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Innovating Food Systems in East Africa

January 2022

How does innovation contribute to boosting food security?



AUTHORS

Briter Bridges is a fast-growing market intelligence and research firm focused on emerging economies. Briter has built the largest collection of visual publications on Africa and underserved markets and regularly provides data and insights to corporates, development finance institutions, governments, and investors. Briter's proprietary business data platform, Intelligence, is regularly used by thousands of public and private organisations, ranging from the World Bank to Amazon, governments and funders globally.

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EXECUTIVE SUMMARY

“Innovating Food Systems in East Africa” is a study produced by Briter Bridges and the World Food Programme (WFP), focused on the state of play for innovative, digital, and technology-driven solutions that are improving the food system across five countries in East Africa. Over the past half-decade, there has been proliferation of startups and entrepreneurs that are providing technological, accessible, and affordable tools to increase agricultural productivity and efficiency along the different nodes of the food system, from farm management apps, to smart irrigation products, and supply chain management software, helping farmers adapt to, and mitigate both internal and external shocks to the value chain. Solutions extend beyond mere agritech companies, as the food system is to be understood more broadly and being supported by a combination of auxiliary sectors, which allow for more productive and structured processes from the producer to the consumer. These include, among others, finance, logistics, and energy.

The innovative ecosystem concurring to a healthy food system includes the variety of supportive organisations that assist entrepreneurs, such as investors, tech hubs, research organisations, and donors. These play a critical role in creating an enabling environment for the food system innovators to grow and scale. The engagement and interaction of these players is crucial, as risk-aversion to the space has meant that funding and targeted support to food system innovators has been marginal compared to other tech-driven sectors, such as fintech or e-commerce, despite being an area with incredibly high impact potential. Aside from the availability of capital, farmers’ willingness and capacities to try new technologies, user adoption of internet and mobile data, female representation in agriculture, and a

fragmented support system remain some of the biggest obstacles for entrepreneurs to thrive in East Africa. Similar trends are found across all of the five countries in the study, though the size and state of the ecosystems differ substantially. Kenya is one of the forerunners of *‘agritech’* on the continent, with both startups and support organisations that have gained significant traction in recent years. While the country still has some way to go in terms of food security and childhood stunting, a lot of progress has been made to improve the conditions of the food system. In contrast, South Sudan’s nascent startup ecosystem is primarily recipient of development and donor funding, and is yet to see a sophisticated entrepreneurial scene appear. Acute food insecurity remains very high, and subsistence farming dominates the agricultural landscape.

Addressing these challenges is of utmost importance, as a healthy and thriving private sector can help tapping into the largely underexplored opportunity to digitise services and transform East Africa’s food supply chain. One way to achieve this consists of facilitating the growth of a supporting framework for entrepreneurs, ensuring access to resources, financing, and skills needed to develop solutions that create more resilient and sustainable development of the food system. This report explores what type of innovations are being used across East Africa to address food security, and begins by providing a socio-economic context to then analyse the different stages of ecosystem development in each respective country. Finally, it stresses the fact that innovators alone are not a panacea and that numerous challenges remain. In this regard, system thinking and multi-stakeholder approaches, such as partnerships, offer a way to improve food system’s quality, access, and delivery.

INTRODUCTION

The 'food system' can be defined as a web of interlinked activities, ranging from production to processing, warehousing, distribution, consumption, and disposal in the food supply chain¹. In order for a food system to be inclusive and sustainable, the different nodes of the system need to interact in a way that guarantees food security and nutrition for current and future generations.

At the heart of the food system is agriculture, which is an integral sector to the African economy and central to food security, creating employment, providing food for local and international consumption, as well as a source of foreign exchange². **In 2020, 'agriculture, forestry and fishing' accounted for 15.5% of value added gross domestic product (GDP) in Sub-Saharan Africa³.** Across Eastern Africa, including the Horn of Africa, the average of the most recent available figures for each country indicates that agriculture stood for 26.2% of value added GDP, with Somalia at the top, and Djibouti at the bottom (notably, the latest figures for Somalia are from 1990)⁴.

Despite the prevalence of the agricultural sector and vastness of arable land in Africa, the objective of meeting Sustainable Development Goal (SDG) 2 of Zero Hunger is currently not set to be achieved by 2030⁵ and, as of 2019, **the number of food insecure people across the region stood at 250 million people, accounting for almost one fifth of the population⁵.** As global food demand is projected to increase by 35-56% by 2050, urgent action and structural transformations are needed to create a fulfilling, sustainable and equitable food system⁷.

'Innovating Food Systems in East Africa' explores how startups and entrepreneurs are using innovative approaches, digital solutions and technology to increase productivity of the food value chain across Ethiopia, Kenya, Rwanda, South Sudan and Uganda, and considers the role of supporting stakeholders and partnerships in creating a conducive environment for food system trailblazers. This report first highlights some of the contextual challenges of the food system in Africa as a whole, followed by a sub-regional mapping of the digitisation of interrelated food system products and services in East Africa, a snapshot of the funding landscape, an overview of the support environment and role of partnerships, and finally discusses the pain points and opportunities that remain to address in achieving stronger and more resilient food systems in the selected countries through technology and digitalisation.

SETTING THE SCENE: A FOOD SYSTEM AT RISK

There exist several social, political, economic and environmental factors threatening Africa's food systems and security, including access to markets and finance, low productive inputs, inaccessible information on best practices, food price volatility, and post-harvest losses. A number of these, such

as the recent locusts' invasion, are specific to East Africa, and the following section takes a closer look at six macro areas currently affecting the stability of the food system on the continent and within the sub-region, followed by a brief contextual overview of the countries in focus for this study.

Figure I: Key challenges in the food system



The historical & economic context

A study on food systems in Africa by the Africa Development Forum (AFD) and World Bank suggests that demographic growth, urbanisation and changes to agricultural production and trade will be the three main factors for both risks of mal- and undernutrition in the region on the one hand, and opportunities to boost employment, production and distribution on the other⁸, showcasing the delicate balance the food system lies in. Approximately 65% of countries across the region are dependent on high commodity exports⁹, and while Africa as a region was a net exporter of food in the 1980s, the continent has switched between being a net exporter and importer over the last 20 years, and intra-regional trade has

been the lowest in the world. **With the introduction of the African Continental Free Trade Area (AfCFTA) agreement, which commenced on January 1 2021, there is an expectation that imports and exports of agricultural commodities between countries in Africa will increase, and the elimination of tariffs will benefit smaller countries¹⁰.** Nonetheless, commodity dependence and lack of economic diversification make many countries across Africa vulnerable to agricultural shocks, changes to the terms of trade, and price fluctuations. With disruptions to supply chains and economic downturns becoming increasingly frequent, links to undernourishment are becoming indisputable, as more than 250 million people

are severely food insecure across Africa¹¹, and the number of people affected is growing. In East Africa alone, more than 30 million people are facing severe food insecurity, particularly in Sudan, South Sudan and Ethiopia. Historical drivers of food insecurity in East Africa include recurring climate shocks, conflict and macroeconomic instability¹². Looking at the current situation, little progress has been made towards ensuring sufficient and nutritious provision of food on a global scale¹³. Current food consumption patterns, undernutrition and insufficient healthy diets are a significant health concern across many African countries¹⁴.

In order to achieve SDG 2 by 2030, increased equitable, sustainable and productive food production is vital¹⁵. According to McKinsey (2019), food production of cereals and grains could be tripled if agricultural productivity were to be intensified. However, achieving this would require billions of dollars in investments to increase access to fertiliser, expand basic storage, and boost irrigation¹⁶. In an effort to overcome historical and economic limitations, and increase food security across the region and East Africa, several measures need to be put in place. This includes increasing the affordability of food, investing in production and technological advancements, creating a conducive environment for innovation, promoting consumer education on adequate nutrition, enhancing efficiencies and productive practices, and strengthening countries' global positioning in the supply chain.

COVID-19

Estimates from The Food and Agriculture Organization of the United Nations (FAO) suggest that between 720 and 811 million people around the world suffered from hunger in 2020, of which approximately **282 million classified as undernourished**

were in Africa¹⁷. The rising figures have been linked to the COVID-19 pandemic, and have triggered concerns of a food security crisis across the continent¹⁸. Vulnerable and low-income households have been particularly impacted, as prices for agricultural commodities have surged due to high demand, and severe supply chain and import disruptions have affected most countries across the continent¹⁹. The impact of loss of income and work has seen the return of people falling into poverty traps and subsistence farming across the region²⁰.

In East Africa, economic growth slowed in 2020, and although progress towards recovery was made in 2021²¹, a report by the UNDP predicts that countries with low government capacity and a large labour force in the agricultural sector will suffer longer-term economic consequences as a result of the pandemic. While Kenya exceeds average government capacity level for sub-Saharan Africa, and both Kenya and Ethiopia are focusing their efforts on reducing reliance on agriculture, South Sudan presents both low governance capacity and high dependency on agriculture. Given the immense role agriculture plays in East Africa, significant efforts will be needed to diversify the economy and strengthen government operations²². The pandemic has also exacerbated existing threats to food security, including limited infrastructure and transportation, climate related events, political crises, low purchasing power, and conflict and displacement²³.

Natural disasters

Natural and environmental hazards pose a continuous threat to the agricultural sector, with small and large climate related events causing significant damage to physical assets like crops, machinery and livestock. The FAO suggests that between 1991-2013, sub-Saharan Africa suffered losses of about USD \$31 billion as a result of droughts, with

about 60% of losses found in East Africa²⁴. La Niña, an ocean surface cooling phenomenon occurring every few years, meant that South Sudan, Somalia, Ethiopia, Kenya, Tanzania, Rwanda, and Uganda were inflicted with lower than average rainfalls near the end of 2020, resulting in failed crops and an urgent need for food assistance for millions of people²⁵. Crop yields in East Africa vary significantly with rainfall, and a study by Perez et al. (2019) showed that the ability to monitor rainfall in East Africa is crucial to anticipating a food insecurity crisis, allowing for better preparations and early action from governments and humanitarian agencies²⁶. Aside from weather shocks, the type of land and climatic conditions play a big role in determining the types of crops or inputs used. According to Carbon Brief (2021), large parts of Northern and Southern Africa are characterised by arid land, which is susceptible to scarce or variable rainfall and poor soil conditions²⁷. With uncertainties raised by weather-related shocks and distinctive land types, increasing the ability to anticipate, adapt to, and mitigate the effects of climate related changes is crucial to securing the livelihoods and yields of smallholder and large-scale agricultural businesses alike.

Pests and plant diseases

There are also a number of pests and plant diseases damaging crops across the region, many of which are referred to as Invasive Alien Species (IAS), that is pests and plants that negatively alter their environment. Such pests are a major financial burden on the agricultural sector in Africa, costing an estimated \$65 billion per year²⁸. The armyworm, for instance, is an invasive insect pest that was discovered in Western and Central Africa in 2016. It has since been detected across multiple countries across the continent, and has had a highly destructive impact on crops, including maize, sorghum and wheat, threatening both food security

and livelihoods²⁹. Figures from the FAO suggest that approximately 18 million tonnes of maize is lost in Africa annually because of armyworms, resulting in a loss of \$4.6 billion³⁰. Since the end of 2019, a locust surge has also had devastating effects on crops and land in the Horn of Africa, and the situation has been particularly alarming in Kenya, Ethiopia and Somalia³¹. Unlike the invasive nature of the armyworm and locusts, the black soldier fly, which thrives in the East African climate, has been touted as a possible solution to both food waste and food insecurity. It feeds and decomposes waste, and has larvae that provide high-protein animal feed or fertiliser³².

Food waste

Aside from the external challenges, there are issues associated with the productivity and output of food products. Food waste is arguably the biggest flaw of the global food system, as a projected 768 million people were food insecure in 2020³³, yet an estimated 2.5 billion tonnes of food is wasted each year. There are a number of severe implications associated with food waste, including greenhouse gas emissions, water wastage, loss of farmer incomes, and limitations to food accessibility. As stated in a study by WWF and Tesco, an estimated 40% of all food produced is lost or wasted, contributing to approximately 10% of greenhouse gas emissions³⁴. Food loss is particularly costly for farmers, as any inputs put into production, such as water and fertiliser, is lost income if the food items cannot be sold. In addition to not having enough accessible food for all, healthy foods are unaffordable to large parts of the population³⁵. There is a direct correlation between inadequate nutrition and childhood stunting³⁶, which currently affects approximately 30% of children in Africa³⁷.

UNEP's latest Food Waste Index report indicates that the five countries in this study produce an average of 4.6 million tonnes in estimated household food waste per year, with the lowest figures in South Sudan at 1.1 million and the highest in Ethiopia at 10.3 million tonnes. In contrast, the estimates for Lesotho and Guinea-Bissau are both below 200 thousand, and Nigeria is estimated at almost 38 million. On a global scale, some of the biggest producers of food waste across other regions are China at 91 million, Brazil at 12 million, Indonesia at 20 million, India at 68 million, Germany at 6 million, and the United States at 19 million³⁸. It should be noted that there is a margin of error associated with this sample, as the data available has significant gaps. On the basis of the most recent available data for each of the five countries in East Africa, prevalence of childhood stunting ranges between 26.2% in Kenya, and 36.8% in Ethiopia³⁹. Meanwhile, childhood stunting remains prevalent across the region, and World Bank data indicates that 12 countries around the world have rates of childhood stunting above 40%, 8 of which are in Africa⁴⁰. Despite this evident gap, a lot of nutrient-dense fruit and vegetables are lost. Food waste happens at multiple stages of the value chain, from production and post-harvest, to distribution, retail and consumption, and is caused by factors such as climate-related shocks and changing weather patterns, unproductive inputs and fertilisers, overproduction, irregularities in standards, crop pests and diseases, lack of storage facilities, inefficient distribution channels, poor infrastructure, and consumer attitudes to food standards⁴¹.

Unproductive practices

At the production level, farm practices and management can have a significant impact on yields and sustainability. Many smallholder farmers in sub-Saharan Africa operate without adequate knowledge and tools about best usage of seeds, fertilisers, and irrigation,

and have limited access to information about weather, prices and markets, and few funding opportunities for appropriate inputs⁴². Given the distinct features of the climate and weather in East Africa, it is important that farmers consider the types of crops that will be most resilient and yield the biggest output. Wheat, for instance, is an important highland crop in East Africa, yet poor information on land management and fertiliser use means that crop yields remain low⁴³. As a highly capital, land and labour intensive sector, poor management significantly reduces potential outputs and incomes of the farmers, and the decisions being made about different types of inputs, storage, distribution, processes and documentation are essential for efficient practices. Soil fertility for instance, is one of the primary determinants of productive yields, yet many smallholder farmers do what is referred to as nutrient mining or soil nutrient depletion where nutrients that are extracted are not returned to the soil or replenished, either because the farmer does not know how it's done, or because they are unaware of the deterioration caused by crop harvests. This leaves the soil infertile and unproductive⁴⁴. Even if farmers are aware of the long term consequences of soil nutrient depletion, many smallholders have few options but to maximise their farmland to secure their livelihoods. A study by Stewart et al. (2010) indicates that each country in East Africa presents its own challenges in terms of agricultural practices and soil fertility, but common themes include micronutrient, nitrogen and phosphorous deficiencies, as well as low organic carbon content and low water-holding capacity⁴⁵. Soil erosion and land degradation are other issues threatening crop yields across the sub-region⁴⁶. In Uganda for instance, the highlands are particularly prone to soil erosion, as the land has been extensively exploited for agricultural use.

