



## Pioneering AgTech solutions for smallholder farmers in Tanzania and beyond - The mFarming model

A case study of Sibesonke Ltd in Tanzania

## Who we are

AECF (Africa Enterprise Challenge Fund) is a leading non-profit development organisation that supports innovative enterprises in the agribusiness and renewable energy sectors with the aim of reducing rural poverty, promoting resilient communities and creating jobs.

AECF has raised over US\$ 400 million to provide catalytic funding and technical advisory support to enterprises that struggle to meet traditional risk-return standards for commercial investors. In just over a decade, we have supported over 375 businesses in 26 countries in Sub-Saharan Africa, impacted more than 30 million lives, created over 27,000 direct jobs, and leveraged US \$771 million in matching funds.

We surface and commercialize new ideas, business models and technologies designed to increase agricultural productivity, improve farmer incomes, expand clean energy access, reduce greenhouse gas emissions and improve resilience to the effects of climate change while also addressing the crosscutting themes of women, youth, and fragility.

AECF is committed to working in frontier markets, fragile contexts, and high-risk economies where few mainstream financing institutions dare to go. In 2021, the AECF launched a refreshed strategy with the objective to build resilience and sustainable incomes for rural and marginalized communities in Africa.

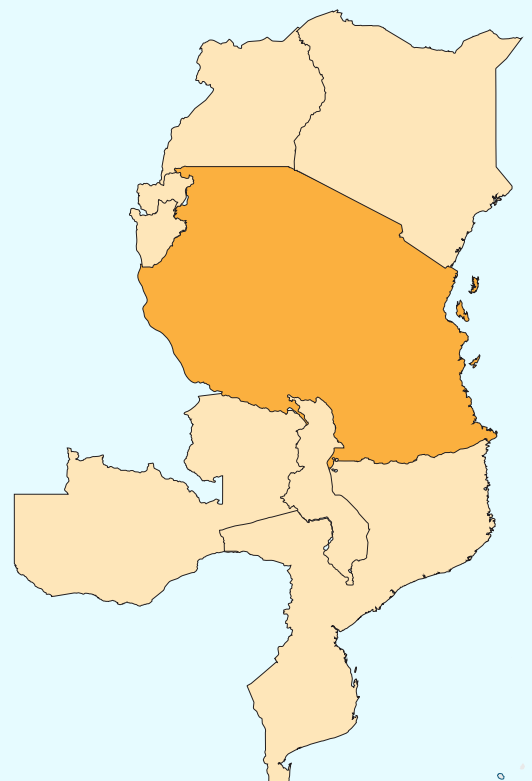
## The Tanzania Agribusiness Window (TZAW)

The Tanzania Agribusiness Window (TZAW) is a US\$ 38M ten-year programme funded by the Foreign Commission Development Office (FCDO) and the Swedish International Development Cooperation Agency (Sida).

The programme seeks to address challenges of the availability, acceptability, affordability, and accessibility of agricultural produce and products by making food supply chain dynamics more efficient and effective to serve the poor; increasing the availability of agricultural inputs such as improved seeds, agrochemicals, fertilizers, veterinary services, transportation, and information; and enabling access to processing infrastructure in both rural and remote areas. The programme also seeks to increase the production and productivity of smallholder farmers thus increasing the availability of food, stabilizing prices, and ensuring a healthier population.

AECF has invested in more than 50 agricultural-oriented companies in a wide range of value chains ranging from seed companies, horticulture, fruit and vegetables, potatoes, fertilizer, and cashew nuts. The program has impacted tens of thousands of rural people, introduced innovative technologies, and changed how markets work for the poor.

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## Linking farmers to markets with innovative digital technologies

Agriculture is the backbone of Tanzania's economy accounting for 29.1% of the share of GDP (NAO-URT, 2019). Small-scale farmers cultivate 5.1 million hectares annually, of which 85% is food crops, accounting for 75% of agricultural outputs and employment, with women constituting 70% of this labour force. While the percentage share of the rural population engaged in agriculture continues to decline as more non-farm opportunities become increasingly available, technology plays an integral part in leveraging agricultural information (Wineman et al, 2020)

Agriculture in Tanzania is hampered by over-dependence on rainfall, poor farming practices, unreliable markets, climate change effects, poor rural transport infrastructure, low-value addition, limited post-harvesting practices and poor policies and regulatory environment. These constraints are often aggravated by lack of access to timely, relevant and reliable agricultural information on technologies and solutions: markets, finance, natural resource and climate action, infrastructure, policies and regulations.

