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>The COVID-19 pandemic has made mobile payments more popular, with a doubling of transactions</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>4G services are available with 49% coverage</li> <li>Leading network operators have invested in infrastructure to improve access to 3G and 4G services, and the government plans to upgrade mobile infrastructure to 5G services</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Zambia has made significant investments in digital infrastructure, resulting in all provincial centres being linked to the fibre backbone and a state-of-the-art data centre for government and commercial use</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>75% of the population have access to electricity, with 62% having access in rural areas</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>20th in the African Infrastructure Development Index 2021: composite measure for electricity (13th), transport (25th), ICT (35th) and water and sanitation (42nd)</li> </ul>
Government policies and regulations	National ICT Policy (2007)	<ul style="list-style-type: none"> <li>Aims to reduce the development divide by building an information-centred society</li> <li>Agriculture is one of the policy's 13 pillars, and the adoption of e-commerce by SMEs in agriculture is especially highlighted</li> </ul>
	ICT (Universal Access) Regulations	<ul style="list-style-type: none"> <li>Implemented in 2012 and based on the 2009 Act, encourages the installation of electronic communications networks and the provision of electronic communications services in particular areas</li> </ul>
	Smart Zambia	<ul style="list-style-type: none"> <li>Project launched to help national institutions and ministries establish viable and interoperable computing systems</li> </ul>
	Universal Access Fund	<ul style="list-style-type: none"> <li>Aims to construct over 200 Multipurpose Communication Towers to improve construction of the country's ICT infrastructure, particularly in rural and underserved areas</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>85th in the Ease of Doing Business Index globally</li> <li>Unemployment was 12.2% in 2020, and 22.6% among youth in 2019, with a growing youth population putting pressure on job creation. Agribusiness has been identified as a way to generate job opportunities for youth</li> </ul>
		<ul style="list-style-type: none"> <li>In 2020 agriculture accounted for 49.6% of employment, decreasing sharply from 71.43% in 2008</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been a poor recipient of FDI in Africa, ranked 46th in SSA in terms of FDI volume in 2020</li> <li>Although the government has emphasized rural agribusiness development and encouraged private investment in agriculture through business support services, growth of innovative companies has decreased</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – Lesotho



Enabling environment		Lesotho
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>As of 2017, mobile phone ownership was estimated at 79%, with 72.9 active mobile subscriptions per 100 people</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 21st</li> <li>Maseru, the capital city, has the highest number of internet users, with a 45% penetration rate, indicating low usage in rural areas</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>Lesotho has achieved 98.5% 2G coverage, nearly 100% for 3G and 75% 4G coverage, with a 5G technology pilot being conducted by the Universal Services Fund and the Central Bank of Lesotho</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Connectivity infrastructure has developed significantly with access to three international gateways and submarine cables (EASSy, SEACOM and WACS)</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>As of 2019, access in urban and rural areas stood at 75.8% and 32.2%, respectively</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>32nd in the African Infrastructure Development Index 2021: composite measure for electricity (27th), transport (24th), ICT (22nd) and water and sanitation (20th)</li> </ul>
Government policies and regulations	ICT Policy (2005), Communications Policy (2008), National Broadband Policy (2014)	<ul style="list-style-type: none"> <li>“Cocktail policy regime” which has enabled implementation of an e-government strategy that has facilitated the smooth migration from analogue to digital</li> <li>Supports network growth and accessibility to achieve rural connectivity</li> <li>Facilitates e-government projects and enables national e-payment systems</li> <li>No evidence that the favourable policies have influenced digital agriculture activities in Lesotho</li> </ul>
	Lesotho eGovernment Infrastructure	<ul style="list-style-type: none"> <li>Enhances the capability of the government’s data centres and portals, which in turn improves the effectiveness of public service delivery across ministries, key government agencies and local governments</li> </ul>
	National Strategic Development Plan	<ul style="list-style-type: none"> <li>Seeks to improve the enabling environment, strengthen public institutions and create a stable investment opportunity for private sector participation</li> <li>Builds the capacity of human resources by improving knowledge and skills, particularly for women and girls</li> <li>Promotes ICT literacy and life-long learning of citizens through e-learning and awareness programmes, thus reducing the digital divide</li> <li>Encourages the development of digital solutions and content creation in all strategic areas of the policy</li> </ul>
	Agricultural Productivity Program for Southern Africa	<ul style="list-style-type: none"> <li>Lesotho participated in a World Bank programme to increase the availability of improved agricultural technologies in participating countries in the Southern African Development Community (SADC) region</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>122nd in the Ease of Doing Business Index globally</li> <li>The government has established ASYCUDA, a customs data management system, and offers financial and technical assistance through the Lesotho Enterprise Assistance Programme (LEAP), and Vodacom’s Innovation Park business incubator supports SMEs and young entrepreneurs</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture employs 44% of the population but only contributes 6.4% to GDP (only 10% of available land is cultivable due to mountainous terrain)</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been a poor recipient of FDI in Africa, ranked 38th in SSA in terms of FDI volume in 2020</li> <li>Due to favourable climatic conditions, availability of water bodies and good policy framework, investment in Lesotho’s agriculture is considered a good choice</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – Mozambique