To prevent further degradation, soil conservation methods need to be implemented. This may be in the form of better water management or switching to more soil conservation efficient crops⁴⁷. In order to reduce inefficient practices across East Africa and the region as a whole, there's

a need for more sustainable agricultural practices, facilitated by accessible resources to diversify crops and reduce crop dependence, as well as platforms and solutions for information sharing and advice on alternative farming methods and inputs.



Maize sorting – WFP/Fredrik Lerneryd

FOOD SYSTEMS IN EAST AFRICA

The six high-level challenges highlighted in the section above touch the surface of obstacles to a productive and sustainable food system in Africa, but there are in reality many more to consider, many of which are specific to a given country's context. The focus of this study is on five selected

countries across East Africa, namely Ethiopia, Kenya, Rwanda, South Sudan and Uganda, who alongside the above-mentioned challenges, are facing their own unique food-system pain points and opportunities (see Figure II for a country overview).

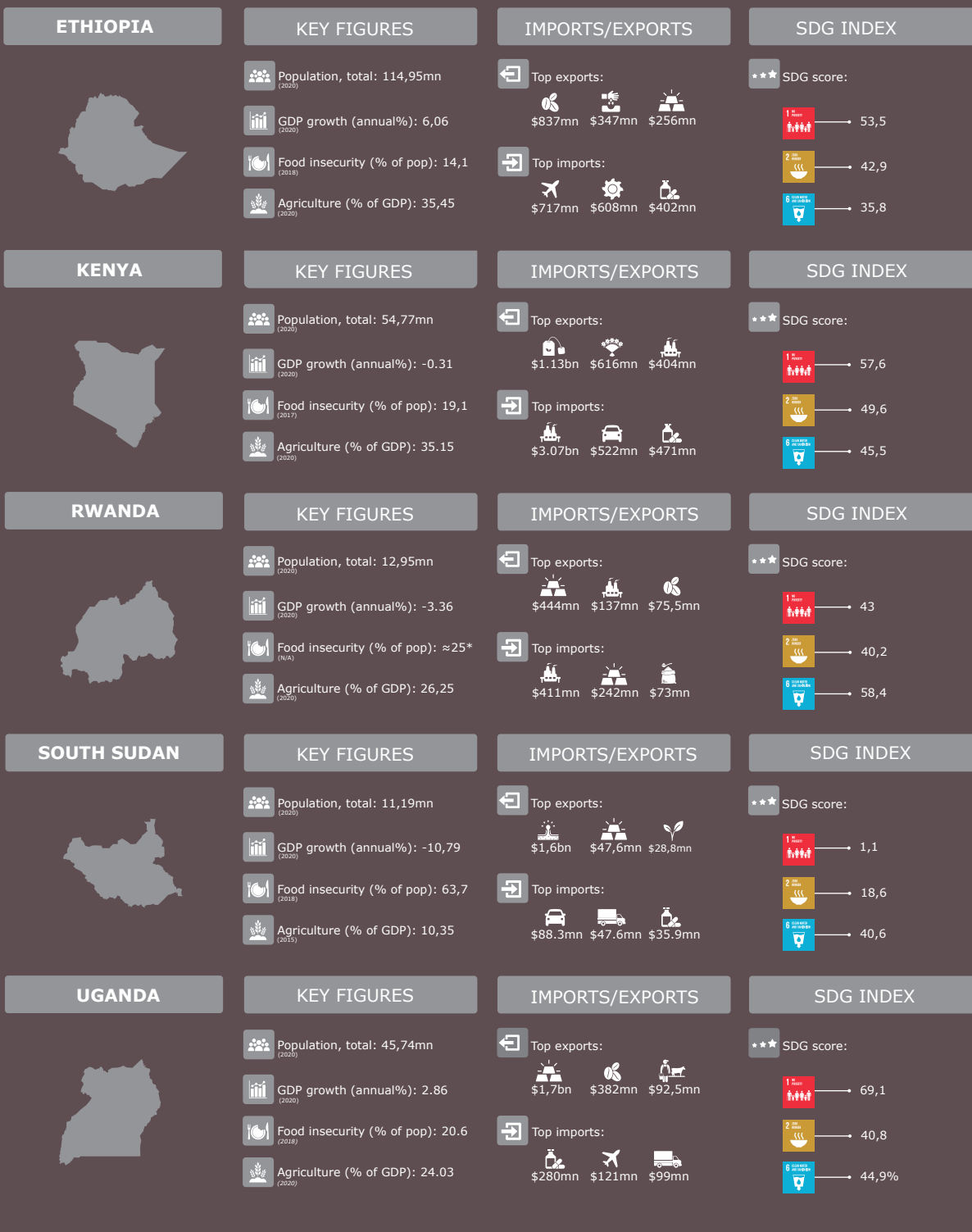
Figure II: Overview of food systems in East Africa



* Figure II continues on the next page.

FOOD SYSTEMS IN AFRICA

COUNTRY OVERVIEW



Sources: Key figures: World Bank Development Indicators (2021), Import/Export Data: The Observatory of Economic Complexity (2019), SDG Index: The Sustainable Development Goals Center for Africa and Sustainable Development Solutions Network (2020)

* Food insecurity data for Rwanda extracted from WFP Rwanda overview.

Ethiopia

Ethiopia is among the fastest growing economies in Africa and is characterised by high rates of poverty, political tensions and social unrest, which are factors that continue to disrupt social and economic progress in the country⁴⁸. Economic growth slowed during 2020 with the impact of COVID-19, and though this has not had a direct impact on the agricultural sector, the locust plague has been a major threat to food security in Ethiopia in the past couple of years⁴⁹. Escalating local turmoil and civil unrest, with conflicts between the government and forces in the Tigray region since November 2020, has also had a major destabilising impact on the food system, with hundreds of thousands currently living in famine⁵⁰.

The country is a net exporter of agricultural products, but only 1% is in higher value processed food⁵¹. Livestock and grains are the top segments of agricultural production in the country, and cereals are a crucial part of people's diets⁵². In more recent years, the sector has severely suffered from droughts, flash floods, and failed harvests⁵³. Even though an estimated 66% of the population was employed in the agricultural sector in 2019⁵⁴, over 5.9 million people in the country have acute food needs, and 36,8% of children under five are stunted⁵⁵. Not only does stunting make children susceptible to disease, it also impairs both physical and mental development, limiting their potential in adult age⁵⁶. In order to reduce the burden of stunting on families and society, the Ethiopian government has implemented a number of policies and interventions, including programmes to promote agriculture for food security and decentralising the health system⁵⁷. With an aim of becoming a middle-income country by 2025, the government has also introduced a five-year 'Growth and Transformation Plan' to move Ethiopia towards rapid economic growth and structural transformation⁵⁸, and a ten-year

economic development plan that sees a priority in boosting agricultural export revenues and reducing production costs to decrease imports⁵⁹.

Kenya

Kenya has undergone a number of political and economic reforms in recent years, and has quickly become one of the fastest growing economies on the continent. Despite a contraction of the real gross domestic product (GDP) in 2020 due to COVID-19 related supply and demand shocks, the agricultural sector and output has continued to grow. This is also in spite of the locust infestation in North East Kenya in the same period⁶⁰. Agriculture is a core sector to Kenya's economy, constituting 26% of the GDP, and an additional 27% through indirect linkages, and standing for 65% of export earnings. The sector has played a crucial role in alleviating poverty in the country⁶¹, which stood at a headcount ratio of 36% of the population in 2015⁶². Areas of the country characterised by high rainfall conducive to rain-fed farming systems amount to approximately 10% of arable land and 70% of commercial agricultural output. As the population is increasing rapidly, progressively more farmers are forced to cultivate land that is dry and vulnerable to drought and extreme weather, signalling a clear need for resilient and climate-adaptable practices. Almost 40% of Kenya's active labour force works in agriculture, and while productivity has historically remained low, a number of reforms and a new regulatory framework has been implemented to increase growth in the sector. Despite food supply shortages, Kenya limits food imports through the Common Market for Eastern and Southern Africa (COMESA), and the East African Community (EAC) agreements. While tea, coffee, vegetables and flowers have been key commodities for exports in the country, maize, wheat and rice are essential crops for consumption⁶³.

consumption⁶³. Although some progress has been made global nutritional targets, such as reducing anemia among women and stunting among children⁶⁴, 40% of risk factors for diseases and mortality in Kenya are related to nutrition, with diets being low in fiber and high in sugars and fats. The Global Alliance for Improved Nutrition (GAIN) refers to this as a double-burden of malnutrition, as parts of the population are undernourished whereas others are overweight or obese⁶⁵. Education on diets and nutrition will therefore be essential to meeting the remaining nutrition targets in the country.

Rwanda

Rwanda is a small, densely populated country that, since the end of the civil conflict in the mid-1990s, has seen the share of GDP in agriculture almost halve⁶⁶, in line with its neighbouring economies, although economic activities were significantly slowed down during the COVID-19 pandemic and poverty rates began rising again. Public debt has also increased in recent years and the private sector is heavily relied on to sustain growth⁶⁷. Almost 20% of the population is food insecure, childhood stunting stands at 25%⁶⁸, and the poverty headcount ratio is at 38.2%⁶⁹. While social and economic challenges remain, the country has made substantial developmental progress and structural reforms over the last two decades. Agriculture remains a strategic sector in Rwanda, employing approximately 70% of the population and contributing to 31% of GDP. The key crops for exports include coffee, pyrethrum, tea, hides and skins, and horticulture⁷⁰. While approximately 46.6% of the land area is arable and suited for agricultural activities⁷¹, most of the land has already been exploited and is on slopes prone to soil loss and decreasing fertility. The shortage of available and productive land, combined with inefficient farming practices, has been a major driver of poverty in the country⁷². The government has introduced a

wide range of policies aimed at creating a more market-oriented system, increasing productivity, however research by Weatherspoon et al. (2021) suggests that access to land and wealth is a predictor of participation in markets, and while crops are increasingly diversified and welfare prioritised, the longer-term impact on smallholder farmers is not yet clear⁷³. Rwanda's Strategic Plan for Agriculture Transformation' is part of the national strategy for transformation in the country for the period 2018-2024, and sets out to create a more knowledge-based value sector for the benefit of the economy and nutrition security. One of the central elements of the plan is to focus on investments into higher value agricultural commodities to increase profits and productivity gains⁷⁴. Although significant progress has been made on many social and economic indicators over the past two decades, the direct effectiveness of these policies are yet to be determined, as data on production yields are scarce and often unreliable, and overestimations of production volumes in Rwanda over the years have made measuring the impact of several stages of agricultural reforms somewhat uncertain⁷⁵.

South Sudan

In 2011, South Sudan became independent, and the newest country in the world⁷⁶. Since then, the political climate has been unstable, with conflicts arising in 2013 and again in 2016 that have posed significant threats to development goals and economic stability. Slow signs of an improving climate were worsened once again at the onset of the COVID-19 pandemic. Today, the country remains in crisis as more than half of the population is acutely food insecure, 1.6 million people are internally displaced, 2.2 million are refugees in other countries, basic services are lacking, and public expenditure on key sectors remains low. The oil industry, which has resumed following a period of shutting down

down due to conflict with the Sudanese government, has been crucial to increasing economic growth in South Sudan. While agricultural production is slowly returning to pre-conflict levels⁷⁷, the country still imports approximately half of its food needs, and agricultural production has suffered from droughts, flooding and the fall armyworm⁷⁸. The majority of the population relies on subsistence farming, and the absence of roads, especially during the rainy season, makes it difficult for farmers to access markets to sell their surplus⁷⁹. Cereals, millet and rice are staple crops in the country, but millions still struggle to secure nutritious food⁸⁰. The mobilisation of aid and humanitarian organisations is being intensified in 2021, as food and water is urgently needed in multiple counties in the country⁸².

Uganda

Uganda is a highly populated and landlocked country in East Africa. The economy has contracted significantly during the pandemic, largely due to a domestic slowdown and shifts to global supply chains. The country has in recent years undergone a structural transformation, moving away from employment in agriculture and towards agro-processing, however sustained reliance on the sector has led to income volatility for large segments of the population. Undernutrition and stunting in children under the age of 5 remains high, but poverty has declined in recent years, despite a temporary increase following a drought in 2016/2017⁸³. The agriculture sector in Uganda holds immense potential, with favourable weather and temperature conditions, and fertile soils that could feed 200 million people, yet only 35% of arable land is currently being cultivated. There is limited use of high quality inputs (such as fertiliser or seeds), and adequate irrigation. About 70% of the population are employed in the sector, with subsistence crops such as plantains, cassava

and wheat dominating production, and coffee, tea and tobacco are key products for export⁸⁴. The government is leading a number of programmes intended to increase the commercialisation of staple foods, and new projects to address stunting and undernutrition are also emerging⁸⁵, including The Uganda Multi-sectoral Food Security and Nutrition Project, which is funded by Global Agriculture and Food Security Program (GAFSP), set out to “*increase production and consumption of micronutrient-rich foods and utilization of community-based nutrition services in smallholder households in project areas*”⁸⁶. As of December 2020, more than 1.3 million people had benefited from the programme, including increased access to nutrition commodities and nutrition education sessions. Progress has however been somewhat stalled by the pandemic, halting planned community activities and training⁸⁷.

Regional comparison

Despite similar geographic proximity to the Horn of Africa, the countries analysed in this study have vastly different social, political and economic backgrounds, and their food systems have been greatly influenced by their history and pace of development. A recent study by Dengerink et al. (2021) explores regional differences in food systems, and finds that challenges and priorities differ on a global scale. Whereas nutrition is suggested as a key area of priority in Asia and the Pacific, the availability of food is the focus and the Pacific, the availability of food is the focus for East and Southern Africa, low incomes and affordability for West and Central Africa, safety of food in the Middle East and North Africa sub-region, and sustainability and environmental impact of food production in Latin America and the Caribbean. In East and Southern Africa, the availability of food is largely a result of challenges related to environmental and sustainability constraints, which can be

increased improving agricultural productivity. Increasing access to finance is highlighted as a priority area of intervention in these parts of Africa⁸⁸, with formal and traditional financial institutions often being inaccessible to lower-income and unbanked populations⁸⁹. There are exceptions to this, as Equity Bank is empowering small and medium businesses across East Africa by providing access to credit and financial services⁹⁰. Access to finance is considered to be much less of a priority in Latin America. This can also be a possible explanation for why crowdfunding for farmer solutions appears to be more prevalent in Africa than Latin America⁹¹.

The differences in the state of food systems are driven by a number of factors specific to the regions, such as geography, economy, and governance. East Africa for instance, has its own distinctive characteristics in terms of

the climate, types of crops being cultivated, the agricultural sector as a proportion of the economy, nutrition and diets, and positioning in global supply chains⁹². Overall, the main food crops in East Africa are maize, rice, potatoes, cassava, vegetables, wheat, sorghum, millet, and the cash crops are tea, coffee, cotton, sugar cane, tobacco, and cashew nuts⁹³. The area is highly vulnerable to climate shocks, such as flooding and droughts, and the agricultural system is mainly rain-fed⁹⁴. Despite the individual and jointly shared challenges to the food system of selected countries, there are also big opportunities for growth. A notable trend emerging in East Africa and other emerging markets, is an increasing number of digital and mobile solutions in the agricultural space that address both local and regional challenges, and that create more resilient and sustainable food systems⁹⁵.