Mobile telecommunications in agriculture offer the potential to bridge this information asymmetry by leveraging access to agricultural information across all phases of the agricultural value chains (Sife, A.S, 2018). The Tanzania Communications Regulatory Authority (TCRA, 2021) indicates that Tanzania has 53 million mobile subscribers (89% of the population), 29 million internet users and with a mobile Short Message Service (SMS) traffic of 11 billion per month - or at least 2 SMS per mobile subscriber per month. Agricultural technologies and solutions have emerged that provide support services to agricultural value chain actors, leveraging on the rapid increase in access to mobile phone technologies.

The intersection of the agricultural economy and the expanding use of mobile phones has led to innovations related to mobile phones for a range of agricultural services including the connection of farmers to buyers, the provisioning of inputs for farming, and the formal and informal exchange of agricultural information in Tanzania (Aker et al, 2016).

mFarming by AECF investee Sibesonke provides the opportunity of coordinating small holder farmers and value chain actors by providing access to agricultural information. Agricultural input suppliers can provide information on product availability, performance and cost directly to farmers and farmers and aggregators can inform off takers of their production. Governments and policy makers can also directly communicate with farmers to understand needs and inform them of relevant changes to the regulatory environment.

## Building an information platform for farmers

Sibesonke Ltd (a spinoff from Nokia's Emerging Market Team), develops innovative solutions for developing countries. In Tanzania, Sibesonke works through a local partner Tai Mobile Solutions (TMS) based in Dar-es-salaam with defined roles, where, the innovation product development division is led in Finland, while TMS focuses on marketing and sales, customer care and client relations.

The Agri-trading and CRM platform is an innovative business model that interfaces input supplies, marketing and distribution and extension services. It was founded on the need to facilitate agricultural information and trade through connecting smallholder farmers, who are often located in remote areas and geographically isolated, to input providers and farm output markets. Facilitating synergies between actors in an often-fragmented agricultural value chain was the core aim of the m-Farming platform.

Coordinating access of all stakeholders to the platform will lead to increased farm productivity, higher profitability for individual (smallholder) farmers, new entrepreneurial opportunities for rural agro-

dealers and traders and market opportunities for Agri-service providers and complimentary product vendors. The model offers free entry and access to smallholder farmers and generates revenue by leveraging on the mass market, providing corporate clients with appropriate CRM tools and facilitating platform access for farmers to sell their products and services.

AECF investment in mFarming was implemented between 2015 and 2020. The innovation was to create a platform of [mostly] small holder farmers creating mass demand and a market for agricultural information, services and products. The platform attracts agro-companies by offering:

- i. Two-way communication platform over any phone and any network, with an in-built reverse billing option which disseminates product information and application guides without farmers being billed.
- ii. Farmer can rapidly find an agro-dealer and the product information, while the agro-dealer can also promote their business offerings through

- iii. Access to a dashboard by agro-companies (or product vendors) that provides customer insights, direct marketing through the two-way communication system and feedback to improve the distribution chains and better use of their products.
- iv. Additional access to pay-for-information services offered to corporate clients and agro-dealers.

The rationale for operations of the business model is illustrated below. Figure 1 depicts how the model intended to crowd-in value chain actors, while Table 1 summarizes how the stakeholders' interactions through the platform create the potential benefit.

Sibesonke thus anticipated to affect systems change and factor markets through crowding value chain actors into the platform at two levels:

- i. Primarily; farmers, input providers, and product off-takers will interact making the trading platform functional.

- ii. Secondary, complimentary product providers of solar, irrigation, water pump solutions; financial services, distributors and networks would eventually be attracted to leverage on the potential market. These functional relationships will then expand the mass market and create value to all value chain actors, as catalyzed by the trading platform and its associated CRM tools.

mFarming expected to generate most of its revenues through corporate clients by:

- i. SMS revenue shares with Mobile Network Operators (MNOs).
- ii. Input providers, off takers and other market intermediaries such as NGOs paying for CRM tools, additional pay-for-info services such as brand and product awareness, ads, promotions, and direct marketing).
- iii. Access to customized market insight analyses.