Enabling environment		Mozambique
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Low mobile penetration rate of 40%, with the number of mobile phone subscriptions per 100 inhabitants having decreased from 70.31 in 2014 to 48.65 in 2019</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 22nd</li> <li>Mozambique has a low internet penetration rate of 10%</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>Low 4G coverage of 12.4% in 2019</li> <li>Investment in high-speed mobile broadband has allowed Mozambique Telecom to launch 4G services and compete with other operators</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Mozambique is currently investing in several ICT projects to improve infrastructure construction. These include the eGovernment Communication Infrastructure Project, the Mozambican Mobile Unit and Provincial Digital Resource Centres, among other initiatives to build basic infrastructure support for the improvement of institutional and human capacity as well as rural access to information</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>In 2019, only 4.9% of the rural population had access to electricity</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>44th in the African Infrastructure Development Index 2021: composite measure for electricity (16th), transport (48th), ICT (44th) and water and sanitation (45th)</li> </ul>
Government policies and regulations	National ICT Policy (2000)	<ul style="list-style-type: none"> <li>Developed by the ICT Policy Commission, one of the first in Africa to promote ICTs and to integrate them into a national policy</li> <li>Special focus on the empowerment of women and youth through basic computer skills training</li> <li>Agriculture is not one of the six priorities but is nevertheless given special attention</li> </ul>
	Digital Squares (2020)	<ul style="list-style-type: none"> <li>Rural internet connectivity project with the goal to provide free internet access to rural communities</li> <li>27 districts have already been selected, and 73 “digital squares” will be deployed across the country by 2025</li> </ul>
	National Poverty Reduction Action Plan and the Rural Development Strategy	<ul style="list-style-type: none"> <li>Jointly aims to address poverty and promote economic growth in rural areas</li> <li>Focuses on improving access to education, health care and other essential services, as well as promoting the development of agriculture and other industries</li> <li>Goal of improving infrastructure, including transportation and communication networks, to support economic growth and improve the quality of life for individuals and communities</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>138th in the Ease of Doing Business Index globally</li> <li>Mozambique's legislation protects investor property and does not discriminate against investors or restrict loans, but local SMEs face difficulty accessing financial support because they are considered risky investments</li> </ul>
		Agriculture employs 70.2% of the population, accounting for 30% of GDP between 2010 and 2013
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Mozambique is the largest recipient of FDI in Africa, ranked 1st in SSA in terms of FDI volume in 2020</li> <li>The private sector in Mozambique remains informal and has been impacted by the debt crisis and the COVID-19 pandemic, making it difficult for entrepreneurs to maintain their businesses</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.