Figure III: Overview of trends in East Africa

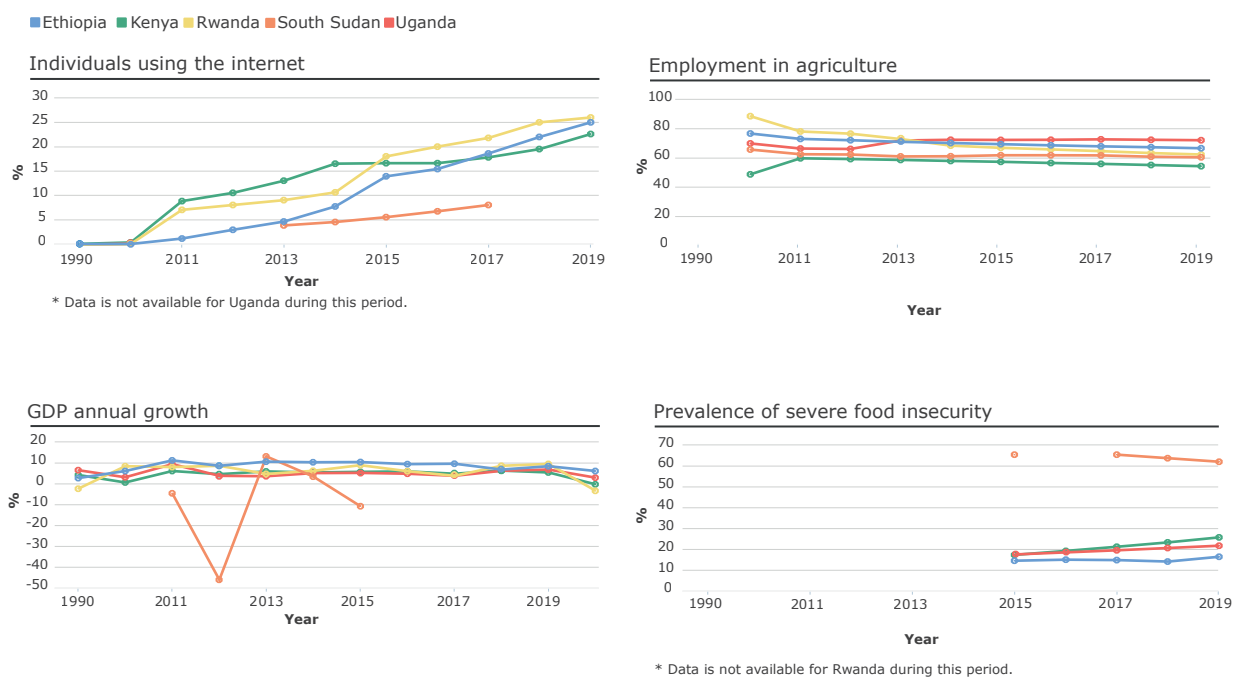


Figure III source: World Development Indicators (2021)

INNOVATIONS AND DIGITAL INNOVATIONS FOR FOOD SYSTEMS IN EAST AFRICA

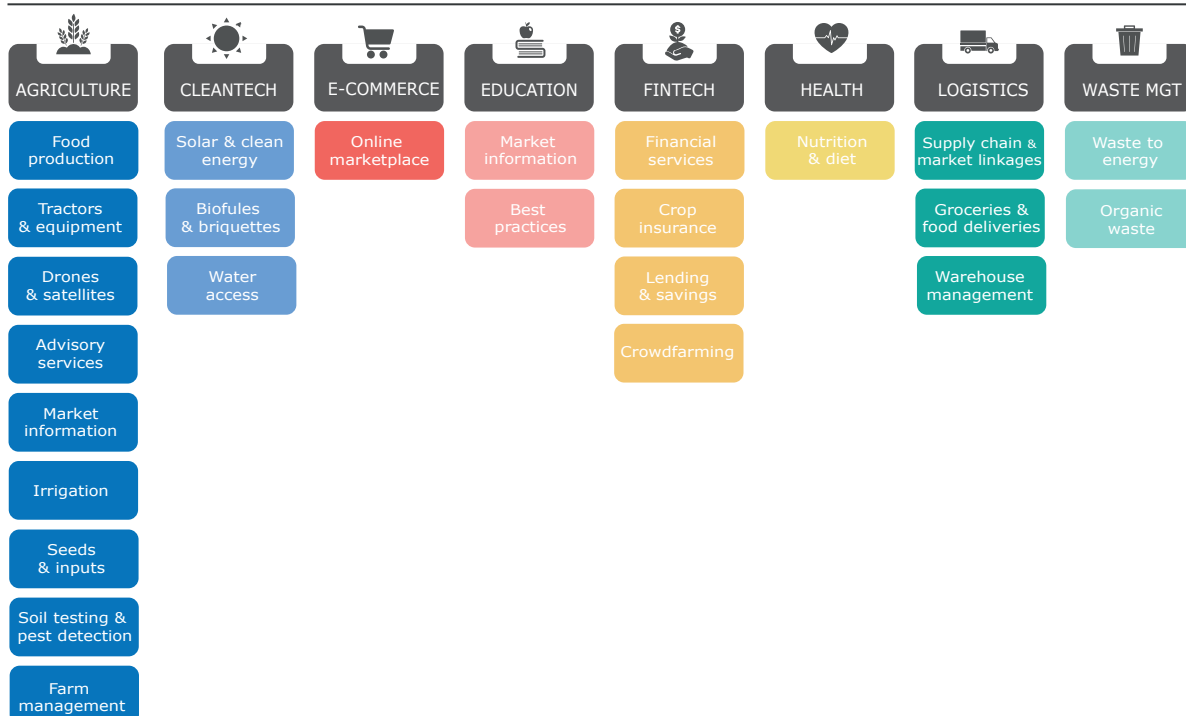
Innovations, technology-driven solutions and digitalisation of services hold the potential to raise productivity along all nodes of the value chain in the food system, strengthening resilience to local and external challenges, improving farm practices, and contributing to increased outputs and incomes for farmers⁹⁶. Drawing on the Small Foundation’s theory of change and insights from the GSMA Agritech Programme, it is becoming increasingly evident that technology can work as an enabler, in conjunction with financing, knowledge and skills building, and play a role in income-generating activities and impact on individuals and rural households⁹⁷, by providing farmers with better access to services, assets and markets.

Startups and innovators across Africa are leveraging technology-driven solutions to improve food systems - often referred to as agritech and foodtech - include:

- information on prices and practices
- precision farming
- satellite imagery and drones
- solar-powered irrigation
- farm management tools
- warehousing solutions
- robotics and automation
- online marketplaces for produce and inputs
- weather prediction apps
- crops testing and disease diagnostics
- insurance products that protect crop yields.

One of the key highlights of this report shows that **most of the solutions driving digital transformation in the food system cut across a range of sectors and cannot be categorised under agriculture per se** (see Figure IV), and the links between these sectors or clusters of products are increasingly intertwined. The value to the food system is created by improving efficiency in and between each stage.

Figure IV: Sectors and products at the centre of the digital food system

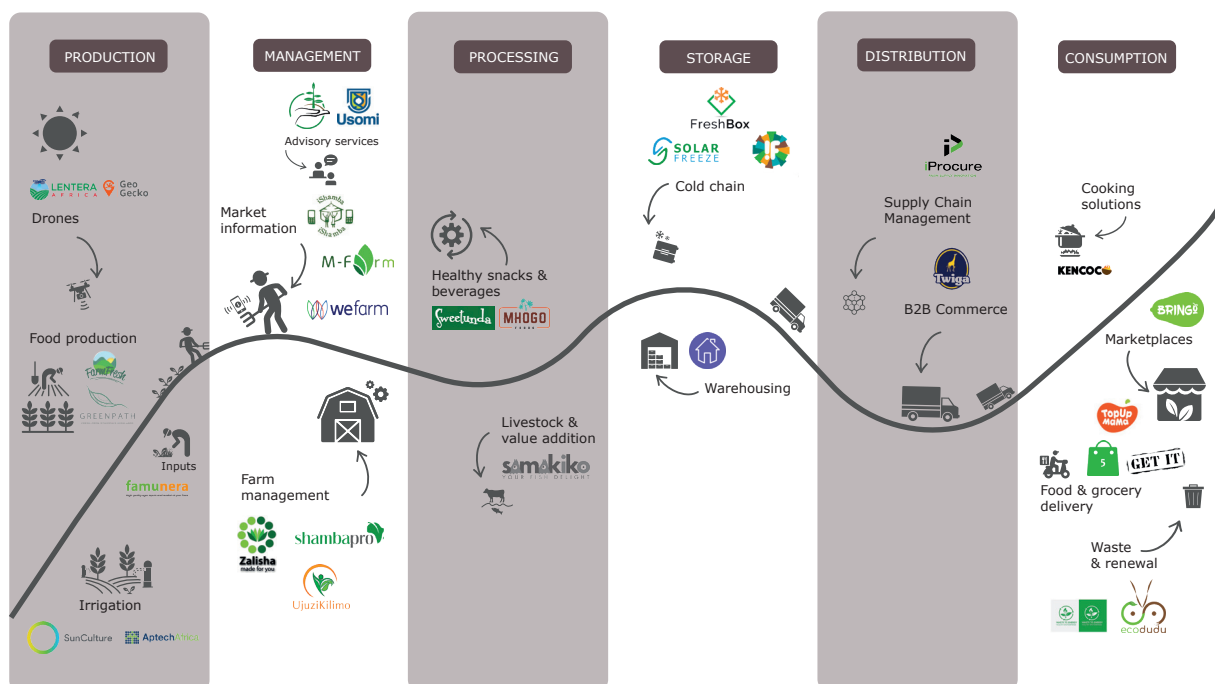


Box I: A farmer's journey leveraging innovative solutions

Consider for instance a farmer who is looking for solutions to increase her yields. Market information services via SMS and USSD technology are now available for her to access pricing and demand data or road conditions information. Farm management tools allow her to better track cultivations, seasonality, crop diseases, input supply, etc. This is possible thanks to unmanned aerial technologies such as drones, AI-powered image recognition software, and geographic information systems, which scan the field and identify trends and anomalies. Commodities exchanges and commerce platforms allow her to source the appropriate seeds and other inputs, while solar-powered irrigation equipment

paid via mobile money grant her the ability to farm independently of the electricity power grid. To protect the crops against severe weather and shocks, she can access crop insurance through her phone or local agents, and identify available markets where to sell her produce. When it comes to distribution of the goods, the online marketplace provider selling farmer's output uses cold storage and supply chain management tools to facilitate the movement of goods from producer to consumer, and waste collection providers may reuse organic waste to create fertiliser that goes back to the farmer.

Figure V: The food value chain



A taxonomy by role in the value chain

The type of solutions relevant to the food system can be broken down in the following levels:

- **Production and Management:** food production (crops, dairy, livestock), farm financing solutions, aggregators, irrigation solutions, precision farming solutions; inputs and fertilisers, diagnostics and crop disease (image recognition, GIS, UAVs, big data), food and beverage manufacturing;
- **Processing:** agro-processing, food processing, livestock and fishery, value addition, healthy snacks, and beverages;
- **Storage and Distribution:** B2B and B2C logistics, groceries marketplaces and delivery services, market linkages, cold chain, storage and warehousing, and supply chain management;
- **Consumption:** nutrition, diets, and health and wellness;
- **Disposal:** Post-harvest and renewal, waste to energy, and waste management.

The increasing availability of real-time knowledge, improved processes, streamlined distribution, and optimised food production mechanisms contributes to making food systems more resilient in the face of challenges, such as global macroeconomic fluctuations, pandemics, natural disasters, pests, food waste and losses, and inefficient practices at the farm level. This is due to the fact that the majority of these products and services are suited to target smallholder farmers directly, connecting them to the inputs, resources, knowledge and market linkages needed to become more efficient, sustainable, produce greater yields, and secure livelihoods. This market segment is crucial to the food system, as an estimated
















one third of the world's food production is attributed to small-scale farmers, pastoralists, fishers, and forest keepers⁹⁸. The attractiveness of digital solutions is driven by the ability to reach wider audiences in rural and remote areas, including segments of the population that have historically been excluded from markets and financial services, and creating economic empowerment for rural communities, youth and women⁹⁹. Uduak Igbeka, Africa Regional Manager at GAIN Health, suggests that "*with equitable access and knowledge of use [of digital tools], we could eliminate social barriers that affect productivity such as income brackets, gender and disability. Technology could also make agriculture more interesting for the youth, which is important as the increased migration of able-bodied young people from rural to urban areas indicates that the agricultural sector is made up predominantly of aging farmers. Digital transformation could improve return on investments and the dignity that should be associated with being involved in agriculture.*"

A mapping of the startup ecosystem







As of 2021, more than 400 companies operate in agritech and digital agriculture in Africa (Briter Intelligence, 2021), at least 100 of which are in East Africa, and with several more in other sectors that intersect with the food system, such as cleantech, e-commerce or logistics. When defining the industry, it is hard to reduce companies to a single sector as several solutions addressing food security tend to cross over. The taxonomy displayed in Figure VI and the associated mapping in Figure VII attempt to provide a comprehensive snapshot of how different products intersect, building on the matrix above (Figure IV).

Figure VI: Taxonomy of innovators in the food system

AGRICULTURE

 FARM MANAGEMENT Digital solutions and software for farms to manage day-to-day activities, such as crop planning, sales planning and bookkeeping.	 BIG DATA & ANALYTICS Tools for the delivery of analytics and big data for key information on market trends or weather patterns that allow for better decision-making.	 IRRIGATION Equipment and manufactured products for supplying water to crops and land.
 MARKETPLACE FOR AGRI PRODUCE Online platforms connecting producers to consumers for the purchase and sale of agricultural produce, such as vegetables.	 LIVESTOCK AND AQUACULTURE Tools for better livestock management, such as platforms that give access to animal feed and inputs, or dedicated to the sale of animal products.	 URBAN FARMING & HYDROPONICS Solutions for farming in an urban environment, including vertical farming systems, and hydroponic designs which allow for farming without soil.
 MARKETPLACE FOR AGRI INPUTS Platforms that connect farmers and agricultural providers to farm inputs, including seeds and fertiliser.	 ADVISORY SERVICES & TRAINING Providers of training, capacity building and advice for farmers on best practices for farming activities.	 MARKET INFORMATION Platforms and service providers of market information, such as pricing, regulations, weather forecasting and data.
 SOIL TESTING & PEST DETECTION Tools and equipment for soil testing and pest detection to optimise farming and guaranteeing healthy crops.	 FOOD PRODUCTION & PROCESSING Farmers that produce and process agricultural products for sale through both offline and online markets.	 TRACTORS & EQUIPMENT Marketplaces for tractors and other equipment used for to improve farming productivity.
 FINANCIAL SERVICES & INSURANCE Providers of financial products, such as credit, and insurance to finance operations a protect farmers against pests and weather shocks.	 CROWDFARMING Platforms for individuals and investors to jointly deploy capital and share the profits.	 DRONES & SATELLITE TECHNOLOGY Designers, manufacturers and distributors of drones, sensors and satellite imagery for precision farming, mapping and field data collection.

