



FERTILE GROUND

A 2015 Kenya Ecosystem Review & Strategic Perspective On Digital Financial Services for Smallholder Farmers

November 2015

A White Paper prepared by the Mercy Corps AgriFin Accelerate program for The MasterCard Foundation.



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List of Acronyms/Specialized Terminology

AD	Alternative Data
AFA	AgriFin Accelerate program of Mercy Corps, supported by the MasterCard Foundation
AGRA	Alliance for Green Revolution in Africa
B2B	Business to business payment
B2C	Business to consumer payment
CBA	Commercial Bank of Africa
Chama	Kenyan informal savings group
CGAP	Consultative Group to Assist the Poor
DFS	Digital Financial Services
FAO	Food and Agriculture Organization of the United Nations
FSP	Formal Financial Service Providers
G2P	Government to Person Payment
GoK	Government of Kenya
GSMA	Groupe Speciale Mobile Association
ICRW	International Center for Research on Women
ICT	Information and Communication Technology
KCB	Kenya Commercial Bank Group
MCF	The MasterCard Foundation
MFI	Microfinance Institution
MNO	Mobile Network Operator
MSD	Market System Development Approach
SHF	Smallholder Farmer
VAS	Value-Added Service Provider



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Key Country Statistics

Table 1: Kenya General Indicators¹

Indicator	Unit	Kenya
Population	#	44,863,583
Rural Population	% of population	74.8
Female Population	% of population	50.01
Population ages 15-24	% of population	18.7
Population ages 15-64	% of population	55.12
Population ages >65	% of population	2.76
GNI per capita	\$	1,290.0

Table 2: Kenya Financial Inclusion Indicators²

Indicator	Unit	Kenya
Financial Access Points	#	91,158
Agricultural Access Points	#	27,685
No of Accounts	% age 15+	74.7
Mobile Accounts	% age 15+	58.4
Saved at a financial institution	% age 15+	30.2
Saved any money	% age 15+	76.1
Borrowed from a financial institution	% age 15+	14.9
Borrowed any money	% age 15+	79.2

¹ World Bank 2014

² GSMA Intelligence Data Q4 2014, FSDK FinAccess survey 2015

Table 3: Kenya Communications Indicators³

Indicator	Unit	Kenya
No of Mobile Phone Subscribers	#	36.1 Mil
No of Internet Users	#	29.6 Mil
No of MNOs & MVNOs	#	6
Mobile Broad Band	% of subscribers	15
Sim Penetration	% of population	73%

³ Communications Authority of Kenya 2015 report; CIA fact book 2014

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Introduction to the White Paper

In 2015, Mercy Corps launched the AgriFin Accelerate Program, supported by the MasterCard Foundation. AgriFin Accelerate (AFA) is a six year, \$25 million initiative to support the expansion of digital financial and non-financial services to smallholder farmers (SHF) living on less than \$2.50 per day in Kenya, Tanzania and Zambia (www.mercycorpsafa.org). Building on learning from Mercy Corps' AgriFin Mobile program operating in Zimbabwe, Uganda and Indonesia, the program seeks to increase farmer income and productivity through the development of well-designed and accessible digital financial services, bundled with productivity tools and services. AFA pursues its goal by working as an innovation partner with private sector actors committed to expanding delivery of services, particularly financial services, to smallholders on digital channels.

AgriFin Accelerate Theory of Change

IF **well-designed and accessible digital financial services** are bundled with **productivity tools** and offered to smallholders AND **mobile ecosystems** are accelerated to effectively provide those services to smallholder farmers at scale THEN **financial inclusion will increase**, driving gains for farmer income and productivity with:

- Best product design will result from **farmer-centric design thinking** and **rapid iteration**
- **Bundling** will build farmer trust, reduce costs, and create shared value for partners

To build a strong evidence base for program work, AFA conducts a country-level ecosystem study with strategic learning partner, Dalberg Global Development Advisors, upon inception of each country program. The ecosystem study provides the core framework for program decision making, including selection of value chains, partners and key strategic inflection points that may have the greatest impact on smallholder farmers (SHFs). The ecosystem studies are complemented by annual representative farmer benchmark studies and client-centric research in each country, to ensure that current farmer needs and effective demand inform program direction.

This White Paper outlines the major findings of the AFA Kenya Ecosystem study conducted over a four month period in 2015, including components of desk research, expert interviews and farmer focus group discussions. We note that available data is often quite limited and make recommendations to address key research gaps moving forward. The paper is targeted at institutions working to provide digital financial (DFS) and non-financial services for smallholder farmers, as well as enabling actors including donors, investors and government bodies, in the hope the information can support the increased range, scale and

quality of services offer. The paper is organized into the following sections: 1) Introduction to the White Paper; 2) Executive Summary; 3) Kenyan Agriculture and the Smallholder Farmer; 4) Ecosystem Assessment; and 5) Opportunity Identification and Conclusion.

Through our program activities and generated learnings, we aim to support the development of vibrant ecosystems of digitally-enabled financial and agricultural services. Armed with evidence of farmer need and the models and approaches that can improve efficiency, impact and viable businesses that serve them, we hope that a wide variety of private and public ecosystem stakeholders will “crowd-in” to the DFS sector, ultimately enhancing options and driving growth for smallholders.

Executive Summary

Nearly one and a half billion poor people live on less than US\$1.25 a day.⁴ One billion of them live in rural areas where agriculture is their main source of livelihood. For the 70 million smallholder farmers living in Sub Saharan Africa, half of them women, farm productivity is only 56% of the world's average. Still, smallholders, who typically farm two hectares or less, provide over 80% of the food consumed in a large part of the developing world, contributing significantly to poverty reduction and food security⁵. Increasing fragmentation of landholdings, coupled with reduced investment support, growing competition for land and water, rising input prices, lack of farm-to-market infrastructure and climate change threaten this contribution, leaving many smallholders increasingly vulnerable.

SHFs are also the most underserved group in the world by financial services, with women and youth at a particular disadvantage.⁶ The main barriers to financial access include the costs and risk associated with serving remote areas and small scale farming. Investment in this sector is critical, however, as economic growth from agriculture is at least twice as effective in reducing poverty as growth in other sectors.⁷ At an estimated \$450 billion, the global demand for smallholder agricultural finance is largely unmet. Impact-driven agricultural lenders are estimated to reach no more than two percent of demand.⁸

⁴ IFAD, *Smallholders, food security, and the environment*, 2013

⁵ Peck, Anderson, “Segmentation of Smallholder Households: Meeting the Range of Financial Needs in Agricultural Families”, 2013.

⁶ Ibid.

⁷ Agriculture sector strategy 2010–2014, African Development Bank; World development report 2008: Agriculture for development, World Bank

⁸ Dahlberg, “Catalyzing Smallholder Agricultural Finance”, 2013

Given rapidly-growing penetration of mobile networks across Africa, digital technology can be a powerful tool to reach smallholders with information, market linkages and financial services at lower costs and at scale. A recent McKinsey study estimates that mobile and internet technology can drive up to \$3 billion in annual agricultural productivity gains by 2025.⁹ However, McKinsey points to the specific scale challenge for mobile agriculture services, recommending focus on the full ecosystem around farmers, including warehousing, logistics, finance and insurance to drive a critical mass of uptake. It is difficult for a single player to achieve scale in this space on its own. Partnerships and high functioning market ecosystems are essential to build sustainable and efficient agricultural markets.¹⁰ While technology alone cannot solve all the problems facing smallholders, strategic applications and use cases may be able help bridge some of the important barriers to serving them. Successful models, however, remain to be developed.

The core problem the AgriFin Accelerate program (AFA) seeks to address is the inclusion gap for SHFs who lack access to affordable, accessible, demand-driven financial products and services to drive higher productivity and income across Kenya, Tanzania, and Zambia. The diversity in country contexts will enable the program to introduce and prove new models across countries that are at different stages of maturity in the development of DFS. AFA is focused on understanding how providers can leverage technology to surmount the high costs and risks of serving farmers. The ecosystems required to serve smallholders are both complex and fragmented. Market actors are often hampered by lack of strong understanding of smallholder needs and are therefore unable to design impactful products, channels and other services for them. At the same time, farmers often lack the information, trust and capacity to access and productively utilize new products and tools.

This White Paper outlines the major findings of the AFA Kenya Ecosystem Study (KES) which was conducted from April to July 2015 with Dalberg Global Development Advisors on behalf of the program and the MasterCard Foundation. The study takes an ecosystem approach to understanding the market landscape and farmer needs, which includes, but is not limited to, value chain analysis. Ecosystem

Definitions: *An ecosystem is an economic community of interacting organizations and individuals. The community produces goods and services of value to customers, who are also members of the ecosystem.*

⁹ McKinsey, “Lions Go Digital; The Internet’s Transformative Potential in Africa”, 2013.

¹⁰ Grossman & Tarazi, “Serving Smallholder Farmers: Recent Developments in Digital Finance”, CGAP Focus Note, June 2014.

analysis allows AFA to contextualize impact, defining what a mature, well-functioning digital services ecosystem requires to drive understanding of where AFA can contribute with meaningful impact.

The study included a desk review of existing literature, expert interviews and farmer focus group discussions. The main objective of the White Paper is share findings from the study to inform the work of institutions seeking to provide digital financial and non-financial services for smallholder farmers, as well as the funders and policy-makers engaged in this space. Ecosystem studies in Tanzania and Zambia are planned to follow in 2016, combined with annual, representative farmer benchmark studies in each country, which will also be made public.

Key Study Findings: Fertile Ground

AFA's program has selected Kenya as the first country of operation due to its leadership position in DFS through the work of providers including Safaricom's M-PESA and Equity Bank, as well as leadership in digital entrepreneurship and innovation supporting smallholders, through the likes of iCow, Musoni, FarmForce and mFarm. Digital payments are at the core of this success story, with progressively more financial transactions in Kenyan agriculture taking place via mobile phone, utilizing a broad range of use cases. SHFs can now pay premiums and collect payouts from weather-based index insurance policies sold by UAP Insurance and the Syngenta Foundation, and can make "mobile layaway" payments for Kick Start irrigation pumps through M-PESA. MACE Foods is an example of one agribusiness paying all its employees and farmer suppliers in Kenya through mobile money, consequently reducing fraud, theft, and administrative fees, while also being enabled to track key statistical information about the farmers they work with.¹¹

But while Kenya has made important strides in digital financial inclusion over the past ten years, increasing inclusion from 42% to 75% from 2011 to 2014¹², SHF still rely on informal sources for most savings and loans and uptake of insurance to mitigate farm risks is still in its infancy. FinAccess data shows that 91% of farmers save through informal channels, reporting high levels of associated financial loss, while ~90% of smallholders borrow¹³ informally (store credit: 11%, family/friends: 53%, employer: 5%, private lenders:

¹¹ Babcock, "Three Steps to Jumpstart Agriculture Mobile Payments: Step 2 – forming strategic alliances", <http://www.nextbillion.net/blogpost.aspx?blogid+2014>

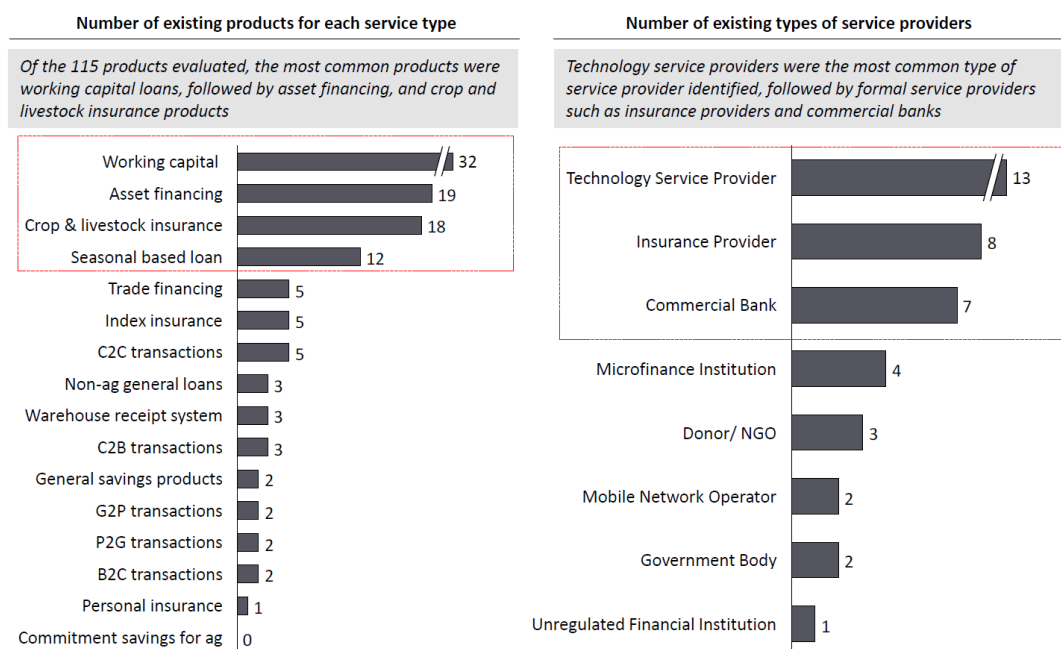
¹² World Bank Global Findex (Global Financial Inclusion Database) FSDK, Key Demographics influence and usage, 2015

¹³ The World Bank, "Global Findex Data Base; Measuring Financial Inclusion around the World", Policy Research Working paper 7255, April 2015

4%)¹⁴. Across current research, SHFs in Kenya consistently list access to markets and access to finance as their greatest needs to improve farm businesses and care for farm households.

Within this context of farmer need, we identified 115 financial service products targeting or clearly reaching SHF offered by 40 major service providers. There is a clear trend toward digital enablement, with all products either entirely or partially digital.

Table 4: Existing Products Targeting SHF and Provider Types



Within this rich environment of service provision in Kenya, it is surprising to note the low penetration of services at the SHF level. Part of the reason for this lack of mass uptake is the need for product tailoring to specific agricultural value chains and the broad range of risk management approaches that financial services providers have implemented to reduce losses, such as requiring land title or a guaranteed buyer. This often narrows the scope of product delivery, particularly across geographies and across the specific segments of smallholders, including women who rarely hold land title. Many products verge more toward medium scale farmers, which can more easily fulfill requirements, accept related transaction costs and utilize technology.

¹⁴ World Bank Global Index (Global Financial Inclusion Database), 2014

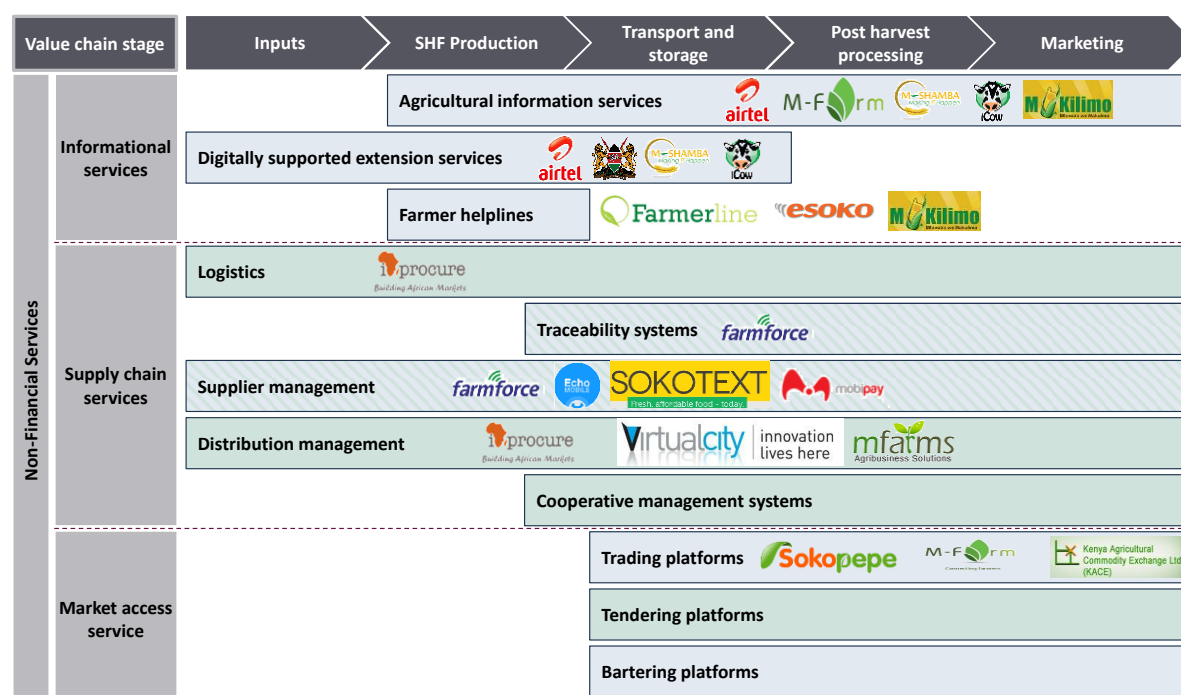
Across digital solution providers, alternative data (AD) is becoming more relevant for smallholder finance with business models developing to leverage it. While this is a growing area of innovation, key questions around types of data most relevant for SHF and cost effective strategies to support repayment discipline and collection need to be developed. The gulf of application of AD in the smallholder context is, however, in its earliest infancy and given the gaps in digitized information on SHFs, a great deal of experimentation, creativity and investment will be needed to realize the potential of data on farmer inclusion.