Figure 1. How (Sibesonke's) model crowds-in value chain actors



Agri-trading & CRM platform actors	How they potentially benefit
Farmers	A free to access large scale SMS platform will attract producers, create demand and market and bridge information gaps in agricultural value chains. This will facilitate access to services and products of better quality and at better prices for farmers both when buying inputs and selling their products, leading to improved productivity and incomes.
Input providers	Input providers have access to appropriate CRM tools which they can use to directly communicate information on their products to farmers, create demand and expand market and thus sales directly with farmers or through local distributors.
Product buyers	Off takers and aggregators can communicate directly with farmers to understand the volumes, quality, and price of their products in real time as well as monitor production throughout the season. Information can be provided to farmers on market demands, helping buyers to maximize quality, minimize costs, and allow farmers to make informed decisions on when it is best to sell and to whom.
Complementary services and product vendors	As the mass market expands, opportunities emerge to crowd in complementary product vendors such as solar companies, irrigation solution providers, crop, and climate risk insurance providers etc. At the same time, NGOs and other companies providing value chain services can also engage directly with farmers to improve access to information and complementary services.
Financial service providers	Financial service providers can link directly with farmers and provide credit or loans for agricultural value chain operations, or develop mechanisms with input providers, product buyers or farmer organizations to channel agricultural credit and financial solutions.
Distributors & networks	Input distributors at the local level will be visible to farmers and thus offer increased access to agricultural inputs of assured quality from recognized input providers to the farmer closer home, reducing challenges of counterfeits. Transporters can take advantage of understanding product volumes available at certain points or centers and move the products for the buyers efficiently and at agreed costs.

Table 1. Potential benefits that the platform provides to key value chain actors

## Implementation progress, challenges, and lessons

### Implementation progress

The AECF investment intended to introduce a robust mass-market agricultural trading and CRM platform as functional add-ons into the existing mFarming platform. Specifically, the investment supported product development, trade and sales' solutions, service moderation within the platform, marketing, customer care and training of agro-dealers to catalyze efficiencies in the marketing and trading platform.

1. The platform massively increased the number of registered farmers to mFarming

The number of smallholder farmers registered on the platform more than doubled between 2015 (750,000) and 2016 (1,520,000). In 2019 and 2020, the number of users<sup>1</sup> had reached 3.3M and 4.1M, respectively. While the actual numbers continued to increase over the investment's implementation period, the percentage year-on increase fluctuated.

This variation in uptake is consistent with technology adoption behavior of farmers, where initial waves of enthusiasm are followed by individual analysis of benefits to adoption and decision making on the value of the technology before consistency in use stabilizes.