CLEANTECH & WASTE MANAGEMENT

 WASTE TO ENERGY Organisations that transform waste, such as animal faeces to sources of energy.	 ENERGY FOR AGRICULTURE Designers and distributors of energy solutions that can be applied to agriculture, such as solar panels that enable to power a farm's activities.	 CLEAN COOKING & STOVES Manufacturers of alternative cooking energy solutions and stoves for urban and rural contexts.
 ORGANIC WASTE Material that is biodegradable, including plant and animal products, as well as food waste.	 BIOFUELS & LPG Producers and distributors of alternative energy biofuel solutions, briquettes and liquid petroleum gas.	 WATER ACCESS Distributors of clean water for drinking and irrigation.

LOGISTICS & E-COMMERCE

 SUPPLY CHAIN & MARKET LINKAGES Platforms that connect stakeholders across supply chain, providing farmers with market access to bigger audiences.	 COLD STORAGE Temperature controlled facilities for the storage and distribution of perishable goods.	 GROCERIES DELIVERY Platforms for selecting and ordering groceries, and getting them delivered to customers' homes.
 WAREHOUSING AND FULFILLMENT CENTRES Warehousing and fulfillment solutions for producers, as well as technologies for keeping track of inventory.	 FOOD DELIVERY Platforms for ordering restaurant food online, and distribution of ready-made meals and items to be delivered to customers' homes.	

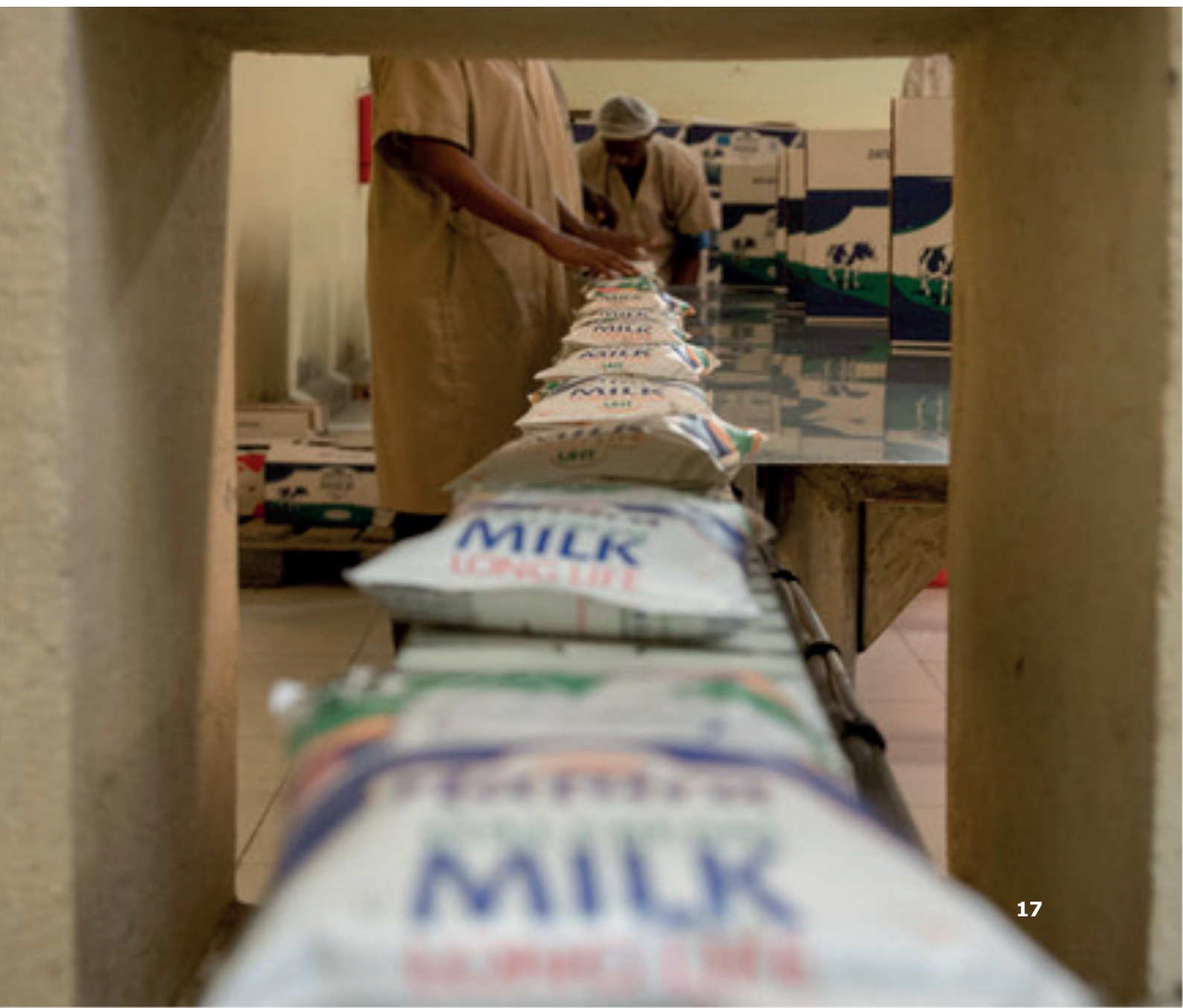
HEALTH & EDUCATION

 NUTRITION Providers of dietary information, and distributors to healthy and nutritious food.	 FOOD WASTE Platforms for educating consumers and producers about food waste, as well as solutions to increase access to food that would otherwise be wasted.
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This research identifies startups developing and providing products and services that are contributing to innovating the food system in East Africa. Over **100+** operate in Kenya, **15+** in Ethiopia, **25+** in Rwanda, **40+** in Uganda, and 4 in South Sudan (see Figure VII for mapping). The sectors explored have been partially grouped, with agritech-specific products such as crop insurance placed in agriculture as opposed to a separate category for fintech. Out of the five countries considered in the analysis, Kenya has the most developed ecosystem, reflected by the number of agritech companies and solutions,

funding to the space, and support network. South Sudan is the only country among those selected that is yet to present a sophisticated startup ecosystem that could be compared to those of its neighbouring countries. It should be noted that there are more active startups in the country than this report reveals, as this study only reflects innovative players in the food system with a strong digital presence. To date, South Sudanese innovations addressing food security are often the product of development and capacity-building initiatives, rather than full-fledged startups.

Milk production – WFP/Giulio d’Adamo





UGANDA



SOUTH SUDAN



KENYA



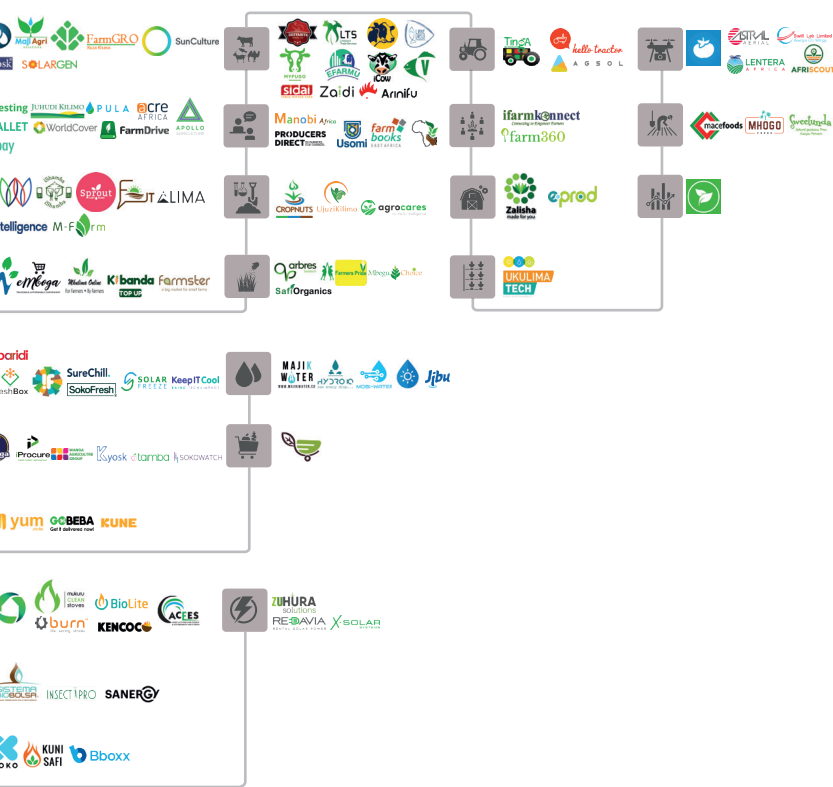
RWANDA



Figure VII: Mapping of food system innovators

* The mapping is based on the availability of data, and does not claim to be a fully exhaustive listing of agritech companies.

ETHIOPIA



ies across the five countries.



FOOD SYSTEM INNOVATORS

AGRICULTURE

- Farm management
- Marketplace for agricultural produce
- Marketplace for agricultural inputs
- Drones & satellite technology
- Financial services & insurance
- Market information
- Soil testing & pest detection
- Big data & analytics
- Livestock & aquaculture
- Tractors & equipment
- Advisory services & training
- Crowdfarming
- Food production & processing
- Irrigation
- Urban farming, hydroponics

CLEANTECH & WASTE MGT.

- Waste to energy
- Organic waste
- Energy for agriculture
- Biofuels & LPG* *Liquefied petroleum gas
- Clean cooking & stoves
- Water access

E-COMMERCE & LOGISTICS

- Supply chain & market linkages
- Warehousing & fulfillment centres
- Groceries delivery
- Cold storage
- Food delivery

HEALTH & EDUCATION

- Nutrition
- Food waste

Case studies on innovative businesses

Startups and innovators in the agritech and affiliated space are providing solutions for some of the most pressing challenges in East Africa, helping to improve farmers' capabilities, and eliminating restrictions to financing and markets. Across the five countries, the most prevalent solutions for the food system include advisory services for farmers, financial services (credit, insurance, savings), market information and weather apps, marketplaces for online produce and inputs, farm management tools, livestock services and products, cold storage, and supply chain and market linkage providers. The data collection phase of this research saw direct engagement with a number of key players in the industry, who exemplify how digital and tech-driven solutions are disrupting the food system:

Pula

Pula is an agricultural insurance company operational across 14 countries in Africa that helps protect farmers from yield losses following weather disasters, pest invasions, and other unexpected shocks. As of October 2021, more than 4.9 million farmers have been insured for a value of \$727 million across 1.96 hectares. Saida Lulu, Partnerships Manager at Pula, explains that Kenya, one of Pula's key operational countries, was recently affected by desert locusts. *"Through funding support from Financial Sector Deepening Kenya (FSDK), we developed a product that would provide payouts to smallholder farmers affected by the locusts for 3 clients. On average, farmers we interviewed lost approximately KES 5,500 per acre due to the impact of desert locusts, with the average reduction of yields due to desert locusts approximated at 45%. Over 4.9 million Kenya shillings was paid out to 1,333 farmers with the remaining funds to be used to support during the 2021 season."*

InspiraFarms

InspiraFarms is an end-to-end cold chain provider focused on emerging markets. The cold rooms, packhouses, cooling technology and solar kits offered by InspiraFarms are helping a range of agricultural stakeholders to handle fresh produce, reduce food losses, and ensure the maximum capture of harvests. Fernando Cojulun, Senior Business Development Officer at the company explains that *"the cold chain is an incredibly significant tool to reduce post-harvest losses and increase shelf-life for fresh fruit and vegetables. However, most farmers lack access to affordable, cold chain infrastructure both at farm and downstream, to help curb post-harvest losses...The application of modular, prefabricated, and high efficiency post-harvest and cold chain infrastructure is fundamental in bringing cost-effective solutions to farmers and food chains..."*, and, *"the integration of hybrid (grid-solar-diesel) solar systems ensures a significant reduction in operational costs of post-harvest management, therefore increasing the farmers' bottom line."* InspiraFarms also uses sensors and Internet of Things (IoT) to remotely monitor the cold chain, so as to supervise things like shelf-life and energy consumption.

Farm to Feed

Farm to Feed is an organisation tackling the food waste problem in Kenya by working with smallholder farmers to aggregate food loss, that is, any food item that farmers would otherwise be unable to sell, such as misshaped potatoes or unusually sized cabbages, and finds a market of consumers that are willing to buy these goods. Operating on a B2B model, the majority of Farm to Feed's current customer base are schools, food processors, street vendors, and climate conscious individuals who are looking for affordable vegetables. The organisation also donates approximately 45% of the vegetables collected to slums.

Claire van Enk, founder of Farm to Feed explains that *"a key way to increase food security is ensuring affordability of food, and one way of doing this is repurposing food that would otherwise be discarded due to being marked or misshapen"*.

SunCulture

SunCulture is a Kenya-based company developing and commercialising off-grid solar technology to provide smallholder farmers with access to water, irrigation and lighting. The company offers a pay-as-you-go model, which allows farmers to pay in installments. By providing reliable solar water pumps and irrigation, farmers can concentrate on higher-value crops and significantly increase their agricultural yield year-round. Andrew Denu, Head of Climate Innovations at SunCulture, explains that some of the key challenges SunCulture's customers are facing include access to financing, strong agricultural advisory data (which is very dependent on non-existent weather data), and access to markets domestically or internationally. A survey of famers' experiences with SunCulture's products from February 2021 revealed that more than 90% of their customers have accessed irrigation services for the first time, improved their way of farming, and improved overall quality of life.

Famunera

Famunera is a digital marketplace for affordable agricultural inputs sourced from verified suppliers in Uganda. The company also provides last-mile delivery, extension services, and market linkages for farmers. Naika Enock Julius, CEO at Famunera, explains that moving agricultural marketplaces online improves convenience and traceability for farmers, and quality farm inputs and farming advisory help boost yields. He suggests that the key challenge to reaching farmers through digital solutions is *"earning farmers' trust before delivery, and*

meeting their expectations as compared to the conventional block and motor". However, as more and more farmers join the digital transformation of agriculture, online products and services are becoming increasingly more recognised and accessible. In fact, Naika explains that the COVID-19 pandemic has been a driver of Famunera's adoption rates amongst farmers, as the digital solution offered convenience during the lockdown period.

iProcure

iProcure is an agricultural supply chain platform providing procurement, last mile distribution services, business intelligence and data-driven stock management. Stefano Carcoforo, Managing Director at iProcure, suggests that the solution is helping increase productivity along the agricultural value chain through real-time data from the field which supports suppliers in determining resource requirements, where to market, and what quantity to produce. He explains that iProcure is focused on agro-dealers, acting as representatives of the needs of smallholder farmers, improving their performance through retail management systems that help them scale their operations to meet smallholders' needs, and stocking them with the right inputs and training for the use of retail management technology.