Even with improved data flows, organizing farmer interaction in an effective, efficient and economical way to the "last mile" is challenging. The 2015 FinAccess Geospatial Mapping Survey released by the Financial Services Deepening Trust of Kenya (FSDK) and the Bill and Melinda Gates Foundation shows impressive gains in financial access points over the last two years across Kenya. The percent of adults living within three kilometers of a service point increased from 59% in 2013 to 73% in 2015. For the first time, the FinAccess study also includes analysis of numbers of service points accessible and relevant for farmers which could be tapped for DFS, including nearly 10,000 agro dealers and thousands more vets, warehouses, extension workers and processors. Improved access to DFS across these channels could include some of the additional services which farmers need, including agricultural extension, micro-insurance training and registration, high quality input access, product and quality tracking, market linkages, etc. Our study tracks the current delivery of both financial and non-financial services across these actors and finds strong potential for leverage, but significant operational issues outstanding, including reliable network coverage and alignment of incentives to promote uptake, particularly of cashless merchant payments.

Linked to DFS, the landscape of technology innovators providing non-financial services for agriculture in Kenya is relatively deep and diverse and includes a significant percentage of the world's emerging digital solutions for agriculture today.¹⁵ Most solutions, however, are struggling to reach scale and commercial viability, even with (or despite) donor subsidized support. The most significant number of institutions provide SHFs with agrotips and information, but many of these firms are reorienting platforms to include new use cases that link farmers more explicitly to markets or services. The ability to link these value-added services to the provision of DFS is ripe for exploration, with initial pilots now underway.

¹⁵ Aegis research

Table 5: Landscape of Digitized Non-Financial Service Providers for SHF



SOURCE: Dalberg analysis; Accenture segmentation model

 B2C Services  B2B Services

Understanding SHFs

One of the likely causes of the disconnect between a relatively robust number of providers and products for SHF and effective uptake may be weak understanding of SHF needs, preferences and behaviors. AFA embraces farmer-centric design in our work with partners. Early results from human centered research shows that farmers are far from monolithic as a market segment and a deep understanding of different profiles of farmers is needed to get products and delivery strategies right.

For the purposes of this Ecosystem Study, we reviewed 14 recent studies which included SHF and rural components to compile evidence of farmer inclusion and needs. This work will be complemented by our own representative farmer baseline study, available in early 2016. In working to understand smallholders, we have adopted the following segmentation, although it is important to note that the vast majority of farm households engage in multiple value chains in order to balance risk and increase revenues.¹⁶ Data shows that of the 20_ million smallholders in Kenya, the World Bank estimates 80% are women and nearly 50% are youth.¹⁷

¹⁶ BFA Financial Diaries and AFA Kenya Farmer Benchmark Study 2015

¹⁷ IFAD Investing in Rural People in Kenya Nov 2015

Table 6: Smallholder Farmer Typology

Part-time smallholder farmers <ul style="list-style-type: none"> This group consists of farmers whose main source of livelihood is not agriculture, although they are engaged in agricultural activities Up to 80% of Kenyan farmers work at least part-time as farmers or pastoralists¹ 	Commercial SHFs in unstructured (loose) value chains <ul style="list-style-type: none"> Commercial smallholders in loose chains generate produce with enough surplus to sell, typically in informal local or regional markets Agricultural production consists of staple crops but also include higher-value crops (e.g., sugar, tea, coffee etc.)
Non-commercial SHFs <ul style="list-style-type: none"> This group consists of subsistence farmers who produced about 70% of Kenya's agricultural output Agricultural production is concentrated on staple crops (e.g., maize, potatoes, sorghum, soybeans, sweet potatoes etc.) as well as livestock (e.g., cattle, hens, goats, sheep etc.) 	Commercial SHFs in structured (tight) value chains <ul style="list-style-type: none"> These are farmers who are less poor and more resilient to economic and weather shocks They generally have better access to land, improved seeds//inputs, information about the market and weather, and are in more structured value chains Agricultural production is concentrated on higher-value crops (e.g., tea, coffee, horticulture crops etc.)

Current research finds the majority of Kenyan SHF, regardless of gender and age, access financial services through mobile money, but this is predominantly for digital payments (59%), forming an important platform for expansion of services.¹⁸ Most households, particularly women-led, continue to use informal products for savings and credit that are often inefficient and unsecure. Main barriers to uptake of financial services include distorted perceptions of interest rates, time needed to travel to nearest services provider and service failure.¹⁹

Social networks are a key component of the financial lives of low income Kenyans and informal financial services. Providers need to find creative ways of integrating such networks (e.g. shopkeepers, schools, chamas) into strategies and products. Indeed, we track high levels of engagement of youth farmers, particularly in periurban farming, using Facebook, WhatsApp and Google regularly as tools to link to markets and farm advance, providing an opportunity for DFS engagement and sources of alternative data.²⁰ By 2020, the median age in Africa is expected to be 20, with over 70% of the population below 25.

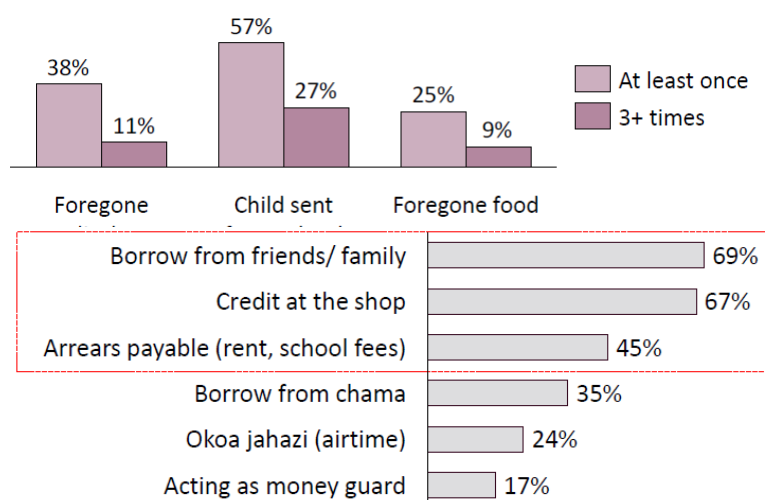
¹⁸ FinAccess 2013

¹⁹ Global Findex 2014

²⁰ AgriFin Accelerate program blog, www.mercycorpsafrica.org.

BFA's Financial Diaries reveal the extent of vulnerability of SHF households in dealing with economic shocks and the highly volatile income flows associated with farm households. With tight household budgets, the three largest expenditure categories are food, housing and education, accounting for 71% of the median household budget. Many households must forgo or postpone important expenses, including investments in farm inputs and assets, due to unexpected shocks.

Table 7: Households Forced to Forgo Important Expenditures (%)



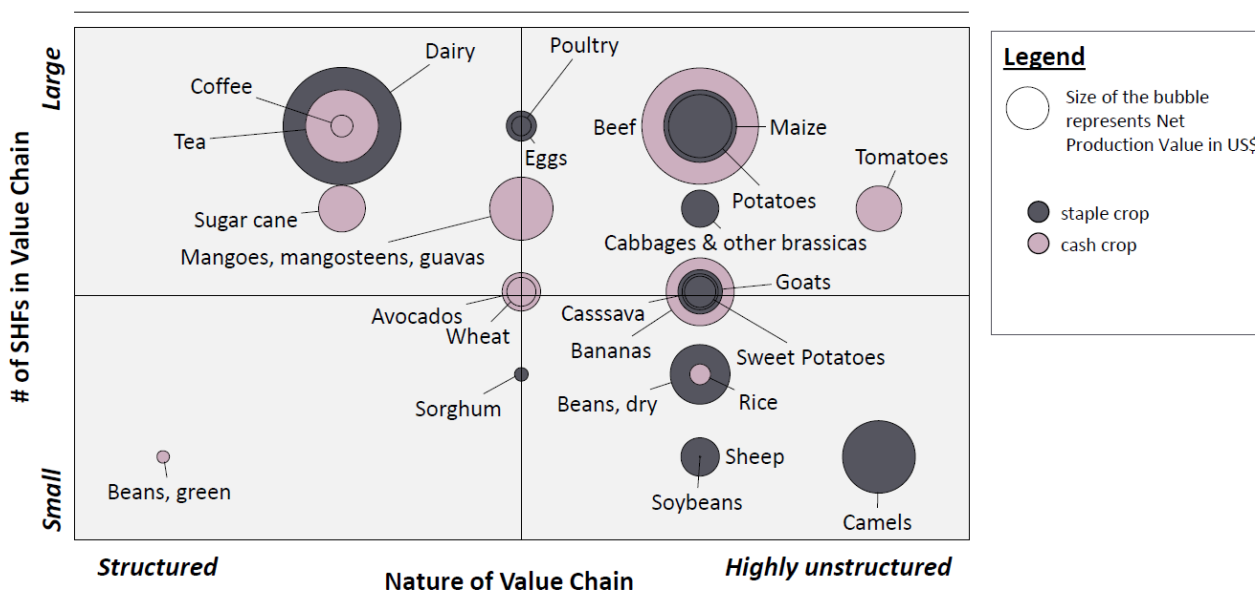
CGAP research has indicated that farmer training and ongoing information provision are among the most difficult components to promote farmer adoption and ensure ongoing delivery of DFS.²¹ Currently, ecosystem players lack effective, financially viable tools and models to meet this need. Capacity building is required in four main areas to leverage and build on existing farmer capabilities: digital literacy, financial literacy, farm management skills and market access skills. The ratio of extension workers to farmers in Kenya is well below optimum at 1:1000, although some experts estimate it is even higher, and only 50% of extension providers target small holder farmers.²² Recent Syngenta and AFA research indicates that 50-60% of SHF never receive any form of technical assistance. Finding the balance between digital and human delivery in cost effective ways that are directly linked to service delivery is an important area of learning for AFA. Our Farmer Capability Lab is dedicated to working with providers leveraging technology to deepen farmer skills to access and fully utilize services and a short catalogue of these providers is included in the body of the report.

²¹ Tarazi, "Serving Smallholder Farmers - Recent Developments in Digital Finance", Focus Note 94, June 2014

²² IFPRI – Agricultural, Agriculture extension and advisory services worldwide, 2014

Serving SHF is a complex puzzle for providers. However, real market opportunities await the providers who can break through to successful service delivery to smallholders. Value chain (VC) analysis reveals the millions of SHF working across a spectrum of structured to highly unstructured agricultural activities. Based on our analysis of these VCs against key criteria, AFA program has selected focal crops of dairy, potatoes, poultry and mangos for deep dive activities leveraging technology to reach farmers with impact.

Table 8: Kenya Ecosystem Value Chain Mapping



Prioritization criteria:

Due to limited availability of data this value chain mapping is based on a mix of qualitative and quantitative assessment

- **Size of value chain (y-axis):** this is a qualitative assessment based on the estimate of the number of SHFs in the value chain
- **Nature of value chain (x-axis):** indicates the degree to which each of the value chains is structured i.e., whether there is a presence of aggregators in the market and the kind of interactions farmers have with the market

SOURCES: FAOSTAT; VC reports; Dalberg analysis

Nature of value chain describes how the market is organized; a structured value chain is one in which the relationship between the buyer and supplier/farmer is clearly defined and there are clear delivery channels through which farmers get their produce to the market place and eventually to the consumer

Dalberg

In conclusion, despite the lack of massive scale of current products for smallholders, Kenya is fertile ground for meaningful innovation and expansion of DFS. A broad ecosystem of support actors in the private sector, farmer organizations, government, donors and investors, technology innovators and NGOs are mobilizing around technology as an enabler. Key unmet needs include bridging the gap between informal and formal savings, credit and insurance products to address farm productivity needs, supported by requirements and pricing that SHF can realistically provide. There are behavioral and attitudinal barriers for farmers, particularly for women, which need to be addressed during product design to ensure uptake and active use. Improved non-financial services, particularly given the weak extension support for farmers, can augment both the access to and impact of financial services. Recent trends to incorporate

human centered design into product development, led by CGAP and others, have yielded promising results in developing more holistic solutions for farmers and farm families, while also leveraging learning and innovation from outside the worlds of development finance. Breakthroughs of these types will need to be tried and tested through multiple iterations in order to develop successful models that can serve more marginalized farmers, including women and youth.

A critical driver for the innovation needed to transform services for low income farmers are technology companies focused on solving the tough problems faced in agriculture, including access to markets, information, improved inputs and infrastructure. Again we see that Kenya is fertile ground for this innovation and is already a focal point in Africa for experimentation. Companies providing direct services for farmers such as iCow, Arifu and iProcure and alternative data providers such First Access, Juntos Finanzas and Acre Africa are laying the groundwork for successful, and impactful service to SHF. The market still lacks, however, successful business models and commercial and impact proof points to drive the scale needed to overcome the huge and complex environment for millions of African smallholders.

Ecosystem enablers, including donors, investors, buyers and government, are vital the development of DFS for farmers. The digitization of basic payment flows through agent networks and trusted farmer service points such as agro dealers and agrovets could present major impetus for improvement and is very realistic within the Kenyan context. Investment and support for technology innovators and improvements in interoperability between digital actors can also be drivers to create more efficient flows of service across rural areas. There is also very important work to be done in unstructured value chains where farmers most acutely lack access to service, including finance.

We look forward to engaging in the ecosystem moving ahead and continuing to communicate learning to ecosystem actors.



Kenyan Agriculture and the Smallholder

In Kenya, agriculture contributes approximately 30% of the country's GDP and 60% of export earnings from trade in goods. The Kenya Agricultural Research Institute (KARI) estimates that in 2012, nearly 60% of Kenya's population worked in the agricultural sector. In rural areas, that figure was closer to 80%.²³ Farming in Kenya is carried out mainly by smallholder farmers who account for over 75% of total agricultural production. These smallholder farmers typically cultivate 2 hectares of land, on average. Kenya's total land area is approximately 587,000 km², of which 98% is land and 2% is covered by water. Of total land area, only about 18-20% has medium to high agricultural potential. The semi-arid to very arid zones (ASALs) are predominantly inhabited by pastoralists, given the low agricultural potential.