# Country profile – Malawi



Enabling environment		Malawi
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>99.6% mobile coverage, but only 36.6% of Malawians own a mobile phone, and 52.3 per 100 people have a mobile phone subscription</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 25th</li> <li>11.9% internet access, with only 0.06 fixed broadband subscriptions per 100 people</li> </ul>
	Mobile money	<ul style="list-style-type: none"> <li>Popular mobile-based payment services such as Khusa M'manja and Mpamba are providing digital inclusion for unbanked and underserved populations</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>Mobile coverage is high across the country</li> <li>3G and 4G coverage estimated at 92% and 77.5%, respectively</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Malawi's government has facilitated access to international submarine cables via neighbouring countries</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>11.9% electricity access rate, with 45.5% access in urban areas and 4.1% in rural areas</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>27th in the African Infrastructure Development Index 2021: composite measure for electricity (31st), transport (36th), ICT (45th) and water and sanitation (30th)</li> </ul>
Government policies and regulations	ICT Policy	<ul style="list-style-type: none"> <li>Adopted in 2005 and revised in 2013, set ICT as a priority sector, and aims at leveraging ICT in all sectors towards socio-economic development</li> </ul>
	National ICT Master Plan (2014-2031)	<ul style="list-style-type: none"> <li>Divided into four implementation phases with four main pillars covering ICT infrastructure, innovation and human capital development, ICT industry development and e-business, as well as e-government services and growth sectors</li> </ul>
	Digital Economy Strategy	<ul style="list-style-type: none"> <li>Aims at boosting access to connectivity by 2026 and making internet access more affordable, reliable and available</li> <li>Waived import taxes on computers and accessories</li> </ul>
	National Agriculture Policy of Malawi (2016-2020)	<ul style="list-style-type: none"> <li>Seeks to transform the agriculture sector from subsistence to one with a market-oriented focus to increase local production and income levels</li> <li>Aims to increase the number of new technologies under development and being demonstrated to farmers by 60%</li> <li>Raises the awareness of digital transformation and encourages digital innovations applied in agriculture</li> </ul>
	Digital Malawi Project	<ul style="list-style-type: none"> <li>Supported by the World Bank to improve access to ICT and the digital ecosystem, and to create digital platforms and portals to modernize government operations</li> </ul>
	SEforAll Action Agenda (2017)	<ul style="list-style-type: none"> <li>Goal of providing access to modern energy services for all by 2030</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>109th in the Ease of Doing Business Index globally</li> <li>While Malawi may be attractive to investors due to a stable political environment, well-functioning legal framework and friendly policies, official assistance and forums, its lack of adequate infrastructure, especially its limited power supply, undermines investments and remains a significant impediment</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture employs 76.4% of the population, accounting for 25.5% of GDP</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been a poor recipient of FDI in Africa, ranked 34th in SSA in terms of FDI volume in 2020</li> <li>Because agriculture accounts for 80% of exports, investment in agribusiness and agro-processing is likely to be attractive due to the promising market outlook</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.

# Country profile – Angola



Enabling environment		Angola
Digital infrastructure	Mobile access	<ul style="list-style-type: none"> <li>Angola has more than 15 million mobile phone users, 70% of whom are youth</li> </ul>
	Internet access	<ul style="list-style-type: none"> <li>E-connectivity ranking in SSA: 37th</li> <li>Internet connectivity remains low at 10.4 million users, representing only 31% of the population</li> </ul>
	Mobile phone infrastructure	<ul style="list-style-type: none"> <li>Four mobile network operators (UNITEL, MOVICEL, Angola Telecom and AFRICELL), three of which offer 4G connectivity with 50% coverage, while one is preparing to start operating</li> </ul>
	Internet infrastructure	<ul style="list-style-type: none"> <li>Access to the SAT-3, WACS and SACS fibre optic submarine cables, which provide gateway connectivity via Europe, Asia and the Americas</li> <li>Angola Cables operates the Angola Domestic Network System, which connects eight coastal cities, where 70% of Angolans live</li> </ul>
Physical infrastructure	Electricity access	<ul style="list-style-type: none"> <li>About 7.3% of the rural population have access to electricity, while the power grid supports only 73.7% of the population</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>29th in the African Infrastructure Development Index 2021: composite measure for electricity (24th), transport (34th), ICT (33rd) and water and sanitation (37th)</li> </ul>
Government policies and regulations	National Investment Plan in Agriculture, Food Security and Nutrition	<ul style="list-style-type: none"> <li>Partnership between the Ministry of Economy and Planning and MINAGRIP, with support from FAO Angola</li> <li>Aims to promote investment in the agriculture sector and support food security and nutrition in the country</li> </ul>
	National Plan for the Information Society (2005)	<ul style="list-style-type: none"> <li>In combination with the Strategic Plan for Electronic Governance 2013-2017, aims to address Angola's weak policy framework to encourage investment in sectors such as digital agriculture and build better e-government strategies</li> <li>Although these initiatives aim to increase the use of digital public services by at least 10% of the population, there are no data on their success</li> </ul>
	Capacity Development for Agricultural Innovation Systems	<ul style="list-style-type: none"> <li>Initiative launched in collaboration with the Ministry of Agriculture and Rural Development, FAO and Agrinatura to support innovative capacities of SHFs, agribusinesses and consumers</li> </ul>
	The Innovation Lab for Payment Systems (LISPA)	<ul style="list-style-type: none"> <li>Led by the National Bank of Angola and Standard Bank to promote engagement of the main players in the Angola start-ups landscape and to incentivize partnerships</li> </ul>
Market conditions	Business market	<ul style="list-style-type: none"> <li>177th in the Ease of Doing Business Index globally</li> <li>Competitiveness and ease of doing business in Angola are hampered by an unfavourable investment and institutional environment for the private sector</li> </ul>
		<ul style="list-style-type: none"> <li>Agriculture employs 50.7% of the workforce but only accounts for 9.4% of the country's GDP</li> </ul>
Availability of funding	Foreign investment	<ul style="list-style-type: none"> <li>Has been a poor recipient of FDI in Africa, ranked 47th in SSA in terms of FDI volume in 2020</li> <li>Outside the gas and oil sectors, there is weak foreign investment: FDI in oil and gas averaged \$15 billion per year from 2012 to 2016 (82% of total investment), while agribusiness received only 6%</li> </ul>