Taimba

Taimba offers a B2B platform to shorten the agricultural supply chain and create market linkages between rural small scale farmers and urban traders. The company is addressing challenges of non-transparency and inefficiency in the agricultural sector in Kenya, by helping farmers access affordable and certified farm input on the one hand, and urban traders access a quality and reliable supply of farm products on the other. Dominique Kavuisya, CEO and Co-Founder of Taimba,

explains that changing the mindset of farmers has been the biggest challenge as an agritech company, especially in the case of older farmers. He states that *"tech is an enabler to fix the agricultural industry, but we lack the right infrastructure to support this. For instance, many farmers lack access to smartphones and reliable weather data. Road infrastructure can also be a challenge at times, and the internet is not affordable to the majority of our farmers."* This is an important factor in Taimba's conversations with investors, as Dominique suggests that it is the innovators' job to showcase how brick and mortar continues to play a big role in Africa, with tech helping scale growth as opposed to being a magic bullet.

Notable mentions

Other prominent examples of food system innovators in East Africa include GET IT, a Rwanda-based company distributing food services and building supply chains for international brands, Debo Engineering, an Ethiopian startup offering drone and mobile app solutions for crop disease detection and farm analysis, Aptech Africa, a Uganda-based company providing off-grid solar solutions and irrigation services across seven countries in Africa, and Biolite, offering safe cooking solutions across East Africa. The range of innovations reflect the breadth of solutions in different areas of the value chain in each country, and the opportunity for disruption in the food system at large.

Open crop field – WFP/Fredrik Lerneryd



FOOD SECURITY INNOVATORS' SUPPORT LANDSCAPE

Supporting the endeavour to strengthen the food system through innovation and digitalisation are a number of organisations that actively engage with agricultural players across Africa (see Figure VIII for relational overview and Figure IX for mapping). These can be referred to as the supporting framework for all innovators working to innovate food systems on the continent and, together, represent the sector's support ecosystem. The joint efforts of local and international support actors play a crucial role in closing the productivity gap and creating an enabling environment for better, more sustainable, and commercially viable food system businesses to grow. Some of key stakeholders driving this process include:

- **Investors**, both public and private actors, with mandates to boost the agricultural sector, play a key role in helping companies scale their solution and reach new markets through access to funding.
- **Training programmes, accelerators and incubators** provide training, access to networks, in-kind support and often grants or pre-seed funding to get businesses off the ground. Joining an accelerator or incubator programme is often the first step of a company's growth journey.
- **Development agencies, NGOs, charities and foundations**, both local and international, are providing a breadth of resources to smallholder farmers, including investments, inputs, and information about best practices. Whereas investors typically require an element of returns, support organisations in this category prioritise social needs and the impact of interventions.
- **Corporations**, who have a corporate social responsibility (CSR) arm/branch with an agricultural impact focus, or who act as investors, donors or programme implementation partners to other official programmes supporting entrepreneurs.
- **Consortia and network platforms** connect various stakeholders to investment, research and knowledge sharing opportunities in the food system.
- **Research organisations** play a fundamental role in putting a spotlight on best practices and highlighting gaps and opportunities in the food system. Continued research efforts into the various functionalities of food systems helps ensure the development of sustainable and efficient agricultural processes. Scientific research and data-backed evidence also provides a reference point for policymakers, donors, and other supporting agencies to implement more targeted interventions.

Figure VIII: Relational mapping of the support ecosystem

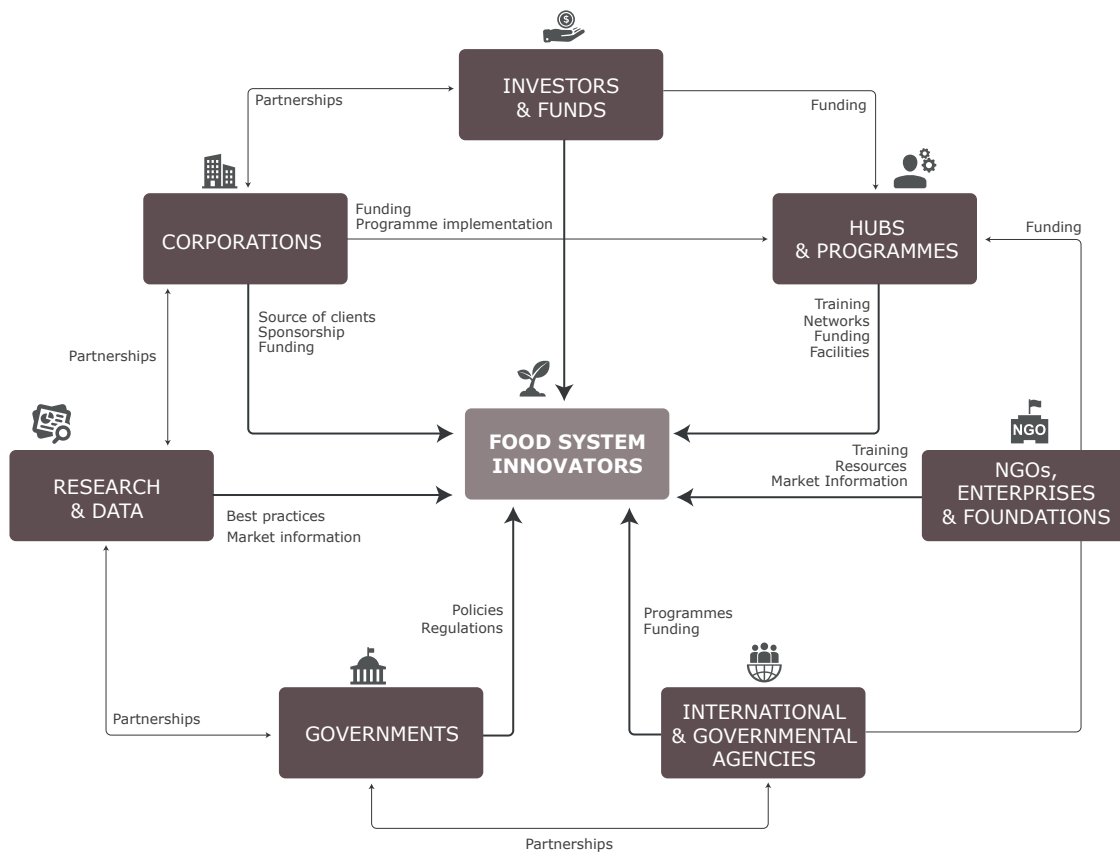


Figure IX: Mapping of the food support ecosystem



*The support organisations listed support at least one of the five countries in focus and beyond.

Funding landscape for digital agriculture and agritech

Startups operating directly in the agritech space in Africa have raised over \$375 million since 2015 (until end of August 2021), reflecting that tech-driven agriculture is becoming commercially attractive to investors. Agritech companies across the five countries examined in this study have raised just over \$75million in disclosed deals in the same period (see Figure X for funding trends in the selected countries), over 85% of which has been allocated to Kenya-headquartered companies.

Note that the figures only consider the company's headquarter/incorporation, not operational countries. The figures exclude funding to traditional agriculture companies, who in total have received significantly higher amounts, in part because there are more support programmes designed for traditional agriculture companies as compared to agritechs. An example is Palladium's Kenya Investment Mechanism, as well as government and donor programmes such as Kenya Climate Smart Agriculture Project (KCSAP), or Agri-Business Capital (ABC) Fund, which sees public and private sector contributors, such as European Commission, the Organisation of Africa, Caribbean and

Pacific States, IFAD, Luxembourg and the Alliance for a Green Revolution in Africa. Kenya is in fact one of the top funded headquarters of agriculture in Africa, though

 **\$75mn+**
raised between 2015-2021

United States (US) incorporated companies notably tops the list (see figure XI). All US-incorporated agritech companies counted towards the total are operational across the continent, many of which are active in East Africa. Notably, several of the top funded companies are founded by either expats or founders operating overseas. If considering funding to the five countries by the operational activities of agritech companies, the total sum of funding rises to \$302 million.

Figure XI: Funding to agritech by HQ country

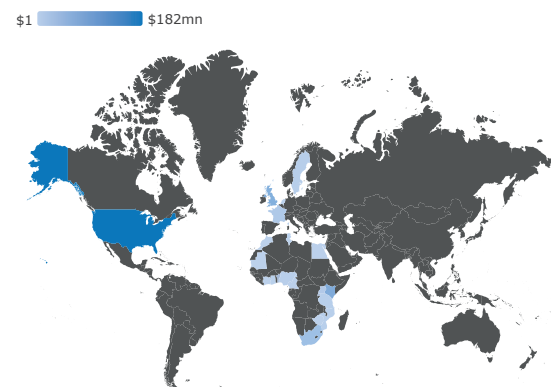
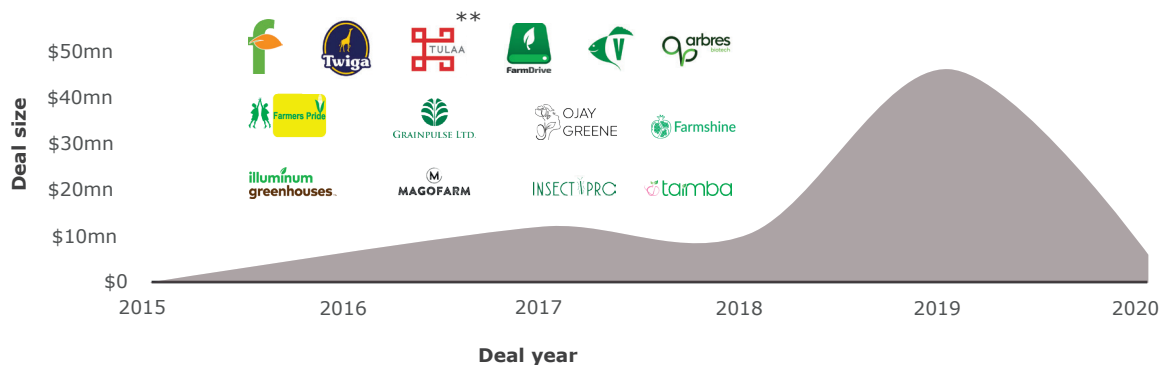


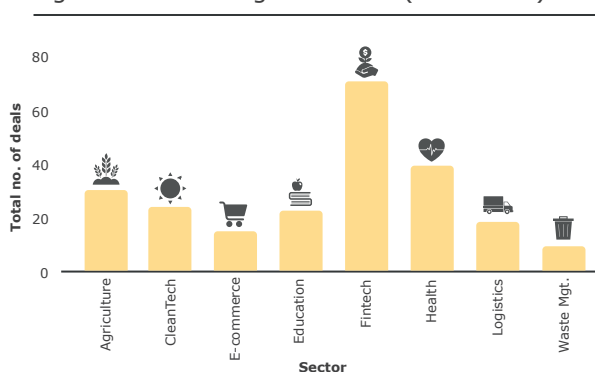
Figure X: Funding landscape for agriculture and agritech in East Africa



*Note that Apollo Agriculture and Gro Intelligence have not been counted towards the total figure due to incorporation in the United States.
** Tulaa, despite raising a six-figure round, is no longer operational.

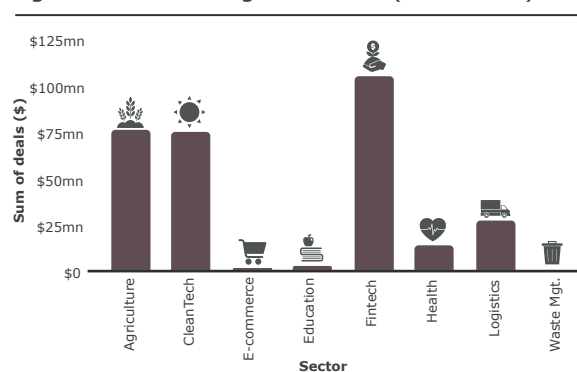
Some of the biggest deals in the sector went to Gro Intelligence, Twiga Foods, Sunculture, iProcure, Apollo Agriculture, and Grainpulse. The top funded products and services have been platforms for market data and linkages, off-grid and smart irrigation, supply chain management, and marketplaces for fertilisers and inputs (note that Twiga Foods announced a \$50 million round on November 1st 2021, which was not included in the analysis). The sector has seen an increase in investments in recent years, accompanied by the acknowledgement that digital and technologically-driven agricultural infrastructure has the potential to transform the industry, by creating greater efficiency and sustainability along the value chain, and the impact potential and size of the customer target is immense. Associated sectors, such as logistics and cleantech, have also seen a spike in interest and investment. Funding to agriculture increased across the continent in 2020, in spite of COVID-19 and fears that investors would develop an aversion to higher-risk sectors during a time influenced by disruptions to global supply and demand chains, and price fluctuations. According to Agfunder (2021), agricultural startups across the world saw a 15.5% year-over-year increase in 2020, yet the countries examined in this study saw a dip from 2019 to 2020, with funding to agricultural companies in Africa remaining highly disproportionate to that of other regions, despite the fact that the continent makes up a quarter of all arable land in the world¹⁰⁰.

Figure XII: Funding to sectors (# of deals)



Compared to other sectors, agritech companies raised 3.65% of total funding to digital and technological solutions in the period 2015 - August 2021. In East Africa, agritech accounted for 22.7% of the total sum of disclosed deals by headquarter countries. There is a margin of error to consider when analysing these percentages, as a number of deal sizes are undisclosed and a few, large deals capture the lion's share of total investment. It can therefore be useful to look at the deals in terms of the number of deals instead of volume, so as to explore the number of players that are attracting capital. This is the case for examining funding allocation across sectors in East Africa, as the number of deals is arguably better at showcasing the distribution of activity (see figure XII and XIII). Regardless of method, however, fintech remains the top funded sector both in East Africa and across the continent as a whole, and funding to agriculture remains below par. When digging deeper into the characteristics of funding, the data suggests that a large share of deal stages and deal types are unspecified or undisclosed in the agritech space in East Africa. Aside from undisclosed rounds, most of the funding in terms of number deals can be classified as early-stage funding, from angel, to incubator and accelerator stage, to Series A rounds (see figure XIV).

Figure XIII: Funding to sectors (deal value)



This is in contrast to for instance the fintech sector, which has an increasing share of growth stage deals, as well as mergers and acquisitions (M&As). Considering the stage by the total sum of funding however, the figures display much bigger rounds across Series A and Series B stages, indicating that there are few big rounds making up the

biggest proportion of funding to the space (see figure XV). Where information on funding type and instruments is available, the data indicates that investments are mostly equity-based, followed by debt, grants and awards and prizes (from programmes and competitions), in terms of both the quantity and value of deals.