The Kenya agricultural sector comprises six major sub-sectors: (i) industrial crops, (ii) food crops, (iii) horticulture, (iv) livestock, (v) fisheries, and (vi) forestry. Industrial crops in Kenya are tea, coffee, sugar cane, cotton, sunflower, pyrethrum, barley, tobacco, sisal, coconuts, and bixa. These contribute to 55% of agricultural exports and 17% of agricultural GDP. Food crops include cereals (maize, wheat, sorghum, rice, millet); pulses (beans, pigeon peas, cow peas, chick peas, green grams); and root tubers (sweet potatoes, Irish potatoes, cassava, arrow roots, and yams). They account for 0.5% of GDP, and 32% of agricultural GDP (agGDP). Horticulture products in this industry include cut-flowers, fresh fruits and vegetables, nuts, herbs and spices. The largest subsector contributing to 38% of export earnings and 33% of agGDP. The livestock sector contributes nearly 7% to the GDP, 17% to the AgGDP²⁴, and provides employment to about 50% of the agricultural labor.²⁵ The demand for fish is rising with increasing shift towards healthy living, meaning the aquaculture sub-sector has the potential to contribute significantly to the national economy, while Kenya's national forest cover is at less than 3%.²⁶

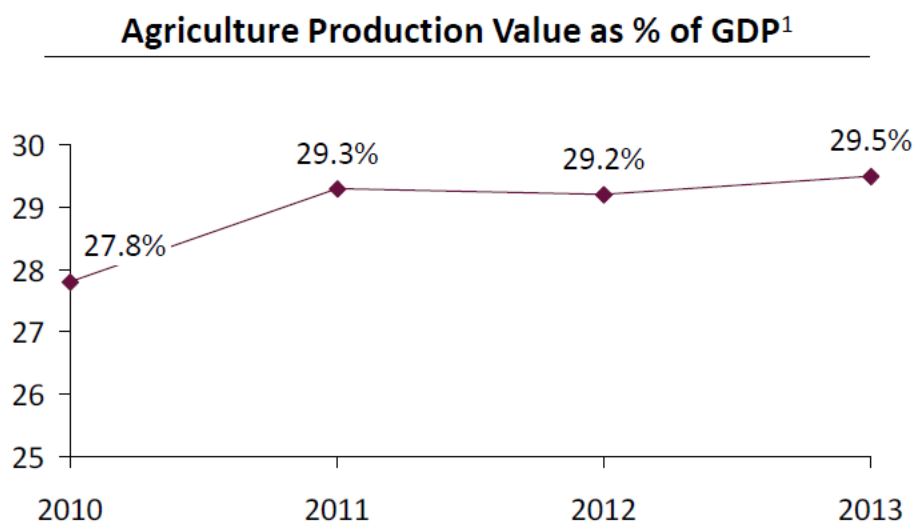
²³ Policy responses to food crisis in Kenya – Prepared by Kenya Agricultural Research Institute, Food Security Report 2012

²⁴ World Bank, FAO, Republic of Kenya – Agricultural Sector Development Strategy (ASDS) 2009 – 2020

²⁵ United Nations Economic Commission for Africa & Government of Kenya, Agricultural Sector Policies and Climate Change in Kenya, Dec 2013 Development Strategy 2010-2020

²⁶ United Nations Economic Commission for Africa An Assessment of Agricultural Sector Policies and Climate Change in Kenya, Dec 2013; DANIDA - Kenyan agricultural sector programme support 2005-2010

Table 9: Agriculture Product Value as a Percentage of Kenyan GDP²⁷



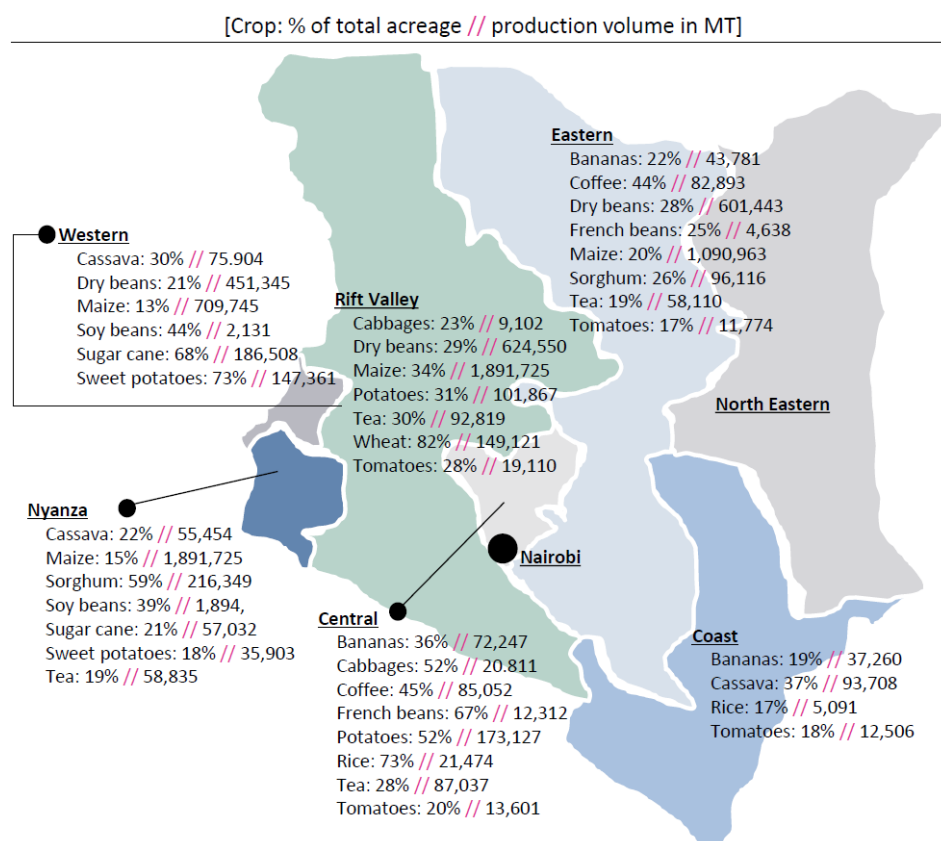
Over the last five years, the agriculture sector has experienced only marginal growth, both in production volume (3.1% CAGR) and production value (3.2% CAGR). This poor performance was driven by declining production and marketed value of key crops like maize, cut flowers, fruits, coffee, tea and sisal. Farmers also received lower gross prices for these crops.²⁸

Most regions grow a diversity of crops, with the majority being staples. However, only 8% of the 20% of land that is arable is currently being used for crop and feed production. Most of Kenya's agricultural output is grown in Rift Valley, Eastern, Central, Nyanza, and Western regions. Very little farming is done in North Eastern Kenya given the land is hot and arid.

²⁷ World Bank, FAO, Republic of Kenya – Agricultural Sector Development Strategy (ASDS) 2009 – 2020

²⁸ FAO; KNBS – ¹Economic Survey 2014; Business Daily Africa – May 15, 2012

Table 10: Location of Growth for Top 15 Kenyan Crops²⁹



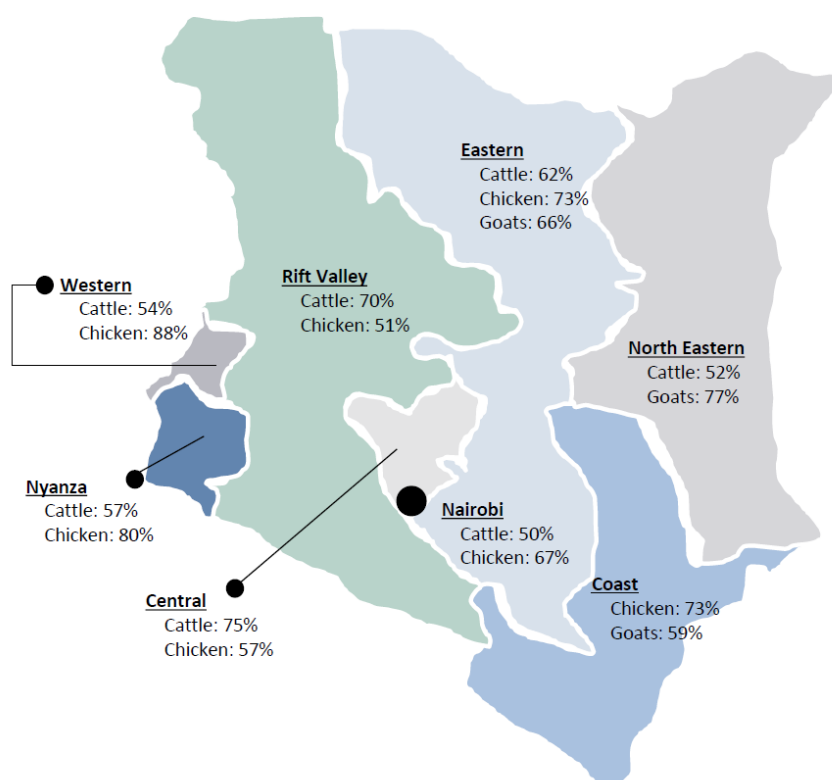
In terms of livestock, goats, cattle, and sheep comprise over 90% of livestock units in Kenya – with cattle contributing to a significant proportion of the net production value. Although goats and sheep represent a significant proportion of livestock units, their net production value is marginal.³⁰ KIHBS estimates that 66% of all Kenyan households keep at least one kind of livestock. The Kenya livestock sector is dominated by smallholder farmers. Majority of livestock units are in the arid and semi-arid lands (ASALs) which cover 80% of total land surface. In ASALs, the livestock sector accounts for over 90% of family incomes, but contributes less than 10% of total net production value in 2013.³¹

²⁹ Kenya Integrated Household Survey Basic Report 2006-07 (sample size = 7,776 households); USAID Strategic Review Feed the Future, Nov 18, 2010

³⁰ FAO Kenya Production Stats – 2013 data

³¹ Kenya Integrated Household Survey Basic 2006-07 (sample size = 7,776 households & FAO Livestock Sector Brief, March 2005

Table 11: Proportion of Kenyan Households Who Own Livestock



Value Chain Mapping

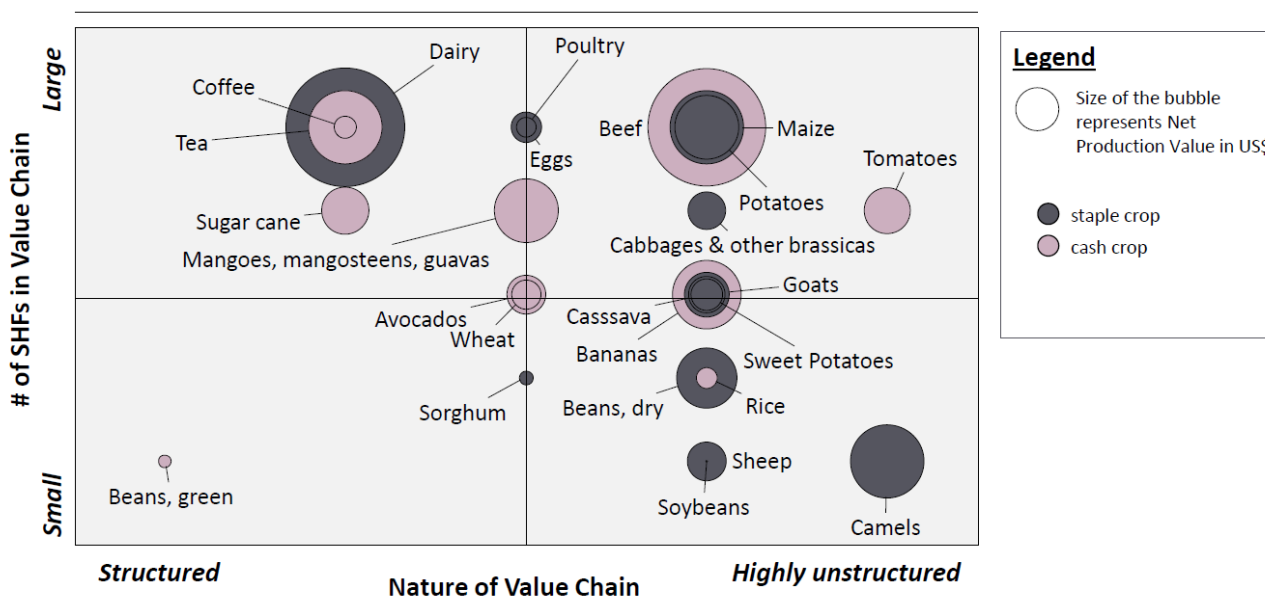
AFA has been designed as a deep, collaborative model working with private sector to rapidly iterate and test new products and delivery channels for smallholder farmers, bundling services where possible to drive uptake, lower costs of delivery and increase utility for SHF. In order to reach our program goal of one million SHF actively using digital financial services, we included a value chain mapping exercise to understand where significant numbers of underserved SHF are engaged to understand these activities and target program activities accordingly.

Up to date agriculture data can be difficult to access across value chains. Specific and actionable demographic data on youth and women is particularly difficult to access. The review described in this White Paper utilized the best information available, but it is important to note that there is an ongoing need for fresh data to inform product and service design and delivery.

We assessed the top 27 crop and livestock value chains by production, which comprised approximately 90% of total volumes in 2013. Initial high level value chain analysis was followed by a deep dive analysis

of four targeted VCs and was conducted through a combination of secondary research and in-person interviews with SHFs and value chain actors.

Table 12: Kenya Ecosystem Value Chain Mapping



Prioritization criteria:

Due to limited availability of data this value chain mapping is based on a mix of qualitative and quantitative assessment

- **Size of value chain (y-axis):** this is a qualitative assessment based on the estimate of the number of SHFs in the value chain
- **Nature of value chain (x-axis):** indicates the degree to which each of the value chains is structured i.e., whether there is a presence of aggregators in the market and the kind of interactions farmers have with the market

SOURCES: FAOSTAT; VC reports; Dalberg analysis

Nature of value chain describes how the market is organized; a structured value chain is one in which the relationship between the buyer and supplier/farmer is clearly defined and there are clear delivery channels through which farmers get their produce to the market place and eventually to the consumer Dalberg

Based on the following key criteria, we identified the four most promising focal value chains for AFA to understand and support in depth over the life of the program, although activities are allowed in other VCs. Key criteria for review included:

- ✓ Number of SHF, estimating populations living on less than \$2.50 per day
- ✓ Role of women and youth in the value chain
- ✓ Level of aggregation in the value chain across buyers and farmer access points
- ✓ Contribution to food security and nutrition
- ✓ Growth trends that would be indicative of the income potential of the VC.

Additional screening was completed after shortlisting to assess for major risk factors including lack of mobile coverage or penetration of digital infrastructure and political dynamics that could inhibit meaningful implementation. Following this review, the program selected dairy, potatoes, poultry and avocados, with a secondary focus on beef and bananas, based on the following key characteristics:

Table 13: AFA Focal Crop Review

Archetype	Description	Promising Value Chains
Large value chains	These value chains encompass a large number of SHFs and are typically unstructured, with multiple middlemen and aggregators	<ul style="list-style-type: none"> – Dairy: 800,000 SHFs accounting for 80% of dairy production – Potatoes: ~780,000 SHFs who account for 83% of national production – Maize: ~3.4 million SHFs accounting for 70% of total maize output – Sweet potatoes: large VCs and can be maize substitutes (important for food security)
Small-medium value chains with high income potential	This group consists of value chains that are smaller in size (i.e., smaller number of SHFs and lower production volumes). However they present a high income potential either because they are expected to grow over the next few years or are typically cash crops	<ul style="list-style-type: none"> – Avocados and Mangoes: these are medium value chains but have a high income potential given their value in the export market – Bananas: The demand for high-quality dessert bananas is growing in Kenya due to a growing middle class and the expansion of supermarkets – Sorghum: growing value chain especially given shift from barley to sorghum in beer production – Dry beans: it's a staple food and plays an important role in SHFs income, food security, and nutrition
Value chains with unique target groups	These value chains are considered important for AFA as they focus on groups of interest such as youth and women (highlighted by MasterCard Foundation) or would address needs for people in Arid and Semi Arid Lands (ASALs)	<ul style="list-style-type: none"> – Poultry: unstructured VCs but chicken are mainly reared by women and youth involvement is also gaining traction – Beef: the bulk of beef consumed in Kenya is produced in ASALs – Green beans: small VC but focus on women who are active in every point of the VC – Fisheries: although a nascent VC, youth involvement is expected to increase, particularly in aquaculture

We found that dairy was a promising value chain for digital financial services in Kenya as it is well structured and highly organized. Cooperatives, self-help groups, and processors can serve as key entry points to reach farmers and scale up any interventions. Raw milk accounts for approximately 86% of total marketed milk i.e., while only 14% of the marketed milk goes through processors, providing room to work with SHFs via cooperatives to further create market linkages around processing between SHFs and buyers, yielding higher prices.³²

The avocado value chain has high income potential in supporting low-income SHFs looking to grow for export. There are an estimated 266,000 – 380,000 SHFs³³ in Kenya contributing approximately 80% of total avocado production divided into two markets: domestic and export, based on varieties grown.³⁴ The export market is highly organized with farmers selling primarily to brokers and directly to exporters. The

³² SNV – Quick Scan of the EADD, Dairy and Beef Sectors of Value Chain in Kenya (May '08), 2008, FAO, Smallholder Dairy Production in Kenya 2010

³³ Dalberg's estimate based on WEF's report on production volume in the country

³⁴ Dalberg analysis 2015

domestic market is more unstructured and disaggregated; farmers prefer selling to customers, retailers, and wholesalers. The majority of SHFs are in the domestic market, although there are many SHFs still selling for export. The value chain presents several opportunities, including expanding access to finance for SHFs to supply export market and developing supplier management and traceability tools for aggregators to facilitate adherence to quality standards. Given the disaggregated nature of the domestic market, however, interventions for SHFs can be hindered by a lack of access points.