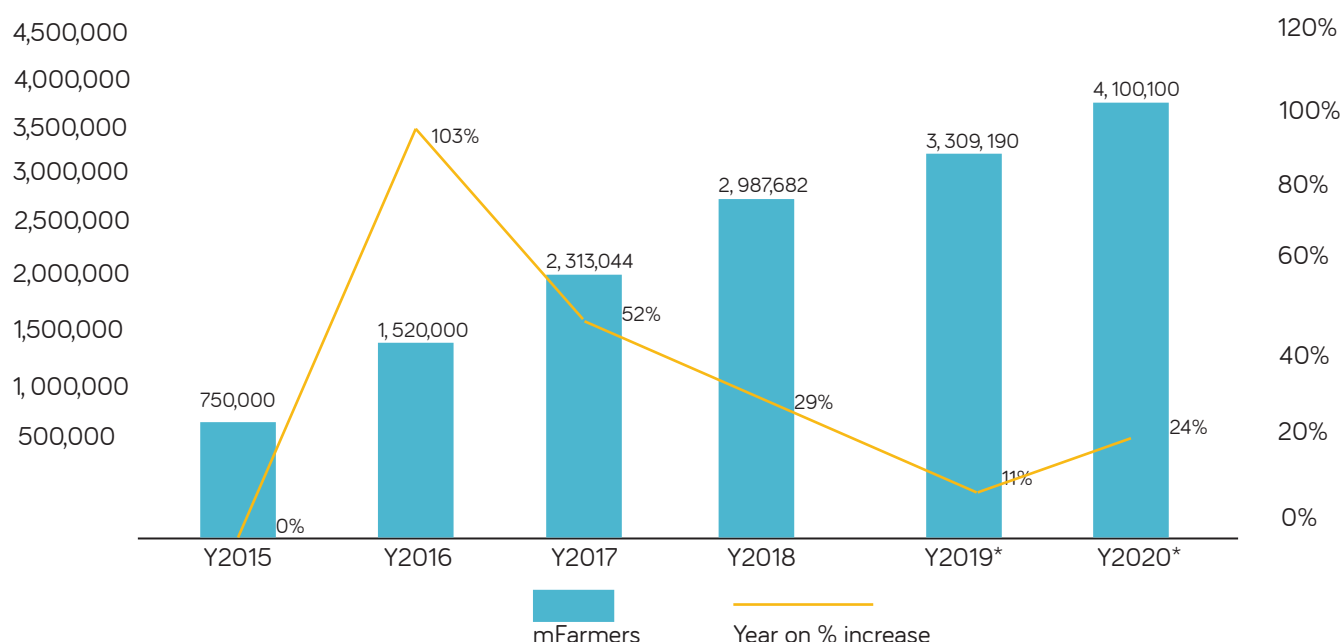


Figure 2. Registered platform users by year (2015-2020)

The significant increase in platform users was driven by a range of factors: Radio based platform promotions conducted with YARA in the Southern Highlands of Tanzania and the Clouds FM<sup>2</sup> 4-week radio campaigns; expansion of platform solutions introducing dedicated short code for farm input companies; introduction of the SME (Small and Medium sized Enterprise) platform to link farmers and agro-input suppliers; inclusion of a satellite weather forecasting provider (SIKIA) in the platform; the partnership with HALOTEL<sup>3</sup>; digitization of input orders and field data for input companies; the Agro shop solution integrated into the platform with internationalization features, and additional strategic partnerships with Farm-to-Market Alliance (FtMA) solutions and Catholic Relief Services (CRS) 'Soya ni Pesa' project

## 2. Corporate clients and partnerships improved business performance

The business model rightly anticipated that bringing farmers (smallholder and large scale) into the platform creates the market, while the corporate clients and strategic partnerships who pay for services, generate revenue. Significant traction had been made in creating solutions that attracted corporate<sup>4</sup> and strategic clients into the platform by 2017, generating a net profit of \$ 337,754. Income dipped in the following year due to external challenges particularly around the communications regulations in Tanzania but has since continued to rise – albeit marginally.

Notwithstanding the revenue fluctuations, the positive business performance between 2017-2020 was driven by some of the follow key initiatives:

- The SME (Small and Medium sized Enterprise)

platform integrated as a farm-to-market platform, following the successful market feasibility study in 2015 and iterations in 2016, added 96 maize and rice millers and 120 agro-dealers into the platform in 2017.

- A Smartphone App for field staff for a Kenyan company, which was developed and later adapted to customize field farm-data collection, field officers and farmers' agronomic oversight of operations for input companies in Tanzania, Kenya, Rwanda, and Zambia.
- SIKIA satellite weather forecasting portal integrated into the platform, offering services to 28,000 platform-registered farmers, and generating some revenue.
- The strategic partnerships with HALOTEL company, Catholic Relief Services-mFarming solution for the "Soya ni Pesa" project and World Food Programme's Zero Hunger Initiative for rice/maize buyers and input providers.

## 3. Unique and sensitive strategy and solutions, attractive and sustained clientele base.

The innovative solutions and CRM tools that were integrated into the Agri-trading and CRM platform were sensitive and responsive to the needs of platform users.

These catalyzed trade in the platform, increased interest and expanded the number of users as well as attracting new partners. Additionally, through continuous feedback loops with platform users and learning through piloting innovative solutions, a current sales strategy was developed founded on three principles: viral marketing tailor made for Africa; platform automation and network effects, where the value of services increases with the number of users.

#### 4. Positive investment growth moved the innovation to maturity

The investment consistently grew in maturity from its inception through to the end of implementation period. Starting from the early operation and validation stage in 2015-2017, the design reviews and user feedback were critical in redesigning the products to meet the needs of different users.

These innovations increased user numbers, improving the platform solutions needed to drive user interface, trading and information distribution within the platform and building significant interest from the market.

By 2020, strategic partners had either seen the benefits or understood the opportunity to partner, enabling the platform to move to scale.

Geographically, clients were serviced through offshoot solutions in Kenya, Rwanda, and Zambia, but also with internationalized functionalities for the Agro shop App to reach many other countries in Africa. Product scale has been varied and included the customized solutions for Soya (CRS-Tanzania), the specific focus on maize production and offtake (Farm to Market Alliance) and emerging opportunities in vegetables and organic avocado farming.