Houses overlooking crop field – Dario Giuliani/Briter Bridges



FIGURE XIV: Funding by number of deals

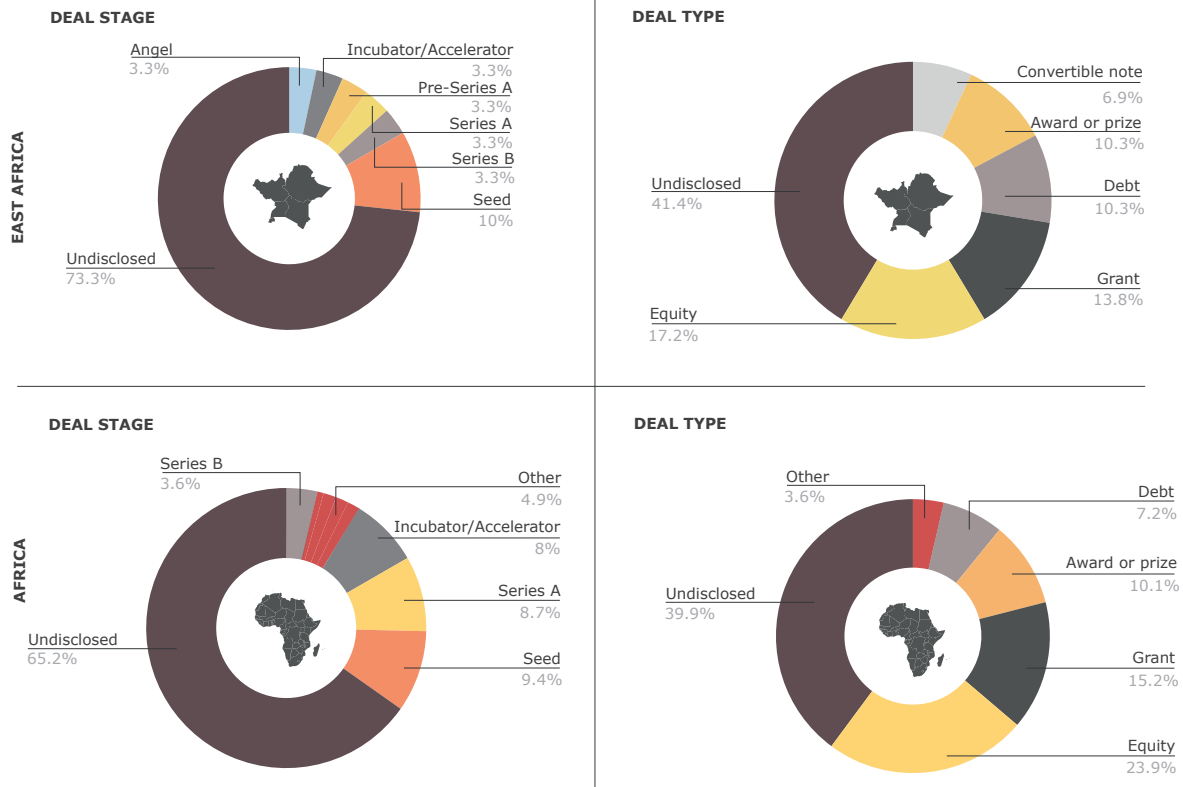
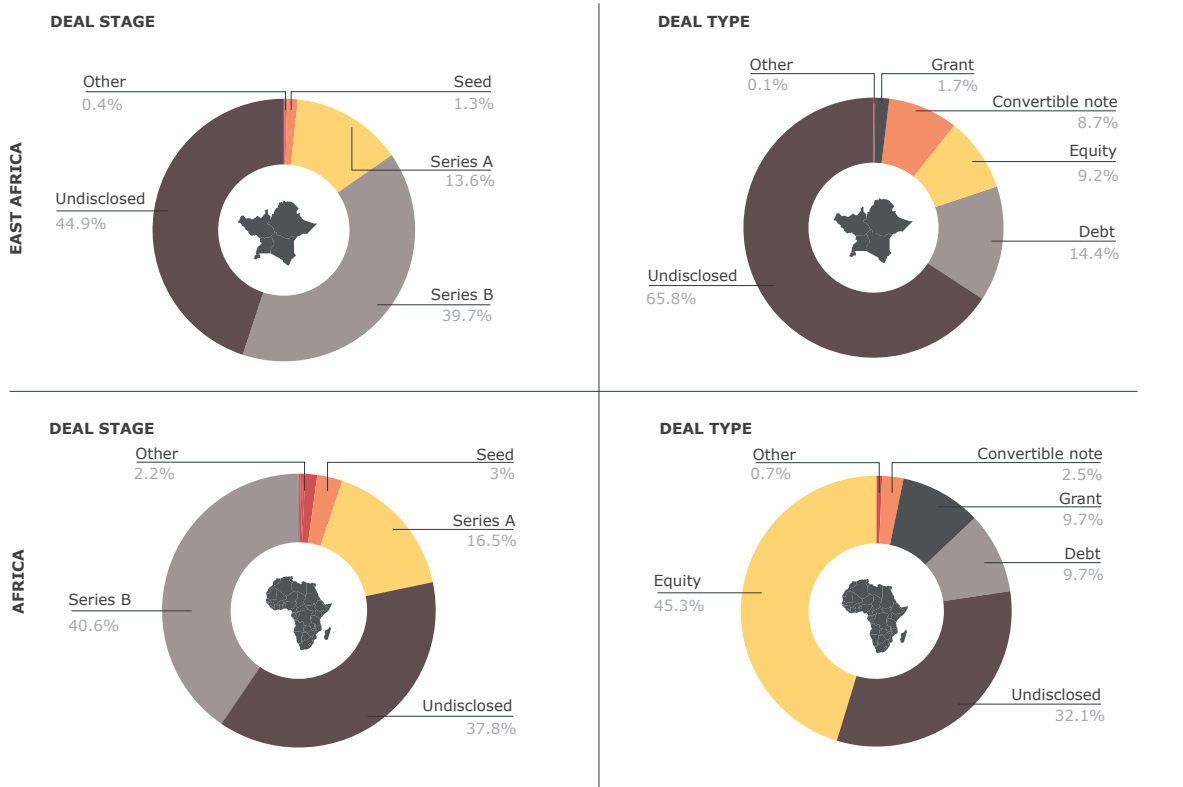


Figure XV: Funding by value of deals



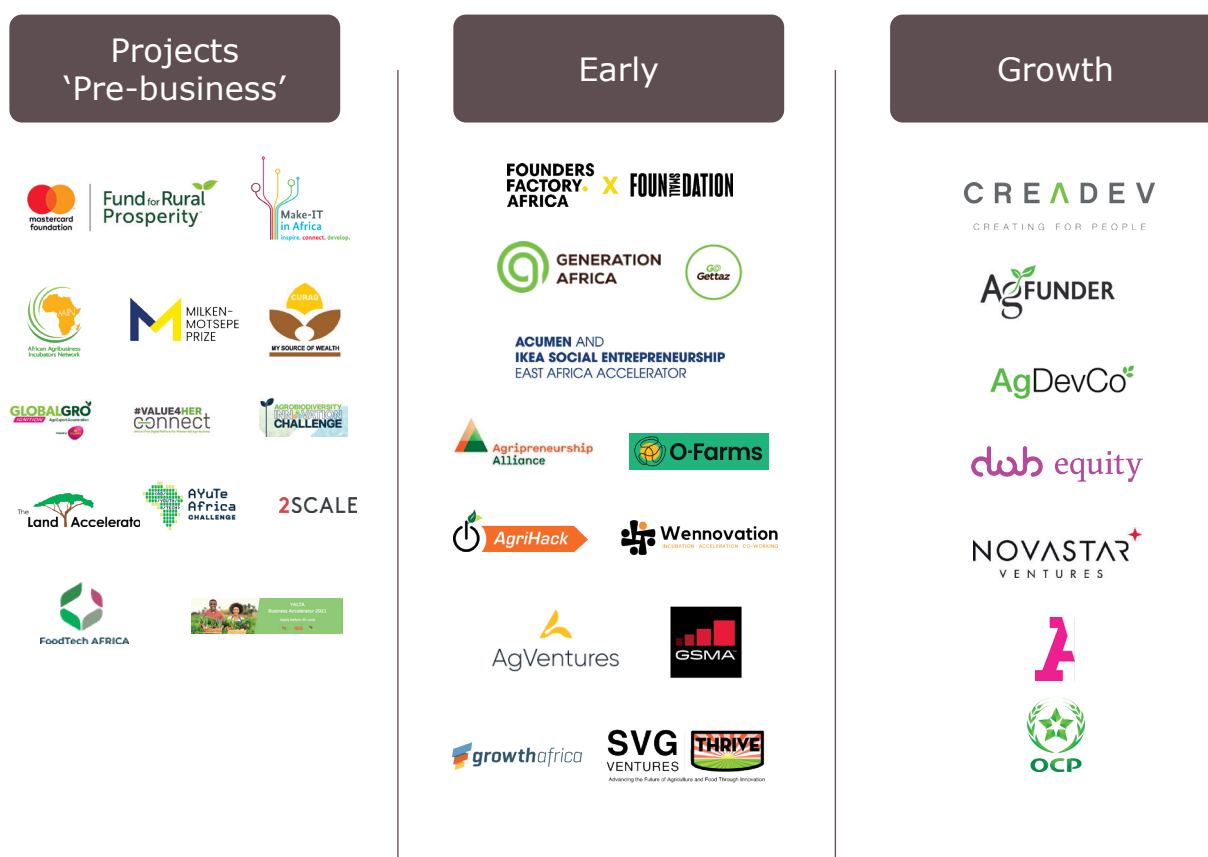
Another important caveat to mention, is that the terminology around deal stages differ greatly, as the data for agritech funding across Africa shows seed rounds ranging from USD \$100K to \$5mn, and Series A from \$1mn to \$13mn. More transparency around funding could prove beneficial to creating a more transparent and data-driven support landscape.

An evident aspect of the investor landscape focused on businesses tackling food security is the lack of continuity. At the idea and early stage development of a solution, challenges, competitions, and grant funding from both private and public organisations represent the dominant source of financial support. At this stage, development and capacity-building initiatives are almost the sole funders. Pre-seed and seed-focused investors are beginning to emerge, spearheaded by accelerator programmes such as Founders Factory Africa, O-Farms, and SVG Ventures' Thrive Agrifood. Growth financing remains confined to a limited number of family offices, impact funds, and corporates such as DOB Equity, CREADEV, Morocco's OCP, Goodwill Investments, AgDevCo and Acumen (see Figure XVI). Significant public and private investments into the sector is crucial for the food system in the selected countries, and Africa as a whole, to progress and reach its full potential. In comparison to other tech-driven sectors, such as fintech, agritech has a layer of uncertainty around the risk and return of investments, often related to external climate challenges and transaction costs that, despite its potential for growth and impact, has deterred investors and translated into a relatively low amount of venture capital (VC) and growth-stage deals in the space.

Rajiv Daya, Head of Investments at Founders Factory Africa, explains two ways of distinguishing investors; those that want to drive fundamental economic realities as the

primary objective or those looking for models that can be replicated and scale. Rajiv says, *"the difference between the two is the time horizon—the former (more aligned to impact investors who need to take a longer-term view) drives local economic impact, and the latter (traditional VC approach) needs to scale quickly. Neither approach is right or wrong, but each results in fundamentally different investment styles. The nature of agricultural crop cycles and uncertainty due to exogenous factors also create timing and risk constraints not conducive with traditional VC/equity models, which is one of the reasons why you observe more grant/debt capital versus equity in this sector."*

Figure XVI: Investor landscape by stage of interest



Private sector

Government resources and budgetary expenditure directed at agriculture in the region are constrained, and the reliance on domestic and international investments from private sector stakeholders is a central strategy for filling the gap. The private sector has played a major role in developing food systems across Africa, not only considering large agricultural firms or companies operating in the FMCG space, but also corporates who have a stake in creating highly productive supply chains.

The mobilisation of private sector capital has been particularly prevalent at the production level, with seeds and fertilisers targeted as high-growth opportunities, and investments increasingly directed towards digital solutions. In order to attract foreign investments into the sector, governments

across Africa offer a number of tax reductions and other incentives, and there is a clear trend seeing multinational companies, institutions and foundations accelerating private capital injection into the agricultural space¹⁰¹. In South Sudan for instance, the vice president has encouraged a bigger role of the private sector to boost the economy and employment, and new laws are being implemented to make it easier for new businesses to set up shop and investors to enter the market¹⁰².

Large agricultural corporations also have a big part to play in developing and strengthening the food system. For one, larger organisations have more resources to adopt new technologies, and they benefit from economies of scale and a bigger scope to generate a supply of products that meets the food needs of the population.

needs of the population. They are also entry points for industry partnerships, such as logistics companies and distribution agencies, and other links in the value chain that require an immense amount of capital, equipment or fleet. Partnerships may also take place between large agricultural companies and smallholder farmers, through contract farming/ outgrower schemes, sponsorships, corporate social responsibility (CSR) initiatives for shared learning, or private investments¹⁰³.

Avenues for partnerships and co-investment

There are in fact a number of partnerships taking place between governments, startups, investors, hubs and corporations across the food system in Africa, and there is a lot to gain from understanding how partners can work together to strengthen the food system, both operationally and through facilitation of a supporting environment.

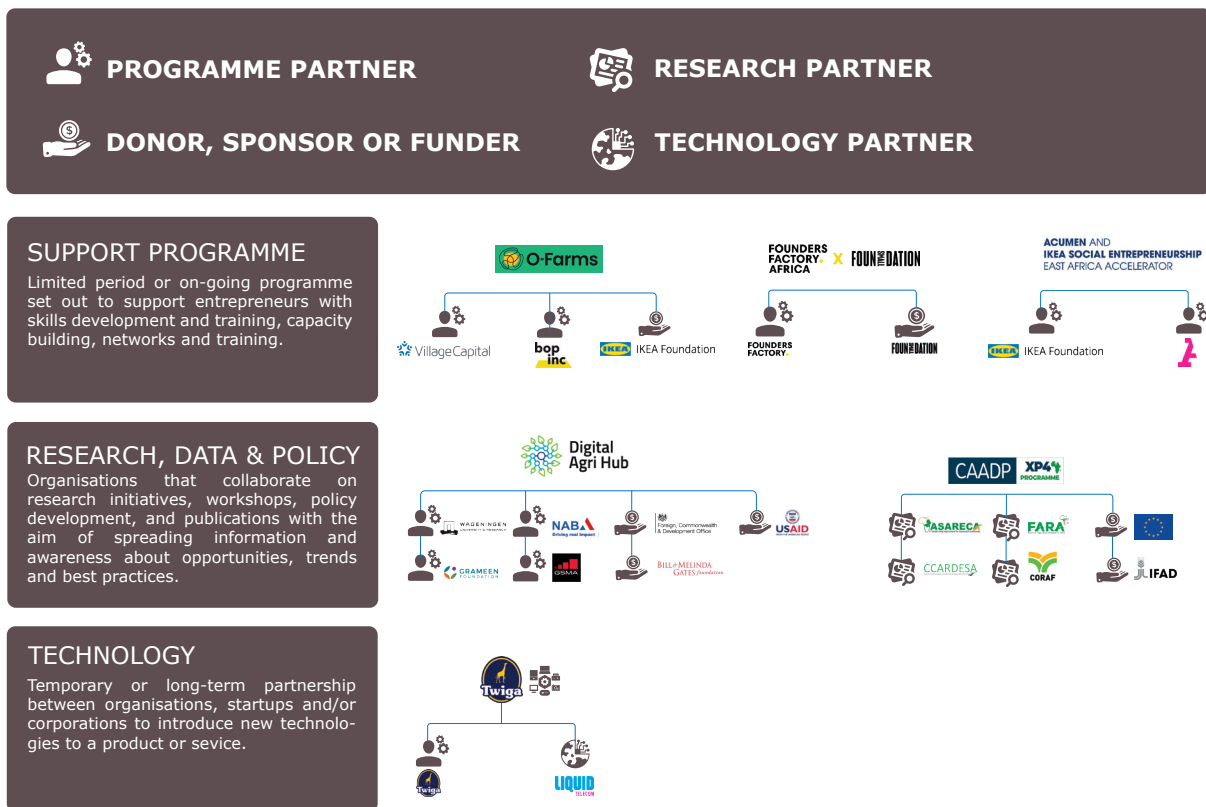
One of the most widely recognised types of partnerships, is that of Private-Public Partnerships, also known as PPPs. PPPs, in an agricultural setting, are initiatives set to bring together a wide range of public and private actors to use individual strengths to improve productivity and growth, and where both contributions and risks are shared. A report by the FAO suggests that an agricultural PPP can take shape through four avenues, namely “*i) partnerships that aim to develop agricultural value chains; ii) partnerships for joint agricultural research, innovation and technology transfer; iii) partnerships for building and upgrading market infrastructure; and iv) partnerships for the delivery of business development services to farmers and small enterprises*”.