The potato value chain presents an opportunity to reach large numbers of SHFs. There are an estimated 800,000 SHFs in Kenya, including a high proportion of women.³⁵ The value chain is, however, largely disaggregated with majority of farmers selling to brokers, traders, or directly to customers. Some farmers are contracted to supply hotels, potato crisps manufactures and supermarkets. There are few identified actors currently organizing the market, which could impact ability to distribute financial products and services. Key unmet needs include informational tools to support improved crop management, pricing information to given farmers better bargaining power when selling to brokers, more efficient trading platforms and access to financial products to purchase high quality seeds.

The poultry value chain presents another important opportunity to scale financial services to large numbers of SHFs. There are an estimated 1.1 -1.4 million poultry farmers in Kenya and majority of these are women.³⁶ Demand for poultry is ever-increasing due to urbanization, increasing population, and cultural preferences. The value chain is organized into two production systems: (i) commercial hybrid and (ii) indigenous poultry production. Most SHFs are in the indigenous poultry value chain which is still nascent and highly unstructured. Commercial poultry is more structured. Farmers in outgrower schemes (e.g. Kenchick, Sigma) tend to be wealthier and larger-scale. Given the significant role of brokers (who purchase 80% of eggs produced by SHFs³⁷), there is an opportunity to support solutions that enhance SHF bargaining power with rural brokers, such as market information, trading and pricing tools. There are few organizations working within the indigenous poultry market at scale, including TechnoServe's SPADE program and JoyWo. In particular, there are opportunities to develop new or expand existing informational tools for SHFs (e.g. iKilimo³⁸) to build better poultry rearing skills (e.g. vaccinations) and

³⁵ GIZ: Post-harvest losses in potato value chains in Kenya TechnoServe/Syngenta, Potato Value Chain Study 2014 & Dutch Ministry of Economic Affairs: The value chain for seed and ware potatoes in Kenya

³⁶ Dalberg estimates based on FAO's estimates on number of chickens per household FAO Poultry Sector Review 2007, TechnoServe SPADE Project

³⁷ ILRI 2010 Poultry Value Chain Analysis

³⁸ See: www.ikilimo.org

provide market and pricing information to re-balance interactions with brokers as well as to expand access to financial products for investment in larger flock size and chicken housing/coops, as well as inputs.

In addition to the individual value chains, we also identified other opportunities, such as working with clusters of value chains with similar characteristics. There is also potential for growth working with COOPs and farmer groups to help them digitize operations to allow members to track contributions and investments mitigating loss of funds associated with informal groups. This can help build credit history for members, which can drive access to services from formal financial service providers (FSP). Traceability tools have important potential across value chains, especially for export to the European Union, as brokers do not have adequate tools to facilitate collection and ensure quality standards to meet the demand of many exporters. In a similar vein, fruit trees and nuts have high income potential and positive environmental impact through prevention of erosion. But due to three year periods between planting trees and first harvest, these value chains have different financing requirements for upfront capital and a longer investment periods, which could be managed through more flexible DFS delivered in cooperation with exporters or working across multiple crops to accommodate longer repayment periods.

There is very important work to be done in unstructured value chains where farmers most acutely lack access to service, including finance. While disaggregated farmers are hardest to engage, digital tools provide a unique means for communication in the absence of aggregators. Alternative data providers can increasingly provide links to these less accessible types of farmers, such as basic cell phone records, utility payments and emerging interaction on digital learning platforms via radio, television and SMS, through players like Arifu and Esoko (see annexes for more detailed information).

There is an important trend toward commercialization of farming, including an increasing shift from food crops to cash crops by small scale farmers looking for better returns, and into sectors with less government regulation, such as horticulture farming (e.g., mangoes and avocados). In terms of farming methods, mechanization rates in agriculture are very low (10-15%), partly due to the nature of small scale holding. However, commercialization of small scale farming will increase demand for financing to meet the high capex costs for necessary equipment. Similarly, fertilizer use also severely lags behind OECD countries. For example, the average for Kenya is 32 Kg/HA, whereas it is 238 Kg/HA in the Netherlands.

Farmers seeking to increase farm productivity need financing for new production methods such as irrigation and also need to address the rampant issues of fake seed and other inputs in the market. Increased incomes and urbanization have led to increasing demand for meat and dairy products, which directly translates to higher demand for crops like maize which are an important ingredient for feedstock. Within this context, weather unpredictability and poor soil quality have also affected the productivity of levels of farmers, expanding the scope of intervention needed to help farmers achieve long term success in agricultural markets.

Understanding the SHF

In the first phase of the study, we developed a digest of leading farmer-centric research to understand what is already known about SHF's financial and non-financial needs. We reviewed 14 recent studies with a range of focal areas, including SHF demographics, financial inclusion, etc., (see annexes for research summaries). In using the following smallholder farmer typology, adapted from CGAP, we note that the majority of smallholder farmers in Kenya are either part-time or non-commercial farmers and operate outside of structured value chains.³⁹ Development of DFS should be targeted at these specific segments in order to be relevant to farmers. Products and services for part time farmers and subsistence farmers, for example, would need to be structured very differently from products for commercial farmers, while commercial farmers in loose value chains would require different processes than those in structured, or tight, value chains.

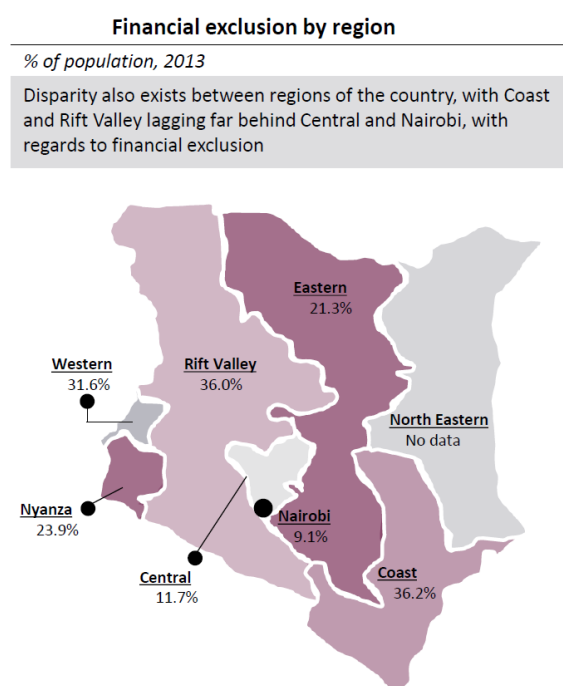
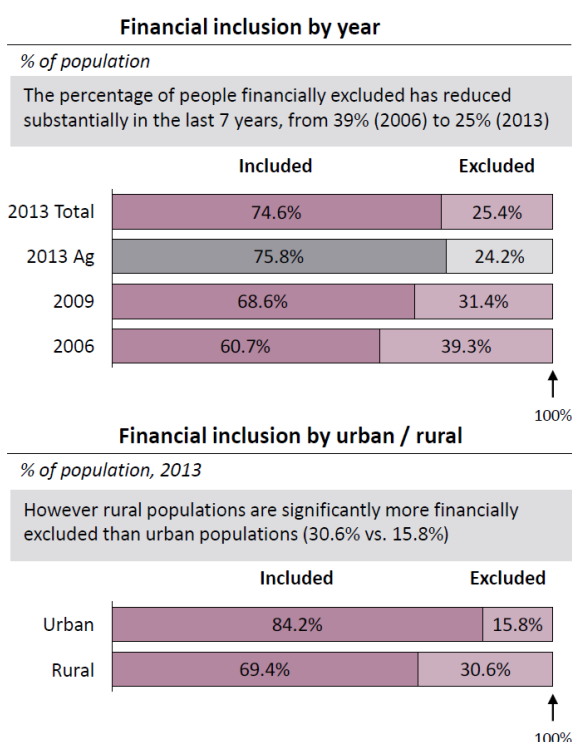
³⁹ USAID: Agriculture, Business, and Energy; CGAP: Segmentation of Smallholder Households: Meeting the Range of Financial Needs in Agricultural Families; IFAD: Brief 20: Smallholder agriculture in East Africa: trends, constraints and opportunities; Dalberg Research and Analysis

Table 14: Smallholder Farmer Typology

Part-time smallholder farmers <ul style="list-style-type: none"> This group consists of farmers whose main source of livelihood is not agriculture, although they are engaged in agricultural activities Up to 80% of Kenyan farmers work at least part-time as farmers or pastoralists¹ 	Commercial SHFs in unstructured (loose) value chains <ul style="list-style-type: none"> Commercial smallholders in loose chains generate produce with enough surplus to sell, typically in informal local or regional markets Agricultural production consists of staple crops but also include higher-value crops (e.g., sugar, tea, coffee etc.)
Non-commercial SHFs <ul style="list-style-type: none"> This group consists of subsistence farmers who produced about 70% of Kenya's agricultural output Agricultural production is concentrated on staple crops (e.g., maize, potatoes, sorghum, soybeans, sweet potatoes etc.) as well as livestock (e.g., cattle, hens, goats, sheep etc.) 	Commercial SHFs in structured (tight) value chains <ul style="list-style-type: none"> These are farmers who are less poor and more resilient to economic and weather shocks They generally have better access to land, improved seeds//inputs, information about the market and weather, and are in more structured value chains Agricultural production is concentrated on higher-value crops (e.g., tea, coffee, horticulture crops etc.)

Kenya is becoming increasingly more financially included. The percentage of people financially excluded has reduced substantially in the last 7 years, from 39% (2006) to 25% (2013). However there is still a significant disparity between urban and rural populations, and even more pronounced across different regions of Kenya.

Table 15: Financial Inclusion in Urban and Rural Areas⁴⁰



The FinAccess 2013 study found that the majority of Kenyan SHF (59%), regardless of gender and age, access financial services through mobile money, with transactions listed as the most prevalent product in use, although other value-added services are emerging. Key deterrents related to the use of formal financial services include perceptions of interest rates, time needed to travel to nearest services provider and high rates of service failure. Interestingly, the gender gap related to mobile money usage is practically negligible in rural areas, although youth (between the ages of 15 and 24) are less likely to be active users compared to other age groups.⁴¹ Poverty levels, however, have important gender implications on the use of mobile money, as poor women are at a disadvantage compared to poor men, while non-poor women are not. In rural areas these gender imbalances are experienced more severely.

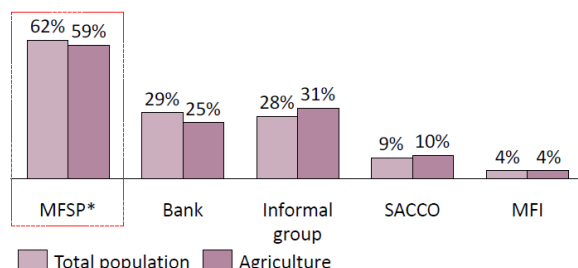
⁴⁰ FinAccess 2013

⁴¹ Financial Inclusion Insights, Dalberg.

Table 16: Use of Financial Services by Provider

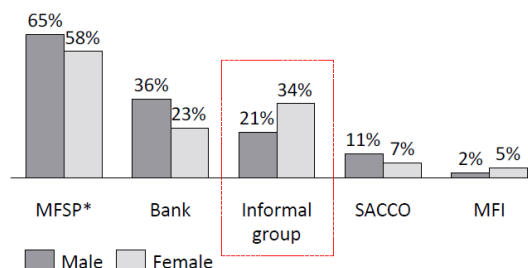
Use of financial service providers, total and ag population

Mobile financial services, banks & informal groups are the most used providers by both the general and farming populations

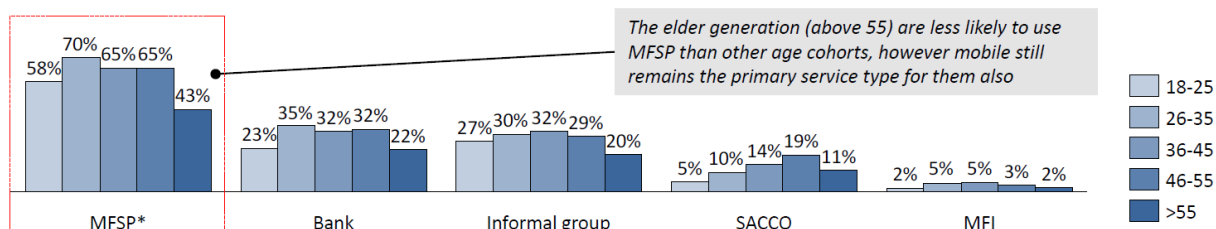


Use of financial service providers by gender

Women use informal financial mechanisms more than men



Use of financial service providers by age group

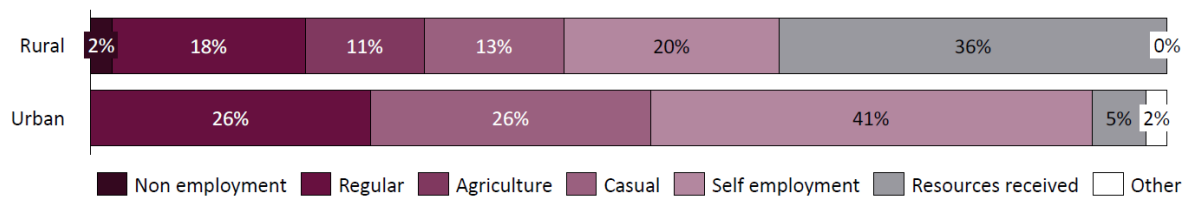


The BFA Kenyan Financial Diaries, which were performed over the course of one year with nearly 300 low income households, 69% rural, provide a rich body of information on how rural and farm households utilize their money, balance income streams and access financial services.⁴² The study found that remittances are a significant complement to rural household farm income, which is typically more volatile than that of their urban peers. Rural households draw their income from multiple sources to increase their pool of revenue. The relatively small sample side from the Diaries found that agriculture only represents a small fraction (18%) of income for rural residents, with the largest share coming from external resources received including remittances from friends and family. Other studies have indicated that agriculture contributes approximately 50% of revenue for farm families on average, particularly in more rural locations⁴³.

⁴² BFA Kenyan Financial Diaries

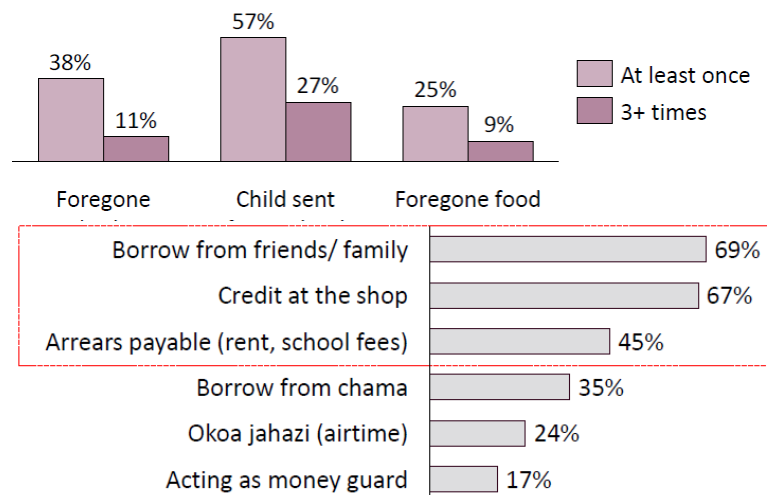
⁴³ UN, Rural Household livelihood and Wellbeing, "Statistics on Rural Development and Agriculture Household income," 2007 Geneva

Figure 1: Main income in rural and urban areas, actual cash flows (%)



The Financial Diaries also reveal that poor rural households have very tight budgets that leave little room to cope with unexpected needs. The three largest expenditure categories – food, housing, and education – account for 71% of the median household’s budget. Many households have to forgo or postpone important expenses due to unexpected shocks. To adjust to shocks, households increase possible elasticity in the budget by keeping open lines of informal credit through family, friends, shops, local SACCOs, arrears payable, etc. The majority of households hold informal assets and liabilities, like investments in small livestock, loans to neighbors and chama (savings group) participation, leaving them exposed to the risk of inefficiencies such as money loss, which had the highest reported incidences of loss of money, with up to 45% of households reporting losses.