#### Investment challenges and responses

The Agric trading and CRM platform, being digital, faced policy and regulatory challenges, platform, and competition issues as well as investment funding for scale. This is illustrated below.

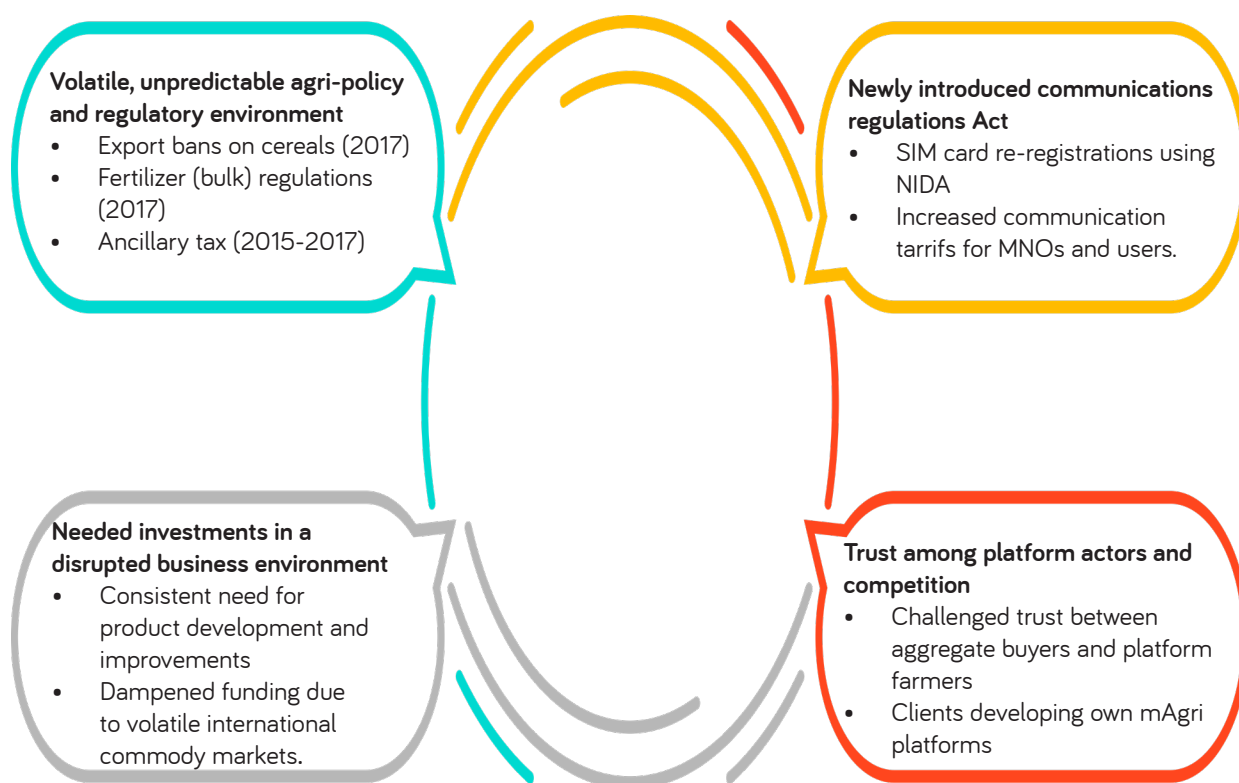


Figure 3. Investment challenges - a synthesis

On the policy and regulatory front, agricultural trading and markets were affected by the introduction of export bans on cereals (2017), fertilizer regulations (2017) and the imposition of an 18% ancillary tax (2015-2017).

The requirement under the communications Act to re-register SIM cards using the National Identification Authority (NIDA) numbers, led to a considerable number of people losing access to mobile services, while increase in the communication tariffs and changes in Sibesonke's revenue share with mobile network operators (MNOs) directly impacted the platform.

Trust was highlighted as a major challenge within the platform, especially between farmers and product buyers where side-selling undermined platform integrity based on unrestricted access to information

and market systems.

However, competition was limited as Sibesonke already had an advantage in product development. The main source of competition was clients who develop their own m-agric platforms to leverage on the advantages and benefits of a digital marketplace. Sibesonke attracted new investments to enable it develop new customized products and solutions demanded by clients.