It should be noted that while PPPs have shown to have many positive impacts, such as increasing efficiencies, improving market access, and increasing collaboration between

stakeholders, factors such as burdensome regulations and legislations or lack of financial transparency among partners may limit their potential for success¹⁰⁴.

Partnerships may also take place without the involvement of public institutions, for instance between corporations, research organisations, donors, investors, accelerators, incubators and foundations, and have proven to be an efficient way of optimising resources and delivering targeted support for startups in the food ecosystem (see Figure XVII for examples). There are a number of ways these organisations collaborate, including joint research and knowledge sharing, programme design implementation, grant delivery, and delivery of in-kind resources and equity investments into the agribusiness and digital startup ecosystem (see appendix for an overview of a selection of key partnerships in the ecosystem).

Figure XVII: Key partnerships fostering the food system



The infographic displays examples of how organisations in the food system might work together, and role of different types of partners. There are many more that exists beyond this visualisation.

CHALLENGES THAT REMAIN

The growth of digital solutions and the surrounding support ecosystem that is emerging is a promising development in creating a more productive and resilient food system. That said, digitalisation is not a one-stop nor an overnight solution to the challenges facing the food system in Africa. Introducing innovative approaches at different stages of the value chain is a process that needs to be able to accommodate the highly dynamic nature of the food system, and that recognises that the development is not happening evenly across countries. In addition to this, **agricultural development on the continent and globally is closely tied to non-tech elements**, such as reliable infrastructure, water supply and irrigation capacity, and a logistical framework enabling the transport of goods from the field to the consumer before the produce perishes. Policies, for instance, aimed at stabilising currency volatility, are key component to consider when discussing the fate of a sector where the vast majority of farmers operate using cash for payments. In fact, besides external shocks, such as adverse climate events, pests and diseases, changes to global trade, price fluctuations and economic downturns, local policies determine the accessibility of products and services on both the supply and demand side of the food system, and amplify or contain external risks. While digital solutions cannot claim to solve these issues, they can create better and more inclusive strategies to adapt to challenging conditions.

I) User willingness and capacities

For the solutions to be impactful, user willingness and ability to try new approaches is crucial. Adoption rates of digital technologies related to agriculture in Africa remain constrained¹⁰⁵. For instance, Saida Lulu at Pula suggests that “*low knowledge on*

how insurance is of value to farmers and how it could create value for them is a challenge. An insurance policy is a ‘promise’, telling farmers in case anything affects their yield according to the set parameters, then they will get paid. This wouldn’t happen during a good harvest so they would really not receive anything if they don’t face losses. This makes it a little difficult to convince them that they would actually be protected from risks”.

McKinsey & Company suggest that greater efforts are needed to increase agritech adoption rates in general. These could imply incentivising usage through clear value-added solutions which include support and training for skills building and knowledge on how to use the tools, and improving infrastructure and regulation from the government¹⁰⁶. Creating a participatory and collaborative approach to the practices along the value chain is fundamental for widespread uptake of new innovations¹⁰⁷. Deepening knowledge and improving agricultural and business practices will also be crucial to retain the youth in the agricultural sector, as participation in the has been declining across Africa in recent years, largely driven by migration, urbanisation, and attractiveness of other industries for wages and personal growth¹⁰⁸. However, as Dr Anne Roulin, president of the Agripreneurship Alliance, explains, “*more than 12 million young people in Africa are coming on to the job market every year, but only 3.7 million formal jobs are created. This means that the agricultural space could be a huge opportunity for youth to develop careers and improve food and nutrition security. The conventional wisdom around agriculture revolves around low productivity and labour-intensive activities, and in order to move away from this type of narrative, we need to spread awareness of the sector’s*

business potential, promote its success potential, its success stories, and inspire young people to develop their business plans".

II) Female representation in agriculture

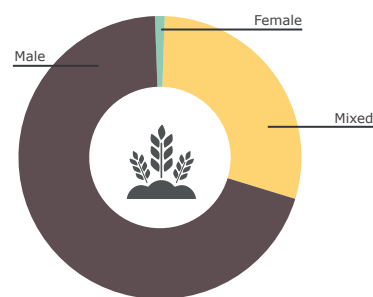
Women constitute a significant share of the labour force in agriculture in sub-Saharan Africa and, yet, data on female participation in agriculture is sparse, and exact figures are uncertain, as the informal nature of subsistence farming, which captures the vast majority of employment, means that there can be a substantial margin or error. The importance of women’s role in agriculture cannot be overlooked, as they are responsible for a breadth of activities, including planting and harvesting crops, and family nutrition. Yet, gender assessments of the agri-food space suggest a notable productivity gap, largely driven by inequitable access to land, resources, and information¹⁰⁹. In order to improve food security, nutrition, and rural poverty across the region, the prevalence of this gap needs to be urgently addressed.

Digital services and technologies can offer a more accessible means to knowledge, skills, inputs and financial services¹¹⁰, and can be a source of empowerment for women in agriculture. On the other hand, barriers such as not having access to the internet and low digital literacy can also be exclusionary, indicating that low-tech solutions such as feature phones remain important to increase inclusion and reach women and other marginalised groups¹¹¹.

Out of a sample of 237 agritech companies in Africa, 75% were all-male teams, 13% were all-female, and 10% from mixed (female and male) teams (see Figure XIX). While this sample cannot be generalised to all agritech companies, it is an indication that there is a gender gap in the co-founding teams of digital and technology-driven agricultural solutions¹¹². Across the five countries in the

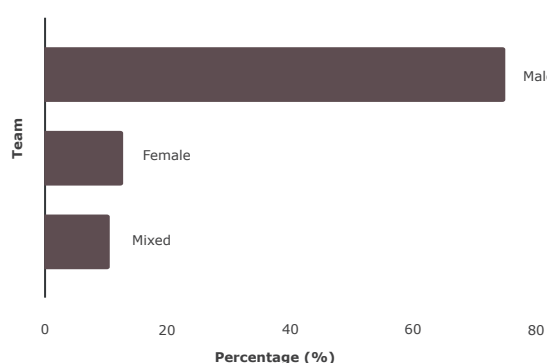
sample raising a cumulative amount of \$75 million, all-female founded agritech companies raised just over 1% of the total from 2015 until May 2021, with the remaining deals raised by all-male teams. It should be noted that several of the female-founded and mixed-founded companies with headquarters outside the five target countries were excluded from the figure. In the same period, agritech companies across all of Africa raised approximately \$369 million in disclosed deals. In this selection, all-female teams still only stood for a disproportionate amount of 1% of the total, however this wider aggregate shows that mixed co-founding teams raised 29%, reducing some of the asymmetry found between genders (see Figure XVIII). Better support for both training and funding could have a big impact on women’s role in the value chain, and programmes and initiatives that directly target female-owned agribusinesses are emerging, including the VALUE4HER Connect platform and Women Smiles Uganda.

Figure XVIII: Distribution of funding by gender



* Includes funding figures for all countries in Africa from 2015 until May 2021.

Figure XIX: Composition of teams in agriculture



* Figures depict founder information from a random sample of 237 agritech startups in Africa.

III) Access to digital technologies

Another factor constraining the impact of agritech is the rate at which digitalisation is happening, in that a significant segment of the population across the five countries in question remain without access to the internet or mobile data, limiting access to digital services and products for users, and inhibiting the design and development of digital transformations for startups and MSMEs. In fact, the World Bank data suggests that none of the five countries explored in this study have much more than a quarter of the population using the internet¹¹³. That said, the share of internet users is steadily increasing. The GSMA estimates that 28% of all connections across sub-Saharan Africa will be on 4G by 2025 and \$155 billion of economic value added will be through mobile technologies by the same year¹¹⁴. This is considered to be a positive sign, as digitalisation of previously unaccountable practices is an increasingly recognised step towards improving the quality of global value chains and food systems, strengthening food security, creating jobs, improving livelihoods, and contributing to poverty alleviation.

As more and more people are embracing the digital and internet revolution, especially in the wake of the COVID-19 pandemic, the process of digitising agriculture and improving productivity is on the rise, complemented by efforts to changing attitudes at all stages, from ideas around sustainable crop inputs to nutrition and food waste, from producers to consumer. Though adoption and implementation of highly complex solutions or technological advancements is arguably more accessible to large scale companies operating in the food system, the data show that there are a number of startups and MSMEs introducing disruptive technologies and reaching all areas of the value chain.

IV) Funding availability

Despite all the progress made, there is still a significant gap in startup access to traditional and early-stage funding for companies in the food system, and increased support from private and public sources to both the sector and surrounding infrastructure is fundamental. With the exception of a few large agricultural, logistics, and e-commerce companies, such as Twiga Foods, Pula, and Apollo Agriculture, the availability of funding to scale operations is still limited in Ethiopia, Kenya, Rwanda, South Sudan and Uganda, and indeed, Africa as a whole.

In 2020, agritech companies across Africa raised just over 7% of total funding into digital and tech-driven sectors. This trend is changing, and agritech and agri innovations are attracting a growing share of startup support and funding, especially from impact-focused investors and donors, but progress is slow and substantial efforts are needed to reduce risk-aversion and increase opportunities for different players in the food value chain. Organisations like CGIAR are combating the gap in funding and support specifically targeting agriculture, and Hauke Dahl*, GIZ Scaling Expert at CGIAR, suggests that *“by providing technical depth around climate smart innovations and climate-resistance, we are able to help investors assess the risk and benefits properly.”*

While the role of private capital has been incredibly important to support startups, increase productivity and boost growth, there are certain ramifications of its role in the space that should be considered, including the increasing share of larger corporates, the possibility of loss of employment, closure of small agribusinesses who are unable to compete, and reduced availability of arable land area for smallholder and subsistence farmers. As such, public regulation of the private sector is important¹¹⁵, and the creation

* Hauke is a member of the CGIAR/GIZ Task Force on Scaling, a program of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). Members of the Task Force are seconded by GIZ to CGIAR Research Centers through the Centre for International Migration and Development (CIM) integrated expert facility.

of beneficial policies to facilitate startups and the supporting environment will determine the capabilities of digital innovators to disrupt the space in the longer term.

V) A fragmented support ecosystem

This research identifies more than 150 investors, hubs, foundations, and research organisations actively supporting food system innovators across East Africa. While these stakeholders are playing a critical role in creating opportunities for startups to grow, there are currently very few success stories, such as companies that have been able to scale and expand regionally or internationally. This is in part due to the many intricacies and risks associated with the food system, and lack of comprehensive support at all stages of the growth journey. A positive trend is seeing a growing number of partnerships emerging between support actors, ensuring greater collaboration, transparency, and risk-sharing, facilitating services that play to the strengths of each stakeholder, and ensuring more unified support to the food system.

VI) Measuring impact

Although the literature, industry data, and case studies of successful digital food system innovators are growing, there is still little available information about the overall measurable impact of the startup ecosystem on food security. This does not mean that digital and technological solutions do not have, or have the potential to have, a significant effect on farmers and consumers, but that there is yet to be a consistent, standardised, and comprehensive overview of monitoring and evaluation for the different types of business models. In part, this is because the use of digital and tech-driven innovations is still relatively nascent, and it takes time to build reliable and continuous data sets that track change over time. Another limitation is that measuring impact in the food system needs to be controlled for a

wide range of factors, such as the political and economic climate. While certain correlations of positive change can be made, for instance from extracting data from a company's monitoring and interactions with users, it is difficult to infer causality. To gain deeper insight into how these solutions can transform the food system, more in-depth research and data collection is needed.

A COMPARISON OF COUNTRY ECOSYSTEMS

Despite the challenges still faced in the digital food system, the ecosystems in Africa are slowly maturing. Kenya boasts the most advanced startup ecosystem out of the five countries explored in this study, when measured by the number of companies operating in the space, as well as the volumes of funding allocated to not only the agricultural sector, but the different areas that contribute to a thriving ecosystem as a whole. Digitalisation is happening at a rapid pace, and new regulations such as the Kenya's Digital Economy Blueprint set out to create more digitally empowered citizens¹¹⁶. The country is already home to some of the region's most funded agritech startups, such as Twiga Foods, iProcure, and Apollo Agriculture.

Uganda follows, albeit further behind, as its agricultural sector remains largely in the informal space, whilst funding to the digital food system solutions rest at a fraction of that of Kenya. Digitalisation in Uganda has been a complex and controversial process, as the government introduced an over-the-top (OTT) services tax in 2018 that required mobile users and communication apps to pay a daily fee which ultimately reduced the number of users, and caused social discontent. While this tax has been changed, social media and internet usage has become highly politicised in the country¹¹⁷, ultimately affecting the ability of agritech startups to connect with their customers. Despite the restrictions, Uganda remains a largely underexplored ecosystem, but a number of agritech innovators are working to provide products and services that improve inputs and yields, such as Geo Gecko's information sharing via satellite data, or WEYE Clean Energy's alternative cooking energy sources produced from waste.

In Ethiopia, increasing financing to agriculture has been a key strategy to increase productivity and reduce poverty¹¹⁸. Several programmes and initiatives have been implemented in recent years to support entrepreneurs in the agritech space, including the Green Innovation and Agritech Slam, which in 2019 was jointly implemented by the Technical Centre for Agricultural and Rural Cooperation, GIZ, Iceaddis, the Ministry of Agriculture and the Ethiopian Agricultural Transformation Agency¹¹⁹. The agritech landscape is growing, with players such as Debo Engineering, who have developed technology for the detection of diseases in plants, GroHydro, manufacturing hydroponics systems that allow growing crops without soil and less water and costs, and Lersha, an all inclusive platform for smallholder farmers to access inputs, equipment, and information on climate and markets. Solutions such as these will be critical for Ethiopia to advance productivity, adjust to climate challenges, and increase resources.

Rwanda may be the smallest country in the study, but over 70% of its population is reliant on agriculture as a primary source of income and driver of economic activity¹²⁰. In light of the COVID-19 pandemic, the government introduced a recovery plan that among other objectives aims to bolster agriculture, and increase food security in the country¹²¹. This is accompanied by a longer-term government mission to accelerate digital transformation, including public investments in digital infrastructure and a number of enabling regulatory reforms, though the private sector will likely have a big role to play in the development of a digital economy and smarter agricultural solutions¹²².