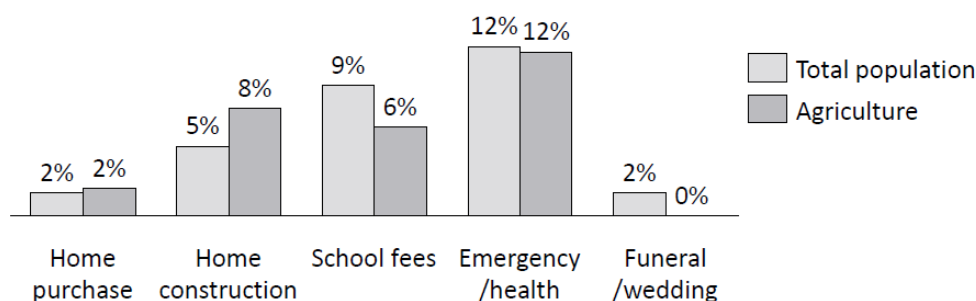
Figure 2: Per Share of households forced to forgo important expenditures during the study (%) and percent of rural household borrowing by source of finance



The Global Index 2014 study in Kenya found that the majority of both farming and general populations currently have a loan to finance emergency/health situations, but these loans are from informal sources such as family and friends. Significantly fewer farm households (only 35%) are saving for emergency reasons as compared to future expenditures. Half of respondents in both farming and the total population

use saving clubs (chamas), principally to put money aside for emergencies.⁴⁴ In the face of shocks and risk factors, studies have also shown very low penetration of insurance to farmers, estimated at 2.93% by the Insurance Regulatory Agency of Kenya, with the majority of products in use offered through the government.

Table 17: Reason for current loan, total and agriculture populations



Desk review of existing literature on SHF was complemented by a series of focus group discussions with farmers and farmer support organizations in targeted value chains. The focus group discussions revealed that poor infrastructure and markets remain a critical issue for farmers, leading to high transaction costs and inhibiting growth of the agriculture sector. High losses post-harvest, combined with unstructured supply chains for some products continuously depresses farm gate prices.

In Kenya, there is now an increasing use of out growers for certain crops especially export fruit and vegetables. With many companies, including multinational companies using local sourcing, small scale farmers are becoming immersed in better supply chains and may increase demand financing. Farmer organizations like co-ops have increased their capacity to offer both commercial and social services, increasingly leveraging digital channels. Still, farmers often choose to sell through informal markets to gain access to higher prices than structured markets offer and the majority of farmers work in unstructured value chains which are not served by coops and aggregators, making DFS more difficult and costly to provide.

Based on the findings from both these discussions and the major research findings to date, we identified five key unmet needs faced by Kenyan smallholders.

⁴⁴ fsdkenya.org/dataset/global-findex-kenya-2014/

Table 18: Key Challenges Facing Kenyan SHF

Lack of access to finance	<ul style="list-style-type: none"> Smallholder farmers have difficulties accessing commercial credit due to their lack of collateral and credit history. This limits capital to meet high cost of production (purchase of farm inputs such as improved seed varieties & planting materials, fertilizers, pesticides, farming machinery etc. A significant proportion lack liquidity prior to harvest hence are unable to stabilize their income stream
Limited access to land and tenure security	<ul style="list-style-type: none"> Poor access to land and unclear land rights continue to plague farmers, specifically reducing farmer access to financial services and inputs, especially women; although women provide 75% of agricultural labor, they only own 1% of the land. Of all registered landholders in Kenya, only 5% are women. As a result, women are almost completely shut out of the financing ecosystem
Lack of information	<ul style="list-style-type: none"> Poor information about weather resulting in crop losses and higher costs to feed livestock Poor technology and information about better farming methods results in low productivity levels
Inaccessibility to structured markets	<ul style="list-style-type: none"> Poor infrastructure and market organization is big challenge and results in high transaction costs, especially given most farmers are not connected to a structured value chain and need to go through middlemen Poor marketing strategies and unstable prices resulting in farmers selling at throw-away prices and as a result are unable to recover their inputs
Weather / climatic hazards	<ul style="list-style-type: none"> Majority of farming in Kenya is dependent on rain-fed agriculture, hence prolonged droughts or heavy rains significantly constraints agricultural productivity

Women Smallholders

According to the World Bank, women make up 80 percent of Kenya's SHF.⁴⁵ Despite their majority, they face many challenges, including gaining ownership of the land they work.⁴⁶ In Kenya less than 5% of women SHFs own a title in their name and less than 10% jointly own titles with their husbands.⁴⁷ The others work the land that belongs to their husbands, typically excluding them from resources to improve farm productivity. According to the United Nations' Food and Agriculture Organization (FAO), Kenyan farms managed by men are eight percent more productive than farms run by women - but the numbers are misleading. The UN reports that if they had credit and were able to invest in new equipment, farms run by women would be the most productive in Kenyan history.

Both the World Bank and the FAO report that in Kenya only 4% of women compared to 14% of men have access to credit.⁴⁸ Lack of credit is an obstacle to access to improved technologies such as fertilizer, improved seed and farming equipment. FAO studies carried out in 97 developing countries, including

⁴⁵ World Bank, Gender in Agriculture Source Book, 2008

⁴⁶ <http://www.dw.com/en/women-take-over-kenyas-farming-sector/a-16716322>

⁴⁷ FAO, Gender differences in Assets, ESA Working Paper No-11-12 FAO Rome 2011

⁴⁸ FAO, The State of Food and Agriculture FAO Rome 2010-11

Kenya, revealed that only 5-7% of all extension resources are directed at women and only 14% of donor resources targeted small holder women farmers. According to the World Bank, giving women farmers the same access to inputs as men can increase yields by 20%.⁴⁹

Women in Kenya are typically excluded from high value agriculture such as tea, coffee and export horticulture. According to the FAO, smallholder women farmers comprise less than 10% of all smallholder farmers involved the contract farming of fruits and vegetables for export.⁵⁰ Our value chain research confirmed these findings. Women are mostly involved in agriculture production and once a value chain becomes commercialized their role significantly reduces. From the top 20 VCs we assessed, the role of women was most significant in potatoes, poultry and small livestock.

The GSMA, the global association of mobile network operators (MNOs) has identified women as a critical target market for digitally-enabled service for smallholders, including information and advisory services, supply chain management, market linkages and mobile financial services.⁵¹ A recent study also notes the important trend of male urban labor migration leaving women to farm. The study notes significantly lower uptake of mobile services by women, mainly linked to cost, culture, illiteracy and perceptions of value, compared with other financial outlays such as health and nutrition. Technology is often considered the male domain in rural communities. And while mobile phone penetration is high in Africa at almost 80%, according to the GSMA women in sub-Saharan Africa are on average 23% less likely to own a mobile phone.⁵² Such cultural and behavioral issues must be addressed if women SHF are to benefit from advances in DFS in Kenya, which is a core focus on the AFA Farmer Capability Lab.

Youth Smallholders

In terms of youth, or farmers up to the age of 25, our study revealed large gaps in existing data, particularly around agricultural activities. Based on the data available, we can say that compared to adults, youth farmers in Kenya have more years of education than average, own less land and farm similar crops to adults.

⁴⁹ World Bank, Gender in Agriculture Source Book, 2008

⁵⁰ FAO The State of Food and Agriculture FAO Rome 2010-11

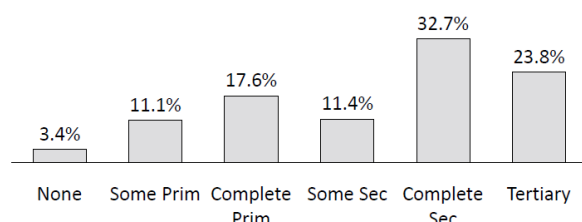
⁵¹ GSMA, "Women in Agriculture: A Toolkit for Mobile Services Practitioners", May 2014.

⁵² Ibid.

Table 19: Key Statistics on Youth SHF

Level of education

Young farmers in Kenya high levels of education (a mean of between 10.5 years) with 55% having either completed secondary or attended tertiary education



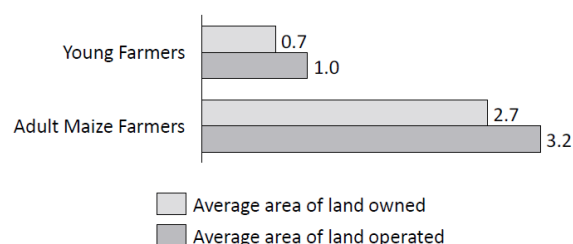
Typical crops produced

Both young farmers and general farming population grow similar crops – the top 8 **actually farmed** are:

- Potatoes
- Tomatoes
- Maize
- Cabbages
- Onions
- Beans
- Sukuma wiki
- Carrots

Size of Land

Young farmers have access to and ownership of less land than the general farming population



Preferred crops/livestock

Young farmers expressed preference in growing primarily high-value commodities that mostly require minimal land – the top 8 youth **desire to farm** are:

- Zero grazing dairy
- Poultry
- Fish
- Fruit and Vegetables
- Maize
- Horticulture
- Bees
- Rabbit Farming

Young farmers in Kenya have high levels of information and communication technology (ICT) use at 90%, including high use of social media, particularly Facebook, Google and Whatsapp. Young farmers encompass two major archetypes; i) young single farmers using ICT as a gateway to better jobs and employment outside or next to farming, with access or rights to land, often men, using ICT skills in farm planning, production and marketing; and ii) young farming families who are more tied to their household and land, applying ICT to improving the productivity and profitability of their farming activities from the outset. They use ICT to obtain more reliable market and modern production information for their existing crops, and gain better access to markets.⁵³ Research and focus group discussions with youth SHF revealed the following key constraints.

⁵³ SOURCES: IICD ICT, Youth and Agriculture, Dalberg analysis

Table 20: Key Constraints Facing Youth SHF

Constraint	Description
Education and vocational training	<ul style="list-style-type: none"> Traditional teaching methods do not provide adequate opportunities to learn practical agricultural skills at school or through vocational education Young people are not encouraged to look for employment opportunities in rural areas, often seeking jobs that are more prevalent in urban areas
Access to land	<ul style="list-style-type: none"> Stigma attached to young people inheriting land before elder relative has died and few opportunities for young women to inherit land at all Farmers therefore are constrained to either farming on small portions of land or rented land and therefore struggle to commercialize production
Perception of agriculture	<ul style="list-style-type: none"> Many young rural people grow up watching their parents working their plots of land with manual tools, and may even have contributed as child laborers This taints their perception of agriculture, and inhibits their ability to understand the real potential that the agro sector possesses in terms of employment opportunities
Access to finance	<ul style="list-style-type: none"> There are three major barriers that youth encounter when trying to access and use formal financial services: <ol style="list-style-type: none"> Restrictions in the legal and regulatory environment (e.g., minimum age and identification requirements) Inappropriate and inaccessible financial products offered by financial service providers Poor financial capabilities of youth
Access to markets	<ul style="list-style-type: none"> Rural youth frequently lack the required knowledge of how markets work, as well as information on prices. Young rural women face additional difficulties in accessing markets, as their freedom of movement may be restricted in many communities because of social and cultural norms
Climate change factor	<ul style="list-style-type: none"> Agricultural production and related activities have already suffered from high volatility due to climate change particularly changing rainfall patterns, particularly changes in the onset of rains and rainfall distribution, resulting in frequent dry spells in some areas and torrential rains in others. Some young farmers doubt whether a career in Agriculture could constitute a viable economic opportunity

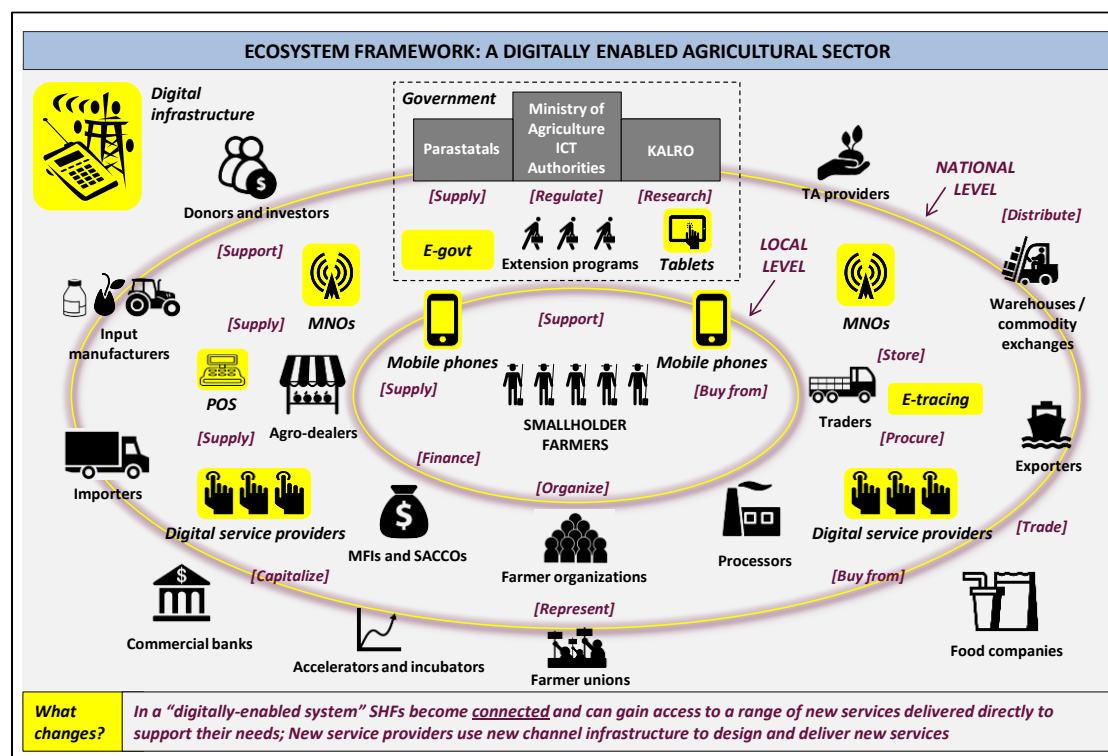
Although not all constraints can be overcome utilizing technology, some barriers such as i) education and vocational training; ii) perceptions of agriculture; iii) access to finance; and iv) access to markets can be addressed leveraging digital tools. “Farming as a business” approaches are gaining traction by helping SHF make the shift from subsistence farming to farming for profit, promoted through key media players, such as Shamba Shape Up.⁵⁴ These approaches empower farmers to plan, produce, market, and use records, working in groups that can efficiently promote information dissemination, bulk buying, and collective marketing. These types of initiatives have strong potential to leverage technology and bring SHF, particularly tech-enabled youth, into a more productive level of farming.

⁵⁴ <http://www.shambashapeup.com/>

Ecosystem Assessment

The study takes an ecosystem approach to understanding the market landscape and farmer needs, which includes, but is not limited to, value chain analysis. In order to drive DFS development, a value chain view is not sufficient alone. SHFs tend to be involved in multiple value chains. Focusing on an exclusive VC may miss the complexities of household strategies to manage risk and related needs for services. Ecosystem analysis allows AgriFin to contextualize impact, defining what a mature, well-functioning digital services ecosystem looks like to drive understanding of AFA's comparative advantages to contribute.