Source: FAO – Status of Digital Agriculture in 47 African Countries. World Bank, Doing Business, AfDB – African Infrastructure Development.



## *E. Stakeholder interviews concluded*

# Stakeholder interviewees

Stakeholders	Organization	Interviewee	Role in ecosystem
Tech providers	Grainpulse	Gloria Asiimwe <i>Project Manager</i>	Operator of an integrated agribusiness company in Uganda providing agro-inputs material, agronomy services and routes to market for coffee, grains and pulses
	Pula Advisors	Faith Kinyajui <i>Senior Partnership Project Manager</i>	Insurance intermediary assisting SHFs in safeguarding their crops and investing in their farms
	Harvesting	Ruchit Garg <i>Founder and CEO</i>	Provides a credit scoring and financial performance monitoring tool to help farmers gain access to finance
	EzyAgric	William Luyinda <i>Co-Founder and CEO</i>	Operator of a value chain digitization platform designed to increase crop yield in Uganda
	Good Nature Agro	Carl Jensen <i>CEO</i>	Offers bundled services to farmers in Zambia, including access to inputs, extension services and market access
	Adapta.Earth	German Vegarra <i>CEO</i>	CCA fintech offering financing, technical assistance and climate-smart technologies to support SHFs and agri-SMEs
Agritech/fintech investors	MercyCorps Ventures	Tim Rann <i>Managing Partner</i>	Early-stage impact investor in agritech and fintech, including in East Africa
	Goodwell Investments	Bitta Wycliffe <i>Investment Manager EA</i>	Equity investor into high-growth companies in SSA
	FINCA Ventures	Melissa Tickle <i>Investment Manager</i>	Financial inclusion/agribusiness investor, pre-Series A
IFAD project leads	IFAD	Nadine Umunyana <i>Private Sector Specialist, Kenya</i>	Working as part of an IFAD programme that extends financing to FIs and SMEs in ESA
Other organizations	GSMA	Abbie Phatty-Jobe <i>Insights Manager – AgriTech, Mobile for Development</i>	Global organization focused on unifying the mobile ecosystem; scientific-based approach
	Aceli Africa	Brian Milder <i>Founder and CEO</i>	Market incentive facility that unlocks capital for agri-SMEs in East Africa
	AgriFin	Sieka Gatabaki <i>Program Director</i>	Accelerator partner of MercyCorp that designs, tests and scales digital services and products to support climate-resilient agriculture
Internal advisors	Palladium	Erin Leyson <i>Private Sector Engagement</i>	Executed the Small Foundation/DFC study
		Amanda Fernandez <i>Economic Growth Manager (on SAFIN's board)</i>	Serves as Executive Director of the \$250 million CATALYZE project for USAID, a global, blended finance innovation platform
		Vivian Achan <i>Uganda Deputy Country Director</i>	Deep expertise concerning agriculture and agribusinesses in Uganda
		Patience Kikoni <i>Uganda Country Lead</i>	Coordinates and manages all of Palladium's in-country activities; former Senior Technical Advisor for Palladium's NU-TEC MD programme
		Shane Mulligan <i>Economic Growth Manager</i>	Working on the Kenya Investment Mechanism project with USAID in facilitating investment in Kenya, and other agribusiness mandates in Africa
		Aubrey Hruby <i>Economic Growth Transaction Lead</i>	Advisor to investors with an interest in African markets, and an active angel investor in African start-ups
		Sinethemba Mafanya <i>Associate Director, Palladium Impact Capital</i>	Expertise in Africa; led a similar study for the World Bank



International Fund for Agricultural Development,  
[www.ifad.org](http://www.ifad.org)

Smallholder and Agri-SME Finance and Investment Network  
[www.safinetwork.org](http://www.safinetwork.org)

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