The volatile international commodities market made investors cautious and as such Sibesonke sought strategic partnerships with CRS-Soya ni pesa and WFP-FtMA to support scale.

### Investment Lessons and AECF additionality

The investment has generated some key lessons, but also highlights AECF's additionality.

#### Product market research and development is critical

The market study on BUY-NOW supported introduction of the SME platform which drove platform trade in agro-inputs and output, and subsequent iterations created opportunities for further value-adding partnerships.

#### Customer feedback and market insights drives real-time adaptations

Immediate responses to customer feedback and market insights from platform data improved the quality of solutions deployed and facilitated sustained engagement of both customers and clients.

#### Bundled services generate optimal benefit

Farmers derive optimal benefit from the platform if inputs, outputs, financial, weather, insurance, market information and services are delivered concurrently to allow for variety of appealing options to choose from.

#### Trust improves transparency and vice versa

Trust or lack of it facilitates or curtails trade (especially among output markets which is still fragmented) and solutions to expand strong and trusted partnerships with value chain actors improves trust and facilitates transparent platform trade.

#### Diversifying customer base and scale manages business risks

Technology adoption among farmers is often slow and diversifying the customer base absorbs this risk. However, when regulatory risks multiply, entry into other economies with low policy and regulatory risks (read-Tanzania national elections) provides reprieve and reduces risk.

#### Policy and regulatory environment affects business performance

While policies and regulations impact business environment, compliance and linkage with local partners and managing relations, contribute safe passage This had effects on business performance, and political economy analysis are needed in future especially when governments change.

#### Mass market models work and can be scaled

Mass market models work in their creation of demand for interested players, however pay-for-service clients are critical for business viability, and scale must be sensitive to differentiated contexts and need continuous customization which requires additional investments.

#### Emerging opportunity in horticulture and organic farming

Significant opportunity is emerging in horticulture and organic farming, currently gaining momentum and if supported by robust policy and regulatory environment, will facilitate greater trade in the platform.



AECF additionality is manifest in the opportunities it created through linkage to AGRA, focus on gender and youth empowerment driving additional partnerships in

and providing a spark for additional product development, strategic partnerships, and scale.

### Linkage to AGRA opened up opportunities

- Linkages provided by AECF to AGRA supported the development of FtMA partnerships that included UN-WFP, IFC, AGRA and YARA, enabling the investment to scale both geographically and in products range (including Maize and Rice).

### Gender insights built interests for partnerships

- The market insights (critical for AECF funding) which showed that women were not adequately benefitting from the platform, occasioned YARA to support studies and innovations to increase women participation in agricultural markets

### AECF funding catalysed opportunity for partnership and scale

- AECF funding provided the spark that facilitated increased product developments and improvements, which in turn attracted interest for approaches to scale into countries outside of Tanzania, as well as leveraging additional funding.

## Development impact on smallholder farmers

The investment anticipated that when the platform users increase, trade in inputs and outputs will be facilitated and smallholder farmers and SMEs in the farm input distribution chains will benefit.

While the investment demonstrates significant increases in platform users, including smallholder farmers, input providers, product buyers, and volumes

and variety of inputs and products traded, it is not always easy to quantify the exact development impact.

The figure below illustrates traction against some of the assumptions undergirding the development impact:

### Some assumptions

The price paid to smallholder farmers for products aggregated on the platform will be higher than farmgate prices.

Smallholder farmers and service providers adopt digital platform solutions to do trade more efficiently.

AgTech platforms allow to do business more efficiently and respond faster to market disruptions (diseases, climate change, etc).

### Evidence of development impact

Crop prices paid to small holder farmers through the platform exceeded \$230,000 by June 2020. Each farmer receives significantly higher prices compared to other traders who show up at the farmgate.

As an AgTech pioneer, mFarming spearheaded the adoption of digital solutions in agriculture. Its experience was key for being selected as technology pioneer in the Farm-to-Market Alliance (FtMA) orchestrating 10,000 farm input orders worth \$3M and 4000MT of products traded.

mFarming facilitated the fast COVID19 emergency response of a large fertiliser company to 80,000 farmers with the support of AGRA, and continues to introduce new products faster to rural markets.

## Market systems change

The Agri-trading and CRM platform targeted to effect systemic change by creating a mass market and solutions that facilitate trade, information, and markets within the platform. In doing so, it anticipated crowding in, replication/copying and competition. While all these have been experienced, albeit with diverse levels of results, major changes in policy and regulatory environment were not anticipated.