Figure 3: Ecosystem Framework for a Digitally Enabled Agricultural Sector




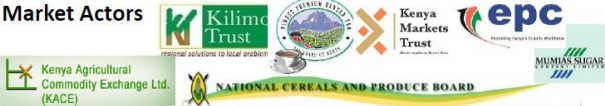



High functioning ecosystems drive efficiency and increase active use of services. For SHFs, ecosystems of providers include buyers, suppliers, farmer unions, banks, insurers, MNOs, government and a diverse range of other players. These ecosystems are often fragmented and few actors are technology enabled. AgriFin Accelerate approaches ecosystem development through our partnership activities, bundling of services and through dissemination of evidence-based learning to ecosystem actors. We tackle the challenge of farmer inclusion following a Market Systems Development (MSD) approach that is focused

on understanding why the agriculture market systems in Kenya, Tanzania and Zambia are not efficiently working for the poor, then addressing the underlying systemic constraints that are present.

The agriculture sector has a diverse set of stakeholders who contribute to policy-making, marketing, trading, financing, capacity building and research. Major government and parastatals bodies primarily are involved in policy and regulation, research, financing, quality assurance and supply of inputs. Many of these institutions, as well as national member organization such as the National Potato Council, are launching digital tools and portals to assist in sector growth. In addition to government players, there are multiple bilateral and multilateral donors supporting the agriculture sector in Kenya. The active collaboration of these actors will be required to move Kenyan agriculture and smallholder finance to more efficient digital platforms in a meaningful way impacting both productivity and farmer income.

We kicked off our Kenya operations by conducted an ecosystem assessment for digitally-enabled services to SHF in order to understand the nature and maturity of the ecosystem, as well as how the overall ecosystem promotes or inhibits the expansion of digital financial services and how AFA can best support its future growth. In order to understand the ecosystem of actors relevant for digital service delivery to SHF, the Dalberg and AFA team conducted 30 interviews with external stakeholders.

Table 21: Landscape of Agricultural Stakeholders⁵⁵

Key Stakeholders	Role
Governance 	<ul style="list-style-type: none"> Ministry of Agriculture, Livestock & Fisheries is tasked with regulating, providing resources to, and promoting agriculture; Ministry of the Environment, Water, and Natural Resources manages and conserves resources for socio-economic development.
Market Actors 	<ul style="list-style-type: none"> These market actors provide the agricultural sector with inputs, access to domestic and international markets, as well as act as middle men, aggregating output for markets.
Financial Actors 	<ul style="list-style-type: none"> Financial actors in Kenya's agricultural sector are varied, including local and international banks, multilateral development banks, microfinance institutions, private firms, and national financial institutions.
Capacity Building 	<ul style="list-style-type: none"> Various government bodies, non-profit, and private sector groups focus on capacity building. The majority of actors choose a specific region or crop to focus on. In some cases, this is advantageous; in others, it leads to a fractured and weakened landscape as different entities duplicate efforts.
Research Community 	<ul style="list-style-type: none"> Many research organizations are sponsored by the Kenyan government, and others by international funding. Like capacity builders, research organizations tend to focus on a specific aspect of agriculture e.g., the International Livestock Research Institute focuses on livestock and the Kenya Seed Company focuses on seed varieties.

Over the course of our research, we identified some of the barriers to ecosystem development for digitally-enabled services, particularly financial services, for smallholders. These barriers encompass the enabling environment, SHF themselves and the solutions currently on offer for them.

⁵⁵ Dalberg research and analysis; International donors include: DANIDA; FAO; GIZ; IFAD; JICA; SIDA; The Africa Development Bank; The European Commission; The World Bank // IFC; UNDP; USAID; WFP

Table 22: Key Constraints and Ideal Changes to Kenya Ecosystem Development

Constraints		Ideal changes in 2-3 years
Enabling Environment <ul style="list-style-type: none"> Limited interoperability between the MNOs Limited smart phone, 3G, and 4G penetration Limited risky capital available from angel investors or venture capital firms Donors and NGOs are focused on only a few value chains (dairy, coffee, tea) 		<ol style="list-style-type: none"> 1. Safaricom and Airtel fully open up APIs to catalyze integrated ecosystem of payment platforms 2. Mobile transaction fees reduce significantly 3. 3G and 4G networks expand, together with increased use of data and ownership of smartphones 4. More capital invested at the seed and angel stage, as well as the emergence of active Kenyan angel investors 5. Donor attention expands to unstructured agri- value chains
Smallholder Farmers <ul style="list-style-type: none"> Very few SHFs are using formal institutions to access financial products SHFs lack advanced financial literacy Easy market access is limited to a few value chains given most value chain are unstructured and operate in informal markets. Additionally, there is limited SHF aggregation Access to high value markets is limited for SHFs Poor crop and animal husbandry skills 		<ol style="list-style-type: none"> 1. An increase in financial product offerings targeting / tailored to SHFs, to address specific needs of farmers (e.g. seasonal loans) 2. An increase in the percentage of SHFs who understand and use financial services 3. Creation of formal aggregators and input providers operating at national scale, across more value chains 4. More sophisticated approached to farming to increase SHF productivity, including use of fertilizers and irrigation techniques
Solutions <ul style="list-style-type: none"> Few commercial start-ups are able to reach scale Start-ups rely on revenue generated from low tech end-users (e.g., farmers), rather than alternative actors (e.g., input providers paying for marketing) Limited partnerships between VAS providers and MNOs Limited understanding of the Kenyan SHF to inform product design 		<ol style="list-style-type: none"> 1. 3-4 ag-fin or ag-tech start-ups achieve >100,000 farmer users 2. More solutions that are commercially viable and affordable to farmers are introduced to the market 3. More partnerships with MNOs to facilitate monetization and scaling of ventures 4. Better agri- TA offered to FSPs and VAS providers to better inform product design tailored to SHFs

Given these barriers, ideal changes to drive meaningful expansion of the Kenyan ecosystem for smallholder DFS could include increased interoperability of solutions and payment platforms. Increasing flows across payment networks could increase transaction volumes in rural areas and provide the support needed to reduce mobile transaction fees, addressing farmer perceptions around high costs. To provide real value to farmers, there is also a need for increased financial product offerings targeting and tailored to SHFs, to address specific needs of farmers (e.g. seasonal loans).

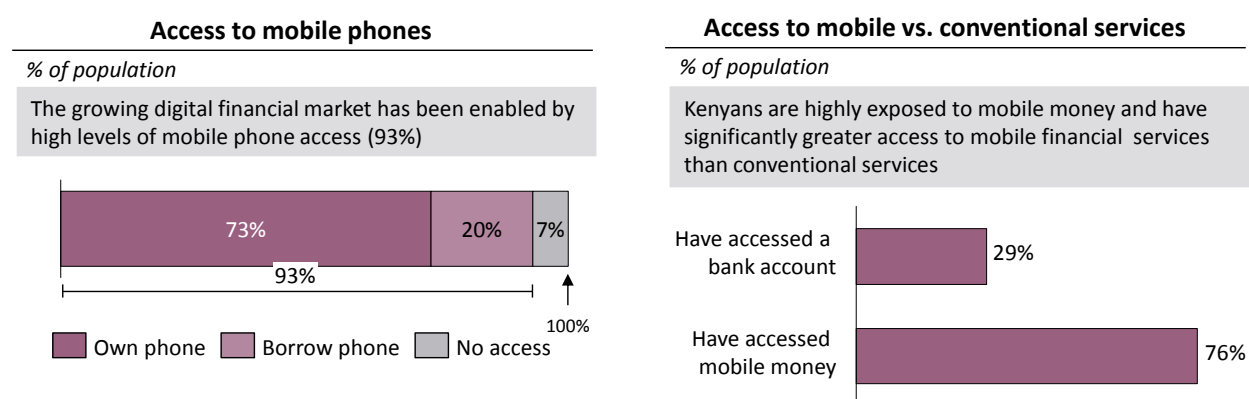
At the farmer level, we see a need increase in the percentage of SHFs who understand and use financial services in order to support farmer businesses. More sophisticated approaches to farming are needed to increase SHF productivity, including use of fertilizers and irrigation techniques. In terms of investment, donor attention should expand to unstructured agricultural value chains which are the most challenging and underserved. Expansion of services will certainly require development of more formal aggregators and input providers for agriculture leveraging digital channels and operating at national scale, across more value chains. Capital invested at the seed and angel stage for the technology innovators working to address these market gaps would provide additional stimulus.

Financial Services for SHF

One of the most critical parts of this study is the financial service provider and product landscaping review, which included both formal and informal services. Investment in this sector is critical, as economic growth from agriculture is at least twice as effective in reducing poverty as growth in other sectors.⁵⁶ At an estimated \$450 billion, the global demand for smallholder agricultural finance is largely unmet. Impact-driven agricultural lenders are estimated to reach no more than two percent of demand.⁵⁷

The opportunity for digital financial services (DFS) for smallholder farmers is perhaps the best in the world in Kenya, where MPESA and other digitally enabled services have established a strong foothold, with 76% of the Kenyan adult population accessing financial services on their cell phone.⁵⁸

Table 23: Kenyan Adult Access to Mobile Phones and Use of Mobile Money vs. Conventional Banking⁵⁹



This portion of the study covers providers and relevant products on offer for SHF in Kenya and identifies most promising product opportunity areas given SHF needs. We completed a comprehensive landscape study of financial service providers and products across all types of digital services. The Kenyan financial services sector is characterized by four major types of institutions.





⁵⁶ Agriculture sector strategy 2010–2014, African Development Bank; World development report 2008: Agriculture for development, World Bank

⁵⁷ Catalyzing Smallholder Agricultural Finance, Dalberg 2012.

⁵⁸ Financial Inclusion Insights 2014

⁵⁹ Financial Inclusion Insights 2014

Table 24: Types of Financial Services Providers for SHF

	Description	Examples	Services Offered	
Formal prudential 	Service providers that are prudentially regulated and supervised by independent statutory regulatory agencies (CMA, CBK, IRA etc.)	<ul style="list-style-type: none"> Commercial banks: 44 commercial banks, 6 first tier, 16 second tier, and 22 third tier Deposit taking microfinance institutions: 9 MFIs, 4 first tier, 2 second tier, 3 third tier Insurance providers: 49 insurance providers, less than 10 provide Agriculture specific products Deposit taking SACCOs: Approximately 150 	Credit	✓
			Insurance	✓
			Saving	✓
			Transactions	✓
Formal non-prudential 	Service providers that are subject to non-prudential oversight by regulatory agencies or government departments/ ministries with focused legislation	<ul style="list-style-type: none"> Mobile phone service providers: 4 MNOs with Safaricom and Airtel sharing 84% of the market <i>Alternative payment services typically use MNO platforms</i> Postbank National Social Security Fund (NSSF) National Health Insurance Fund (NHIF) 	Credit	✓
			Insurance	✓
			Saving	✓
			Transactions	✓
Formal registered 	Service providers that are registered under a law or government direct interventions	<ul style="list-style-type: none"> Credit-only MFIs: unknown number - do not offer savings Cooperatives: Over 15,000, majority are multi-purpose Credit-only SACCOs: Estimated at 40% of all cooperatives (approximately 6,000) - do not offer savings Non governmental organizations Government of Kenya: e.g., Agricultural finance corporation (DFI) and services e.g., Risk sharing facility agreements Hire purchase companies 	Credit	✓
			Insurance	✗
			Saving	✓
			Transactions	✓
Informal 	Financial services obtained through unregulated forms of structured provision	<ul style="list-style-type: none"> Informal groups: ROSCAs and ASCAs Shopkeepers/Merchants: Agro dealers and other shop owners can offer shop credit Employers Money lenders 	Credit	✓
			Insurance	✗
			Saving	✓
			Transactions	✗

There is a growing trend towards formal service providers offering services that are entirely or partially digital. Major commercial banks, insurance providers, and tailor-made social enterprises dominate the credit and insurance markets, while mobile network operators (MNOs) compete with commercial banks transactions markets and stored value accounts (see annexes for detailed tables on providers).

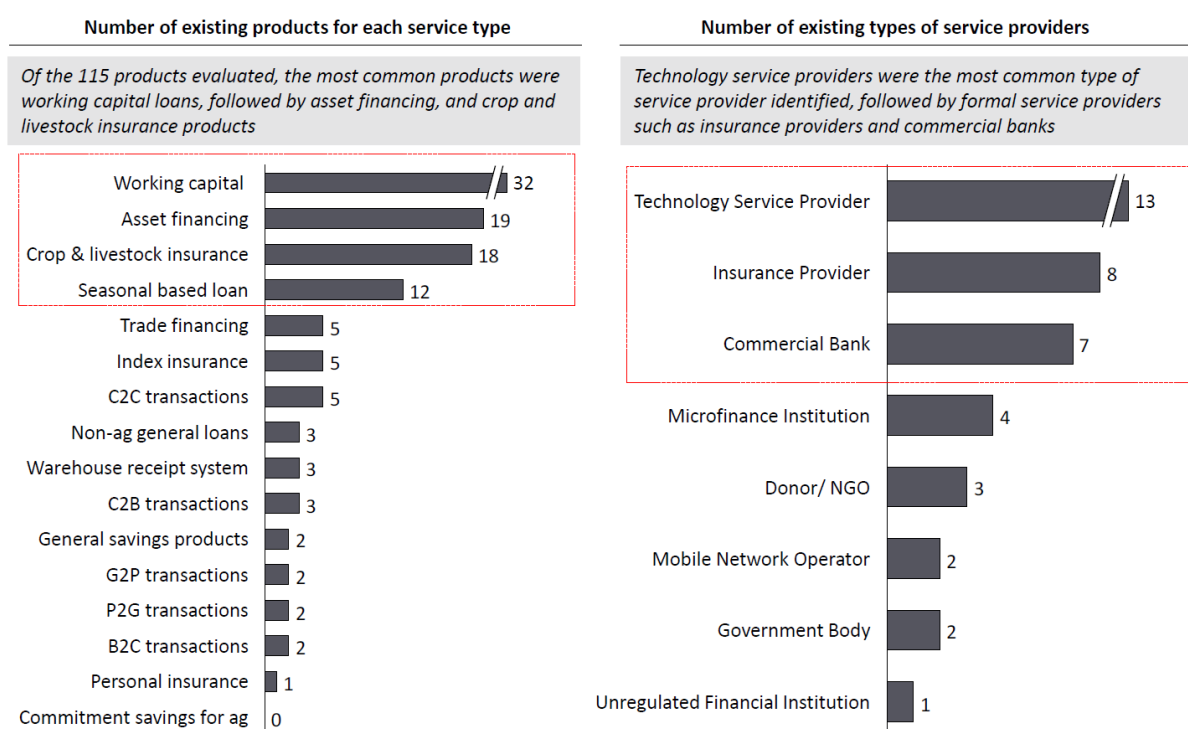
In terms of the network coverage required to drive digital services, Safaricom have 66% of the mobile telecoms market and remain the dominant player. Safaricom's M-PESA mobile money offering claims 99% of all users mobile.⁶⁰ Airtel covers 16% of the telecoms market in Kenya, with broader operations in 17 African countries. Equity Bank's MVNO subsidiary Equitel was recent launched in Kenya and now reaches one million subscribers with telecoms and mobile money services on the Airtel network. Equity Bank already offers DFS through its extensive agent banking network and Eazzy 247 service. Other major commercial banks offer mobile banking services through a variety of custom built applications and allow customers to transfer funds to existing mobile money services. Leading banks targeting SHF include KCB, Coop Bank and Chase Bank with a range of innovative offers, including instant loans supported by credit

⁶⁰ Service provider websites, Dalberg analysis

scoring systems, mobile wallets linked to partner cooperative membership and access to credit linked to ewarehousing.

Through secondary research, 115 financial service products by 40 providers were evaluated targeting or clearly serving smallholder farmers and either entirely or partially digital.

Table 25: Review of Financial Services Products and Providers



The majority of commercial banks and microfinance institutions that service farmers provide working capital loans, which farmers are also able to access working capital through informal means. Prominent examples include Equity Bank, Cooperative Bank, and KWFT. These loans are offered to individuals, groups and societies. Cooperative Bank offers a variety of working capital loans to coffee and dairy farmers. These value chains are typically more structured and make targeting large numbers of aggregated farmers with financial services products more effective.

Ten notable players provide asset financing, with prominent examples include Juhudi Kilimo, Opportunity International and Equity Bank. These loans are typically a mixture of individual and group based loans for

assets including livestock as well as farming equipment, vehicles and infrastructure such as greenhouse and irrigation equipment. Successful providers combine financial services training together with loan provision to ensure that farmer groups fully understand the loan mechanisms.