Despite the scarce presence of private and public funding, Rwanda boasts the presence of several early stage support facilities, and agritech players are beginning to appear. Aside from food marketplaces e.g. GET IT, companies such as Shambapro ensure better management of farms, and other like Shoraweze connect farmers to investors.

South Sudan is on the other side of the spectrum to that of Kenya, with only a handful of startups offering digital solutions to innovate the country's food system. What comes to light through the data and discussions with stakeholders engaged in the country's startup and food ecosystem, is that agriculture in the country is highly community driven and the entrepreneurial space as a whole is very nascent. South Sudan is somewhat an outlier from the other countries in the study, and the ecosystem can in many ways be considered to be in the "pre-startup" phase of its development. What we see is that this phase is dominated by non-profits, and development and humanitarian organisations that are focused on capacity building for smallholder farmers. Such an environment is very different from investigating a high risk and high potential digital culture like Kenya. Pieter de Vries, South Sudan Country Manager for Spark, explains that most of the startup funding in the country is delivered through grant schemes from various development organisations, and often takes the form of farm inputs for vulnerable communities, or machinery and assets for entrepreneurs who already have some assets or income.

Thriving startup ecosystems do not develop in silos, and, as resources to entrepreneurs remain limited compared to neighbouring countries, grants alone have not necessarily had a major impact on developing healthy value chains. Pieter suggests that with access to finance (A2F), stakeholders can have more success in changing the mindsets of people

by focusing on skill transfers, mentoring, and monetary or in-kind loans. The beneficiaries are often required to put down some sort of collateral, which is very challenging for people who live at the subsistence level. *"One way of addressing this is data driven, where sustained agricultural output is captured and linked to a specific individual. With the participation of a bank, this data set can be used as collateral for cash loans to cover operational costs."*

CONCLUDING REMARKS

There are many obstacles to a productive food system in East Africa, including both internal and external shocks to the value chain. While the environment and composition of the food system across Ethiopia, Kenya, Uganda, Rwanda and South Sudan present some similarities, they differ in the stages of development, the size and stage of their startup ecosystems, and the availability of support from surrounding stakeholders. Kenya, for instance, is characterised by a budding entrepreneurial community and a large agricultural sector contributing to a significant share of employment, GDP and export earnings. In South Sudan however, agriculture remains primarily at the subsistence level, and the level of severe food insecurity is among the highest in the world, with development projects and capacity-building initiatives representing the bulk of entrepreneurial and innovation-related activities taking place in the country.

While the immediate priorities for improving the food system may differ between the countries, most long-term strategies to increase productivity in the food system see the adoption of digital and technological advancements. The private sector holds immense potential to address a largely untapped market for digital services, and is bringing vital and inclusive transformations to Africa's food system. Innovators behind digital and tech-driven startups are helping smallholder farmers mitigate and adapt to a broad range of challenges, and strengthening their capacities and positioning in local and international markets by providing the tools and knowledge for better practices and increased productivity. The number of startups operating at the different nodes of the food system, from production to consumption, is on the rise, and has been

further accelerated by the demand for online solutions in the COVID-19 pandemic. Supply chain management solutions, data and market analytics, and platforms for agricultural inputs have received the bulk of investor funding, but the breadth of products and services offered to solve for different obstacles in the food system shows a huge opportunity to develop solutions to increase productivity in this space. Hydroponics for instance, enables farming without the use of soil and can be used for urban and vertical farming to accommodate rapid urbanisation rates. Soil testing and pest detection ensure that critical nutrients aren't being depleted and that crops are properly managed. Crop insurance allows farmers to recover from external shocks, hence ensuring their livelihood.

Nevertheless, this report intends to mark a clear distinction between the role technology can play and the need for critical infrastructure and economic fundamentals at all levels. Macroeconomic aspects such as currency volatility, especially in the context of the cash-based economies where smallholder farmers operate, as well as roads and access to cold storage facilities, cannot be neglected or discussed in isolation. In order to increase the opportunities and share the costs and risks of innovations in a complex environment, efforts towards a more productive food system in Africa are being sustained by partnerships and collaborations between a wide range of public and private stakeholders. In order to meet the SDG objectives of increased food security by 2030, significant investment and support from both local and international investors, government agencies, donors, and private sector is needed, but there is a strong need to push for a coordinated agenda aimed at de-risking investments all along the growth trajectory of

businesses in this sector, from ideation to scale. As Founders Factory Africa's Rajiv Daya remarks, "*Rajiv Daya, Head of Investment at Founders Factory Africa, says, "the VC approach tends to favour sectors such as fintech, because they have the potential to scale or be replicated across other regions, owing to an existing and growing base of enabling digital infrastructure. The African AgTech sector, on the other hand, is unable to scale quickly in its present form."*

It is evident that private capital and a thriving M&A market tend to develop as a result of a

functioning and affluent environment, and the current scattered investor landscape and limited success stories which are often attributed to outliers rather than trends, are yet to reach the necessary critical mass to appeal to more investors. Isolated pools of largely donor-based funding cannot serve as a panacea. Governments continue to play a crucial role in supporting, investing in, and subsidising food production, as well as creating the necessary infrastructural environment and regulatory framework for the food system to thrive.

Farmer in field – WFP/Fredrik Lerneryd



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APPENDIX: PARTNERSHIPS & PROGRAMMES

The list below provides an overview of some of the global programmes, initiatives and partnerships aimed at supporting innovators in the food system in Africa and the five countries in focus for the study.

Agri-Business Capital (ABC) Fund

The ABC Fund is a private investment fund providing blended capital solutions and technical assistance to rural SMEs and agribusinesses, and implemented by Bamboo Capital Fund, Injaro Investments Limited, with contributions from European Commission, the Organisation of Africa, Caribbean and Pacific States, IFAD, Luxembourg and the Alliance for a Green Revolution in Africa.

AgriInvest Initiative

AgriInvest is an initiative by FAO that leverages public funds to attract private investments in agriculture and the food system.

Agripreneurship Alliance

The Agripreneurship Alliance is a Swiss based non-profit organisation that partners with universities to provide business training courses for young entrepreneurs in the agri-food sector. Dr Anne Roulin, president of the Agripreneurship Alliance (AA), suggests that there are many young people that are passionate about agriculture, but their projects sometimes lack the substance and appropriate business plan to get started. The interactive courses provided by the organisation seeks to help agripreneurs build a unique selling proposition, determine who their target customers are, and how to create an operational strategy and pitch for investors. At the end of the 12 week module, the students submit their business plan to the AA team, who provide constructive feedback and a small cash prize for the best plan.

AgriTech Challenge 2021

The AgriTech Challenge 2021 is an initiative of a new platform set up to enable cross-border exchange of innovations, insights and investments, and is driven by the UN Capital Development Fund (UNCDF), Atal Innovation Mission, NITI Aayog (Govt. of India), Bill & Melinda Gates Foundation, Rabo Foundation, International Fund for Agricultural Development (IFAD), and Bayer.

Agrobiodiversity Innovation Challenge

The Agrobiodiversity Innovation Challenge is a global competition for innovators in the food and agricultural sector, focusing on companies that increase productivity and resilience on food systems. Winners of the challenge receive training, networking and partnership opportunities, cash prizes, technological guidance and more. The challenge is implemented and supported by, Ministry of Foreign Affairs and International Cooperation, Bioversity International & CIAT alliance, CGIAR, CIHEAM, IFAT, Instituto Italiano di Tecnologia, IITA BIP Business Incubation Platform, Rockstart, The Lexicon, FAO, WWF, and many more.

AgVentures

AgVentures is a leading agritech and foodtech investor in Africa, primarily focused on private sector companies.

Comprehensive Africa Agriculture Development Programme ex-Pillar 4 (CAADP-XP4)

The CAADP-XP4 is a 4 year project set out to enable research and development initiatives that boost the transformation of agriculture and food systems, and is being implemented by CORAF, ASARECA, FARA, CCARDESA, and funded by the EU and IFAD.

Consultative Group of International Agricultural Research (CGIAR)

CGIAR is the largest agriculture innovation network with a research portfolio of US \$900 million, over 3000 partners and clients in 70+ countries focused on enhancing food and nutrition security through a science-based approach to emerging development issues. The main scientific areas of focus include, supporting food systems transformation driving sustainable land and water use, supporting resilient agri-food systems, and genetic innovation through crop breeding and seed systems for adaptation of food and farms to meet goals for poverty reduction, gender equality, nutrition, climate, and the environment. Mercy Zulu-Hume, Sustainable Finance Specialist at CGIAR Sustainable Finance, explains that through its 8000+ researchers and technicians operating in Latin America, Africa, South Asia and South East Asia and the Pacific, and 3,000 partners and clients, CGIAR has the networks and experience as a technical assistance provider to harness science and innovation to reorient and leverage capital flows towards scalable and sustainable investments that transform food, land and water systems.

Digital Agri Hub

The Digital Agri Hub is a multi-actor knowledge broker and matchmaking platform launched in October 2021 with the objective of tracking the development of digital agriculture in Africa, with partners Wageningen University and Research (WUR), GSMA - Mobile For Development, Grameen Foundation, Netherlands Advisory Board on Impact Investing, and funders FCDO, USAID and Bill & Melinda Gates Foundation.

East Africa Accelerator

East Africa Accelerator 2021 is an accelerator programme implemented by Ikea Foundation and Acumen that is supporting 15 startups across East Africa, combining learning and coaching.

Founders Factory Africa and Small Foundation

Founders Factory Africa is building, investing in, and supporting 18 founders and their ventures over the next three years across various sub-sectors in AgTech. Small Foundation is one of three major corporate investors in Founders Factory Africa (alongside Standard Bank and Netcare), and they are seeking to improve the business ecosystems that increase income opportunities for small businesses. Founders Factory Africa and Small Foundation are working together to bring a commercial lens to impact-underpinned venturing, showing that scale is achievable in AgTech and that it is possible to grow startups on the continent that deliver tangible commercial and impact returns.

Fund for Rural Prosperity I (Mastercard Foundation)

Fund for Rural Prosperity | is a programme and \$50 million challenge fund run by the Mastercard Foundation aimed at supporting financial products reaching rural users in Africa.

Generation Africa

Generation Africa is a partnership initiative operating in the agri-food sector and supporting young entrepreneurs. The initiative is behind the GoGettaz movement, which is a community for entrepreneurs and that offers a competition for agripreneurs. The programme is supported by a range of partners, including Yara International, Econet, Alliance for a Green Revolution in Africa, Corteva Agriscience, Syngenta Foundation for Sustainable Agriculture, Southern African Confederation of Agricultural Unions, U.S. Agency for International Development, Heifer International, Norwegian Agency for Development Cooperation, African Development Bank, Nourishing Africa, and One Young World.

Global Alliance for Improved Nutrition (GAIN)

GAIN works with partners globally to improve health and nutrition for all, and are behind a number of alliances made up of the private sector, governments, academia, consumer groups and development partners, including Food Fortification Alliances and Postharvest for Loss Alliance for Nutrition. The interventions are designed to be driven by the private sector and markets, with support from the government.

GSMA Agritech programme

GSMA Agritech programme, formerly GSMA mAgri, is an initiative seeking to support and scale commercially viable digital agriculture solutions. Supported by the United Kingdom's Foreign, Commonwealth and Development Office (FCDO) and the Australian Department of Foreign Affairs and Trade (DFAT), the programme provides digital service providers with funding and technical expertise.

International Institute of Tropical Agriculture (IITA)

The IITA is a non-profit working to improve food and nutrition security through agricultural innovations and research that addresses staple food crops. IITA works with a range of partners to deliver training programmes and capacity building.

ISF Advisors

ISF Advisors is an advisory group delivering research, partnership opportunities and investment structures, and is supported by the USAID Feed the Future Initiative and Mastercard Foundation Rural & Agricultural Finance Learning Lab.

O-Farms

O-Farms is an SME business accelerator programme launched in 2021 focused on circular agriculture in Kenya and Ethiopia. The programme was set up by Bopinc and Village Capital, with support from the IKEA Foundation.

One Acre Fund

One Acre Fund is a non-profit organisation providing smallholder farmers with a bundle of services, including resources, financing, asset-based loans, market facilitation and training.

Partnership for Inclusive Agricultural Transformation in Africa (PIATA)

PIATA is a five-year and \$280 million partnership set up in 2017 aimed at transforming agricultural systems and catalysing inclusive development across 11 countries, and is represented by global agencies and institutions, including Bill & Melinda Gates Foundation, AGRA, Rockefeller Foundation, Department for International Development (DFID), Federal Ministry for Economic Cooperation and Development BMZ Germany, United States Agency for International Development (USAID), and UK Foreign, Commonwealth & Development Office (FCDO).

PRIME Africa

PRIME Africa is a programme led by IFAD, the EU Commission, DMA, and African Institute for Remittances, aimed at maximising the impact of remittances and empowering individuals to increase their financial resilience. Two of the target demographics of this initiative include rural dwellers and agribusinesses.

Rural and Agricultural Finance Learning Lab

The Rural and Agricultural Finance Learning Lab was an initiative set up by the Mastercard Foundation that ended in May 2021. The Lab was created in an effort to foster knowledge creation, sharing and collaboration for smallholder farmers and other rural clients, and was implemented by Mastercard Foundation, Global Development Incubator (GDI), Dalberg, Fund for Rural Prosperity, AgDevCo, One Acre Fund, ICCO Cooperation, KCB Group, Opportunity International, Kiva Labs, Root Capital, and Mercy Corps.

Scaling Digital Agriculture Innovations through start-ups (SAIS)

SAIS is a five-year project that commenced in 2019 aimed at supporting digital agricultural ventures through increasing technological, organisational and financial capacity building, and is run by GIZ, Federal Ministry for Economic Cooperation and Development (BMZ), Co-creation Hub (CchUB), GreenTec Capital Partners, and Luvent Consulting GmbH.

THRIVE Agrifood Accelerator Programme

THRIVE is a global venture and innovation platform offering an award-winning accelerator programme and corporate innovation programme implemented by Silicon Valley Capital. Thrive has a range of corporate, government and ecosystem partners, including AFN, Amazon, AgTechUCD, EY, and Forward Fooding.

Value4Her Connect

Value4Her is a programme implemented by AGRA, supporting women in agribusinesses through capacity building and the facilitation of advocacy and knowledge networking. The Value4Her platform provides a one-stop solution for agribusiness needs, helping women reach new markets and acquire capital. The platform is backed by Bill & Melinda Gates Foundation, The Federal Ministry for Economic Cooperation and Development (BMZ), The Rockefeller Foundation, UKAID and USAID.

Yalta Initiative

The Yalta Initiative is a programme implemented by the Netherlands Food Partnership and the IKEA Foundation aiming to foster business opportunities for youth in agroecology and sustainable agriculture. The initiative is focused on engaging a wide range of stakeholders, from agripreneurs, to policy makers and academia, in order to increase knowledge sharing across the board.

Yara International

Norwegian soil fertiliser giant Yara International is involved in Africa's agricultural innovation by directly addressing smallholding farmers and initiatives, such as AGRA and Generation Africa.

CONTACTS

Briter Bridges:

<https://briterbridges.com/>

Briter Intelligence:

<https://www.briterintelligence.com/overview>

World Food Programme (WFP):

<https://www.wfp.org/>