### i. Diverse actors and service providers crowded in to benefit through the platform.

The platform facilitated interest among value chain actors, who saw the mass market as an opportunity to leverage their products. While most of these actors eventually joined the platform as corporate clients or strategic partners, their leverage catalyzed trade increased platform users but also acted as an opportunity for revenue generation. Some of these include: Halotel which brought in new subscribers; UN-WFP facilitating cereal millers' engagement and trade within the platform; SIKIA satellite weather platforms; and vendors of complimentary products and services including solar powered solutions for agriculture, drip irrigation providers and water pumps showed interest. Whereas it was also anticipated that agro-dealers would be more visible and connect the last mile at the primary markets through the platform, evidence of this has shown only after the project.

### ii. The innovation was copied and replicated in parts

The platform, driven by its innovative solutions,

supported replication of certain aspects. The solution designed for the Farm-to-Market Alliance supported the cereals trade for the consortium including UN-WFP, YARA, AGRA and IFC and was later appropriated by UN-WFP into their institutional platform with the support of Sibesonke. The field staff smartphone App, for coordinating field staff & farm data, was not only improved but taken to scale in East Africa. Other big agricultural corporations learned from the platform and copied some aspects, with most requesting Sibesonke to work with them to expand the platform capabilities to other African countries they operated in.

### iii. Increased competition in digital markets not a big threat to the innovation

The platform offered some key 'firsts' in the digital market landscape. The two-way communication and the cross MNOs capabilities gave it an edge over most potential competitors, who still used bulk SMS under one way communication platforms. The continuous improvements in the products and solutions based on customer feedback and market insights allowed the platform to evolve and adapt to the realities of its clients. This ensured that clients drove the solutions and thus became partners, however, some clients developed their own m-Agric platforms with the intention to have more control and to coordinate specific value chains. As a learning, Sibesonke now operates a high-scale, high-impact platform business to make farm inputs for smallholder farmers more affordable and reachable.

## Conclusions

The mFarming AgTech platform effectively created a mass market of smallholder farmers in Tanzania that attracted agricultural value chain actors to leverage from the opportunity. Sibesonke's edge in product development, unique platform innovations and effective client relations facilitated this growth and brought years of valuable experience in the agriculture sector. Sibesonke can use all learnings now in its new high-scale AgTech platform business.

The policy and regulatory environment have not been friendly to the investment, although Sibesonke weathered this challenge through fronting the local partners and prioritizing compliance. The change in government in 2015 introduced an array of policies and laws that directly impacted agricultural value chains as well as the communications sector. While the export bans on cereals reduced volumes of trade across countries, the fertilizer (bulk) regulations affected access and reduced fertilizer use among smallholder farmers. The ancillary tax affected costs of transport and distribution within local trade systems before its waiver in 2017. The communications act increased tariffs for mobile communications that affected not only the revenue share arrangements with MNOs, but also the costs of using SMS, data, and voice. It also led to large numbers of SIM cards being cancelled which had direct effects on the participation in the platform as well as revenues. However, the sixth government has now introduced progressive policies which are supportive of the private sector and are reviewing the ICT and digital landscape as opportunities to facilitate greater trade and development of the agricultural sector.

The prospects for Sibesonke look promising in the new political dispensation in Tanzania. Not only have new opportunities in horticulture and organic farming emerged but more importantly Sibesonke now operates a high-scale, high-impact platform business that makes farm inputs more affordable and faster reachable for smallholder farmers. This benefits agricultural stakeholders including farmers in their normal business and even more in times of climate change and new diseases.

## End Notes

- 1 Users here refer to all platform participants, irrespective of whether they actually transacted within the platform or not.
- 2 Clouds FM is a national Radio and TV broadcasting station in Tanzania <http://cloudsmedia.com/profile/clouds-fm-radio/>
- 3 HALOTEL is a Mobile Network Operator (MNO) in Tanzania
- 4 The corporate and strategic clients included: Yara, Olam, Seedco, HALOTEL, CRS, FtMA (WFP, AGRA, IFC, YARA), AgaKhan Foundation, SIKIA, Clouds FM and a range of other training providers including NGOs
- 5 This is because at the time of documenting the case study, specific data on price offered for inputs and outputs traded in the platform, actual volumes traded and the value thereof were not accessed.

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