Most formal and informal service providers also offer non-agricultural general loans. M-Shwari is one the most well-known general loan products in Kenya. Part of its success is due to partners CBA and Safaricom's consolidation of several financial activities onto one mobile platform, in particular, saving, borrowing, and conducting money transfers between M-Shwari and M-PESA. MShwari is a fully digital banking service offered through M-PESA that enables client to open and operate an M-Shwari bank account at CBA through their mobile phone, via M-PESA. It provides ability to move money between an interest-bearing savings account and M-PESA free of charge and enables clients to access instant loans ranging from 100 to 20,000 KSh (approx. 1 to 200 USD) for a duration of 30 days through their M-PESA account and large scale agent network. According to recent CGAP research, one in five Kenyans have opened an account since its launch in late 2012.⁶¹ Small loan terms and high interest rates, however, tend to restrict use of M-Shwari to farm household cashflow smoothing, rather than support of the farming activity itself.

Still, the majority of farmers borrow through informal channels – with only 9% of farmers having borrowed from a formal financial institution vs. 53% who had borrowed from friends and family.⁶²

In some instances, SHFs turn to informal moneylenders (who charge even higher interest rates) for short-term loans to cover immediate needs such as repayment of formal debt.











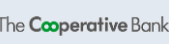

























There are approximately 20 agriculture related insurance products available through formal insurance providers, micro insurance providers and NGOs. However, only two are well established digital platforms, including ACRE Africa (formerly Kilimo Salama) and Linda Jamii. Crop and livestock insurance are offered by nine notable players in this space, prominent examples include UAP, Heritage and APA insurance. There are no prominent examples of digital crop and livestock insurance and the majority of the players serve larger scale farmers, given their limited rural reach.

⁶¹ <http://www.cgap.org/blog/top-10-things-know-about-m-shwari>

⁶² FINDEX World Bank 2014

Personal insurance products, particularly health and life insurance products are offered by multiple insurance providers in Kenya but have very low reach to smallholders. The majority of insurance outreach in Kenya reflects an increase in uptake as a result of government mandated use of NHIF, with 15.6% of respondents using the service.⁶³ Britam, Changamka and Safaricom have partnered to offer health insurance coverage to low income populations, however lower than expected uptake (36,000 customers in 2 years) has led to a change in focus to SME clients⁶⁴.

Table 26: Landscape of Financial Services Providers for SHF

Value chain stage		Inputs	SHF Production	Transport and storage	Post harvest processing	Marketing
Financial Services	Credit	Seasonal based loan				
		Asset-based loan				
		General loans				
		Warehouse receipt systems				
	Insurance	Personal insurance				
		Crop & livestock insurance				
		Index insurance				
	Savings	Commitment savings for agriculture				
		General savings products				
	Transactions	General payments from SHF				
		Payments to SHF by others in VC				





SOURCE: Dalberg analysis; Accenture segmentation model

To date, four providers have demonstrated viable and scalable models digital, including Musoni, mShwari, Acre Africa and MPESA B2C services. Each offers a different range of services, as outlined in the table below.

⁶³ FinAccess 2013

⁶⁴ Business Daily 2014

Table 27: Viable and Scalable Digital Services for SHF

 <p>Musoni Credit – Seasonal Based</p> <ul style="list-style-type: none"> Musoni provides loans of up to 250,000 Kenyan Shillings to groups, and loans of up to 500,000 Kenyan Shillings to individuals Currently the MFI works with more than 15,000 borrowers and aims to reach 23,600 clients by December 2015 Unlike many existing loans, the terms of Kilimo Booster are determined on an individual basis The loans allow farmers to harvest before having to repay their loan and staggered disbursement of the loan amount which allows farmers to manage their money better 	 <p>M-Shwari Savings – General Savings</p> <ul style="list-style-type: none"> M-Shwari, a joint product of Commercial Bank of Africa (CBA) and Safaricom, Kenya's largest mobile communication and mobile money provider, was launched in November 2012. As of January 2015, M-Shwari had over 9 million subscribers Subscribers of M-Shwari, sign up for a bank account hosted by CBA but access their account using Safaricom's mobile money service, M-PESA. Customers requirements are minimal; a registered Safaricom line, a registered M-PESA account and a form of identification
 <p>ACRE Africa (Kilimo Salama) Insurance – Index Based</p> <ul style="list-style-type: none"> Kilimo Salama insures farmers against drought and excess rain. Launched in Kenya in 2008, it is now the largest agricultural insurance program in Africa. By the end of 2013, Kilimo Salama had insured 187,000 farmers in three countries. Traditional crop insurance relies on expensive farm visits to verify claims. Kilimo Salama does not visit the farms. It uses automated weather stations and mobile payments. These dramatically reduce administrative costs, finally enabling a premium price that millions of farmers can afford. 	 <p>M-PESA Bulk Payments Transactions – B2C</p> <ul style="list-style-type: none"> M-Pesa Bulk Payments service allows an organization to make payments to groups of people of values up to KSh 70,000 per transaction Safaricom currently serves over 400 organizations including AAA Growers and Mace Foods Uses of the Bulk Payments Service include; insurance claims settlement; salaries disbursement for companies; Government Organizations, NGOS and FBOs disbursement of various project funds, relief funds, development funds, and wages to field staff

Distribution Channels

Innovations in digital finance have the potential to revolutionize agricultural markets, improving data visibility for supply chain efficiency and creating alternative payment instruments, increasing productivity, lowering costs of distribution and reducing risks. However, robust channels of delivery are critical to make this a reality. DFS, including credit, savings, insurance, transfers and payments, can be provided through alternative delivery channels such as e-vouchers, debit cards, biometric readers and point of sale devices, making distribution more efficient, but scalable networks of service points for farmer onboarding, education, ongoing service and support are still needed.

A significant constraint for SHF access to DFS is the lack of sufficient, affordable and trusted cash agents, merchant acceptance and other digital service points in rural areas. Recent research and mapping by the Helix Institute shows that despite the majority of Africa's population are located in rural areas, only 39% of agents operate in rural areas.⁶⁵ Rural agents also tend to be clustered around bank branches for funds

⁶⁵ GSMA "2013 Mobile Money Usage Survey"

rebalancing, further reducing convenience of access for more remote farmers. The study also shows that rural agent activity rates are low and liquidity more difficult to access, resulting in high levels of agent dropout. There is significant room for improvement of these channels which could include new actors, and enhance interoperability, product deepening and options for cashless payments.

The AFA program seeks to support the development of increased service points for farmers. The cost of delivery of services may often be prohibitive for providers and farmers alike, and the quality and relevance of services across different delivery channels have important implications for risk management of financial services as well. The review of delivery channels for digital financial and non-financial services to farmers included agent networks, financial service providers, agricultural buyers and farmer organizations, providing inputs into costs, levels and scale of farmer use and trust in each channel. This review focused on understanding the primary and also the potential channels that can be used to reach smallholders across Kenya with digitally-enabled products and services, both financial and non-financial.

Table 28: Delivery Channels for Digital Services for SHF⁶⁶






Channel		Financial						Non-financial			
		Credit	Savings	Insurance	Payments	Remittances	Cash – in Cash – out	Extension services	Market information	Supplier management & Traceability	Trading platforms
Physical – commercial	Agent networks of MNOs, banks, MFIs	Usually delivered	Usually delivered	Usually delivered	Usually delivered	Usually delivered	Usually delivered	Never delivered	Never delivered	Never delivered	Never delivered
	Agro-dealers, agri-vets	Usually delivered	Never delivered	Never delivered	Usually delivered	Never delivered	Rarely delivered	Usually delivered	Usually delivered	Never delivered	Usually delivered
	Input producers (e.g. animal feeds, seed, etc)	Usually delivered	Never delivered	Rarely delivered	Never delivered	Never delivered	Never delivered	Usually delivered	Usually delivered	Rarely delivered	Never delivered
	FMCG and other retail distribution networks	Rarely delivered	Never delivered	Never delivered	Never delivered	Never delivered	Never delivered	Never delivered	Never delivered	Never delivered	Rarely delivered
	Major buyers/ offtakers (structured VCs)	Usually delivered	Never delivered	Never delivered	Usually delivered	Never delivered	Never delivered	Usually delivered	Usually delivered	Usually delivered	Usually delivered
Physical – non-commercial	Extension workers	Never delivered	Never delivered	Never delivered	Never delivered	Never delivered	Never delivered	Usually delivered	Usually delivered	Never delivered	Never delivered
	NGO programs	Rarely delivered	Rarely delivered	Rarely delivered	Never delivered	Never delivered	Never delivered	Usually delivered	Usually delivered	Usually delivered	Usually delivered
	Cooperatives and farmer organizations	Usually delivered	Usually delivered	Never delivered	Usually delivered	Never delivered	Usually delivered	Usually delivered	Usually delivered	Never delivered	Usually delivered
	Community Groups	Usually delivered	Usually delivered	Never delivered	Never delivered	Never delivered	Usually delivered	Usually delivered	Usually delivered	Never delivered	Never delivered

Key: Usually delivered Rarely delivered Never delivered

⁶⁶ Interviews, Desk research, Dalberg analysis

Analysis of current use of distribution channels most likely to reach farmers in rural areas indicates that no single type of channel can deliver all products and services for smallholder farmers. Agent networks and cooperatives are most effective in delivering financial services, while agro-dealers, extension workers and NGO programs may be better positioned to deliver information services. In terms of financial service delivery in Kenya, Safaricom has the largest agent network in country by order of multiples. Nevertheless, top banks have fastest-growing networks.

Table 29: Major Agent Networks in Kenya⁶⁷

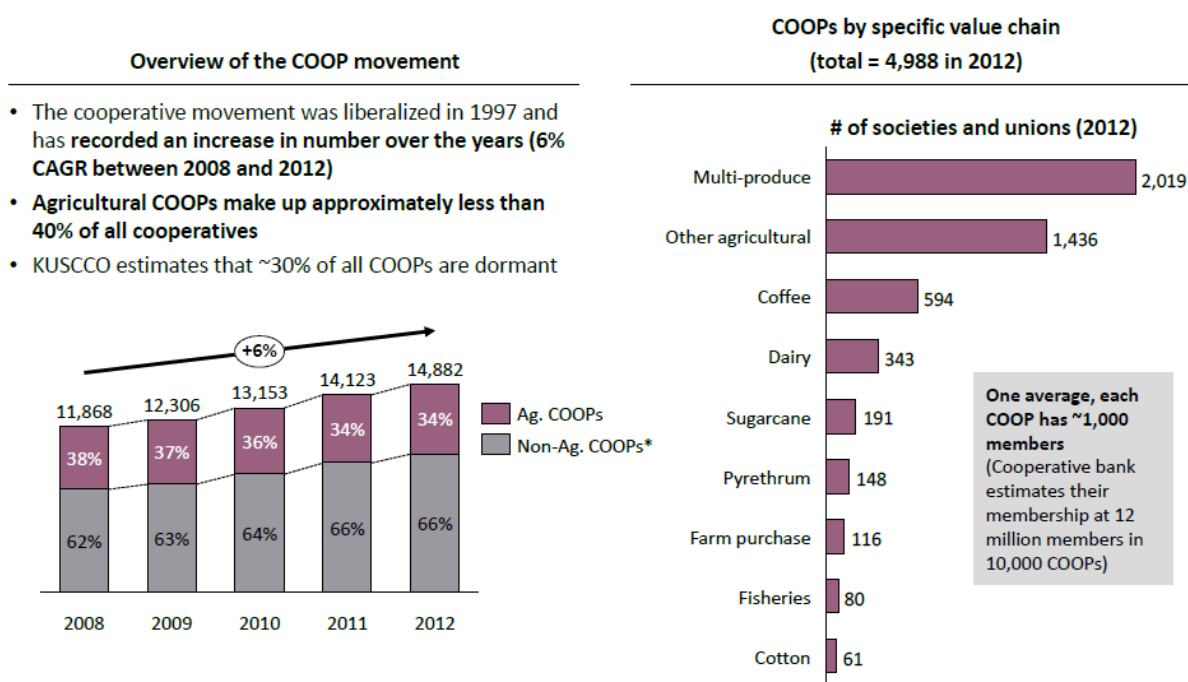
Potential partner	Number of retail customers	Size of distribution network	Geographic coverage
	<ul style="list-style-type: none"> Total connected users: over 22.1 million M-Pesa users: over 19 million M-Shwari users: over 9 million 	<ul style="list-style-type: none"> Number of agents: 81,025 Number of Lipa na M-Pesa merchants: 122,000 Number of Bulk Payments users: over 400 	<ul style="list-style-type: none"> 2G network covers 92% of Kenya's population 3G network covers 69% of Kenya's population
	<ul style="list-style-type: none"> Total connected users: over 5.5 million Airtel Money users: over 3 million 	<ul style="list-style-type: none"> Number of agents: over 10,000 	
	<ul style="list-style-type: none"> Total customer base: 9.6 million customers in Kenya, Uganda, Rwanda, Tanzania and S. Sudan Equitel users: over 665 thousand 	<ul style="list-style-type: none"> Number of agents: 17,523 Number of branches: 166 POS devices: 24,223 ATMs: 602 	<ul style="list-style-type: none"> Has presence in Kenya, Rwanda, Tanzania, South Sudan and Uganda Wide branch and agent network in Kenya, however limited coverage in the ASAL and Coastal areas
	<ul style="list-style-type: none"> Total customer base: over 2.3 million* 	<ul style="list-style-type: none"> Number of agents: 7,099 Number of branches: 134 Sacco FOSA** outlets: 540 ATMs: 532 	<ul style="list-style-type: none"> Has presence in Kenya, Ethiopia, South Sudan and Uganda
	<ul style="list-style-type: none"> Total customer base: over 4.1 million KCB M-Pesa users: over 500,000 	<ul style="list-style-type: none"> Number of agents: 10,102 Number of branches: 242 POS devices: 16,000 ATMs: 962 	<ul style="list-style-type: none"> Has presence in Kenya, Rwanda, Tanzania, South Sudan and Uganda Wide branch and agent network in Kenya, however limited coverage in the ASAL areas

Microfinance institutions are known for close relationships with low income clients, including farmers, and are located throughout the country. KWFT, Faulu and Rafiki are the largest microfinance institutions (MFIs) in Kenya with nearly 85% market share, though some smaller MFIs are also using ICT. Cooperatives and farmer groups are also very important in the provision of savings and loans, but are rarely providing services on digital platforms, providing a significant opportunity as a potential channel to farmers. Cooperative Bank and tech partner Agritech, as well as other players like mChanga, are offering new digital

⁶⁷ Co-operative bank figures are from 2013 annual report, ** FOSA = front-office service points
SOURCE: Interviews, Firm websites, Desk research

products and processes that will impact digitization of cooperatives and farmer savings groups. As of 2012, an estimated 5,000 cooperative societies and unions were directly involved in agriculture.

Table 30: Status of the Cooperative Sector in Kenya⁶⁸



Extension workers provide a particularly important channel to farmers, as agricultural experts and often highly trusted advisors. The national ratio of frontline extension workers to farmers in Kenya, however, is quite low at 1:1000, although e-extension services improve the ratio to 1:1250. Public sector-led extension is provided at the county level based on national level guidelines and is typically supply side driven, offered direct to farmer or through farmer groups by government extension workers. A leading example is the Agricultural Sector Support Development Program, working in 47 counties to strengthen market linkages and pre and post-harvest production capacity building. Government e-extension services are also operating alongside extension services offered by some cooperatives,

NGO-led extension is important in Kenya and is typically value chain specific, incorporating multiple stakeholders such as public sector, NGOs, farmer organizations and private sector. NGOs typically use a demand-driven & participatory approach offered through farmer groups or farmer to farmer. Leading

⁶⁸ Economic Survey 2013; The impact of liberalization on the cooperative movement in Kenya; KUSCCO – Kenya Union of Savings & Credit Co-operatives Ltd. * Non-Agriculture COOPs include: SACCOs, housing COOPs, Service COOPs, Industrial COOPs, Consumer COOPs, Multipurpose COOPs

examples include TechnoServe, reaching over 200,000 dairy farmers, 37,000 fruit farmers, 12,000 poultry farmers and 6,000 coffee farmers, Heifer Kenya working on the East Africa Dairy Development project funded by the Gates Foundation to help 180,000 smallholder dairy farmers, and the One Acre Fund, which, in addition to financing, provides farmers training on modern farming practices reaching over 200,000 farmers. One Acre is also a Lipa na Pesa merchant providing remote, cashless re-payment services to its borrowers. Private sector-led extension is also a resource, although mainly focused on business objectives of specific buyers and input suppliers. This type of extension is value chain specific, typically working in partnership with cooperatives and farmer groups, often leveraging out-grower schemes and utilizing demand-driven and participatory training approaches.

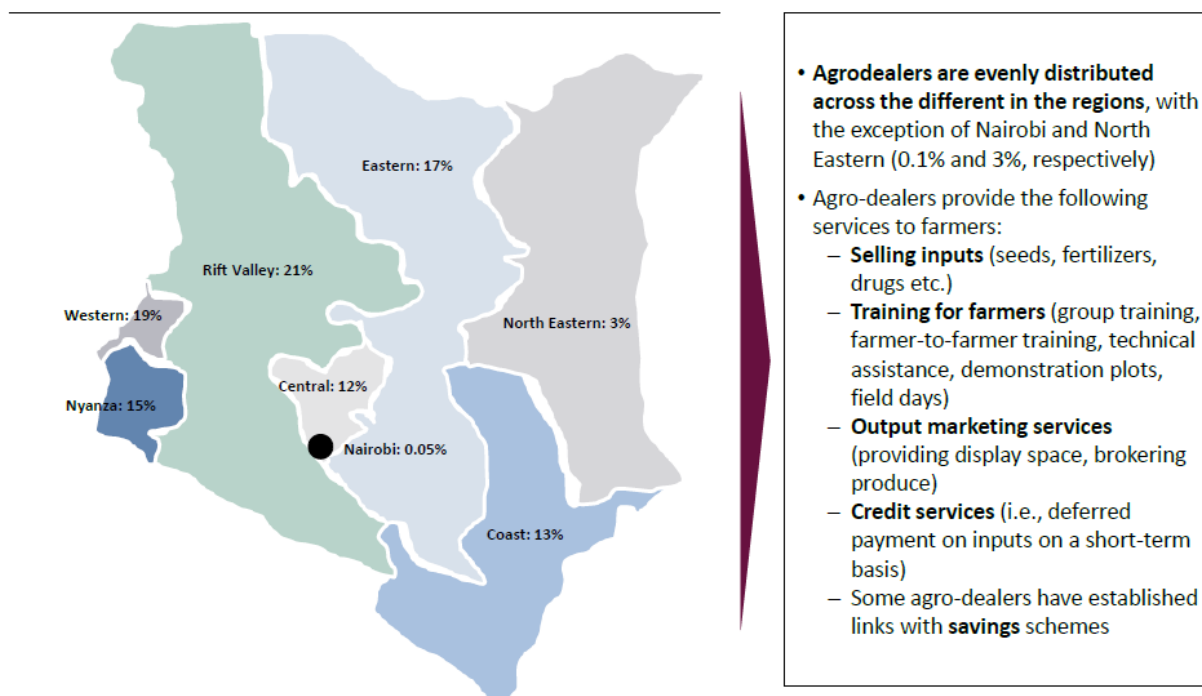
Finally, agro dealers and agro vets have the emerging potential to become an important channel for digital financial service delivery to farmers. The 2015 FinAccess Geospatial Mapping Survey provides a comprehensive listing of potential service points for farmers, including nearly 10,000 agro dealers, 2,500 agro vets and 2,256 marketplaces.⁶⁹ The Alliance for a Green Revolution in Africa (AGRA) has trained approximately 2,500 agro dealers and agro vets.⁷⁰ Working with independent agro dealers and agro vets as distribution partners can be challenging, as few are in chains. Digital payments at agro dealers through MPESA, Airtel and Lipa na MPESA, however, are clearly increasing, although often hampered in the most rural areas by poor network signal. Another trend in Kenya may be the development of new, more digitally-enabled networks of serviced agro dealers through providers such as iProcure, tapping into ecommerce potential and also beginning to lean toward the use of data analytics to drive farmer credit.

Figure 4: Distribution of Agrodealers in Kenya⁷¹

⁶⁹ <http://fsdkenya.org/wp-content/uploads/2015/10/GIS-info-sheet.pdf>

⁷⁰ FinAccess Survey of Financial Service Points, FSDK 2015

⁷¹ ICRW - Agro dealerships in Western Kenya: how promising for Agricultural development and women farmers?



Farmer Capability Building

Recent CGAP research indicates that farmer training and ongoing information provision are among the most difficult components to promote farmer adoption and ensure ongoing delivery.⁷² Currently, ecosystem players lack effective, financially viable tools and models to meet this need. Capacity building is required in three main areas to leverage and build on existing farmer capabilities: digital literacy, financial literacy, farm management and market access skills. CGAP notes that DFS for smallholders requires significant effort and resources, particularly in the early stages of product rollout. Smallholders are typically risk-averse and less experienced with technology and require significant training. Strong multi-stakeholder partnerships are often critical to success. Farmer focus group discussions and desk review on farmer capability indicated a range of constraints related to uptake of DFS, outlined below.

Table 31: Key Constraints to SHF DFS Uptake

⁷² Tarazi, “Serving Smallholder Farmers - Recent Developments in Digital Finance”, Focus Note 94, June 2014

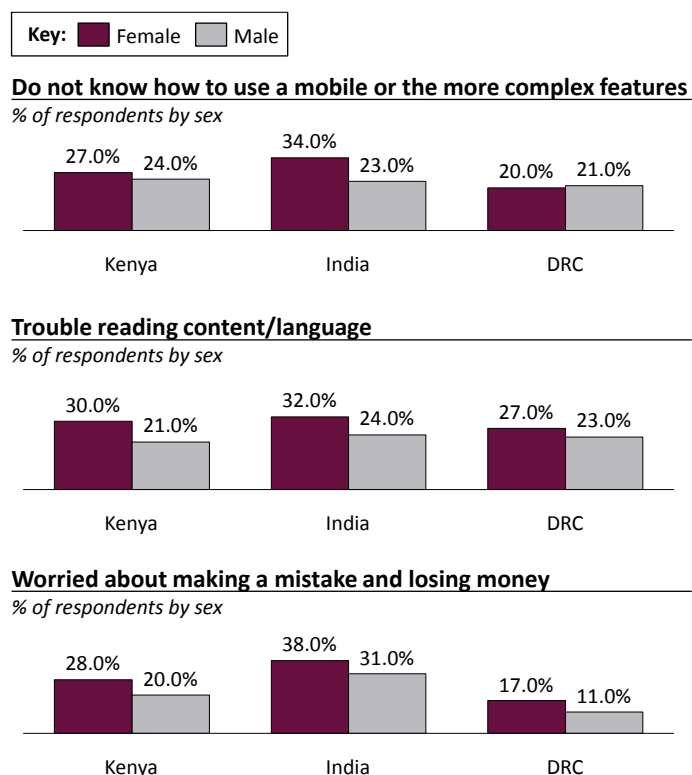
Constraints to uptake of digital financial services

Financial Literacy	SHFs are not fully aware of the range of digital financial services available to them
	SHFs do not fully understand how to use the digital financial services in the market
	SHFs don't have required budgeting and accounts management
	SHFs don't have required titles for hard assets
Digital Literacy*	SHFs struggle with signing-up for digital financial services
	SHFs have concerns over money loss when using digital services as compared to tangible cash
Farm Management	SHFs do not use the right agronomic practices to enable them to commercialize production and control costs
	SHFs are unable to add value to their produce; limiting revenue
Market Linkages	SHFs are disaggregated and are unable to profitably market their produce
	SHFs are unable to engage long term buyers and acquire soft collateral (eg. forward contracts)

Although Kenya has relatively high levels of financial literacy overall, research indicates women have more confidence-related barriers to using mobile phones than men. Studies exploring women's use of digital technology have found that women rely heavily on their social circles, including family and friends, and discovering new applications and services and that women's social circles often had very limited knowledge themselves. Family members also sometimes actively discouraged women from learning through the use of ICT due to negative perceptions of women using the internet.⁷³

⁷³ Accelerating Digital Literacy: Empowering women to use the mobile internet, 2015

Table 32: Gender-Specific Technology Concerns⁷⁴



Experience with SHF to date points to the need for technology-enabled solutions to incorporate “human touch” from trusted agents, NGO trainers or extension workers, an area where organizations like TechnoServe are playing a vital role. DFS market actors, however, lack clear models, tools and impact results to help achieve the balance between education and marketing, as well as technology and human-based channels that are needed to drive active adoption of products and services at scale. A key component of the AFA program is the Farmer Capability Lab. The Lab works with partners to develop and test SHF capability tools and sustainable delivery modalities.

International and local service providers are currently offering a range of approaches to support capability building to various players across value chains. Capability building services in Kenya, relatively to other countries, are moving towards use of digital platforms. In addition, technology firms and content developers are emerging to offer services direct-to-farmer or partnership with traditional TA providers.

⁷⁴ Ibid.

The following table provides illustrative examples of large players including players in prioritized value chains, but is not exhaustive, based on field analysis and public information from organization websites.

Table 33: Selected Providers of Farmer Capability Services

		1	2	3	4
		National service providers	International service providers	Private sector actors	Funders
Model description		Provider based in Kenya implementing TA programs	International provider with permanent delivery offices in Kenya implementing TA programs	International or local private sector actors implementing TA programs	Organizations providing funding for TA program implementation (limited individual implementation)
Topics and modules	Financial Literacy				
	Digital Literacy		No international service providers		
	Farming Practice				
	Market Linkages				

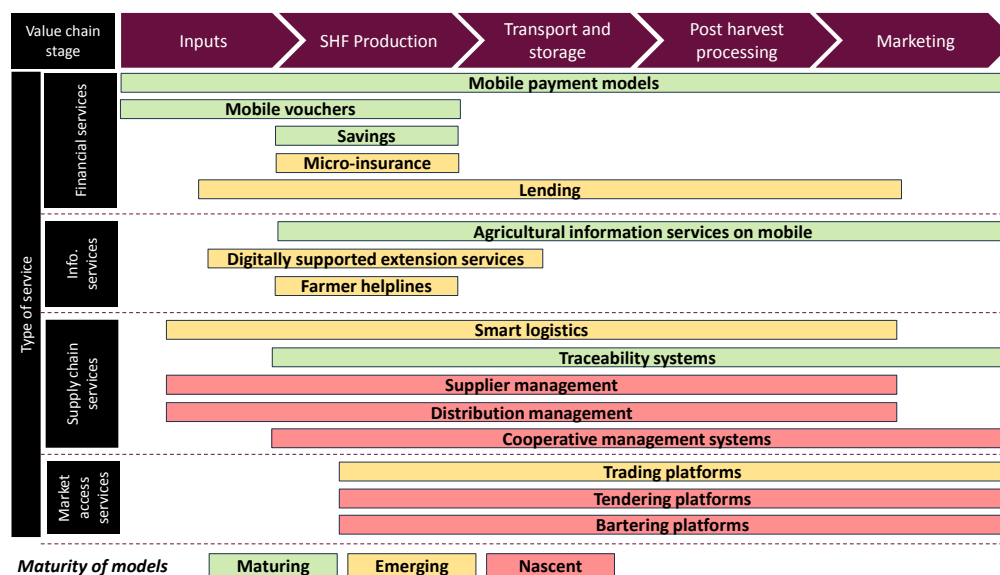
The landscape for digital farmer capability building is relatively strong and quickly evolving. Kenyan TA programs address all constraints, but tend to support market linkage strengthening compared to other farmer constraints. Over the last 10 years, financial service providers and agriculture development funds have supported agricultural financial products and made strategic investments in technical assistance to support agricultural finance and holistic VC development programs, the largest being the ASDPS and Kenya Agricultural Value Chains Enterprises Project. In a similar vein, government extension services have moved from the national to the county level and USAID and GoK have budgeted for e-extension services to be rolled out in each county. Some certification programs are available in Kenya, primarily connected to the tea and coffee sectors, as well as some other value chains for export where farmers are increasingly becoming certified in order to capture higher prices for their crops. And private sector companies, such as Syngenta, are investing in VC development programs, particularly exporters who require farmer traceability and input providers developing markets for their products.

Innovative Technology Providers

SHFs are the most underserved group in the world, with women and youth at a particular disadvantage. This is due to a range of factors, including weak infrastructure, poor market linkages and lack of access to information and critical services including inputs and extension.⁷⁵ Emerging technology innovators providing services to enhance farmer productivity and access to services are a key players in lowering both the costs and risks of serving farmers. A recent Aegis study of 115 live, exclusively digital agriculture solutions globally, noted that innovation is being driven by three main groups of actors, led by independent providers innovating on technologies and applications (e.g. remote sensing, credit scoring algorithms, farm planning tools) followed by MNOs and government. These technology innovators are oriented toward solving the tough problems facing smallholders, but often do not have the relationships or networks to achieve scale, and require specific types of support to realize their potential.⁷⁶

A recent study from Accenture and Vodafone outlines a range of opportunities for digitally-enabled services to improve efficiencies and increase incomes for SHF, noting that the greatest potential benefits can be generated by enabling mobile financial services and information¹.

Table 34: Opportunities for Digital Enablement in Agriculture (Vodafone Accenture)

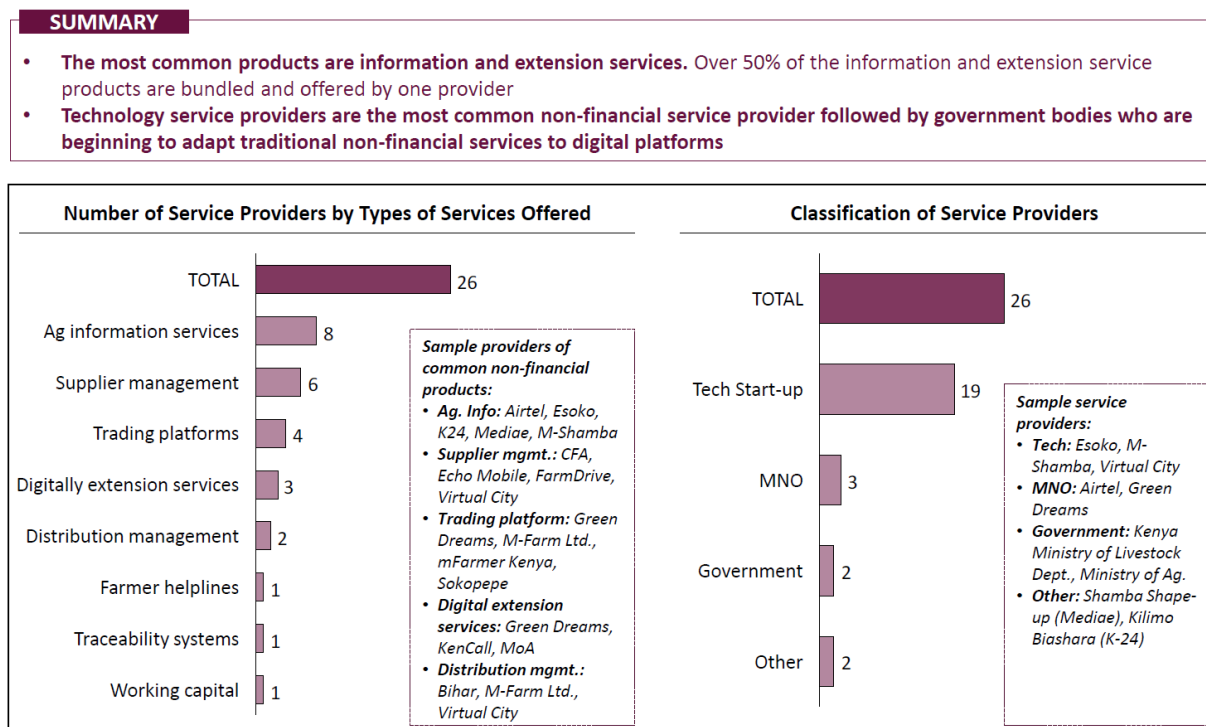


⁷⁵ AgriFin Facility Strategy. World Bank. 2010.

⁷⁶ GSMA, Digital Entrepreneurship Report, 2014

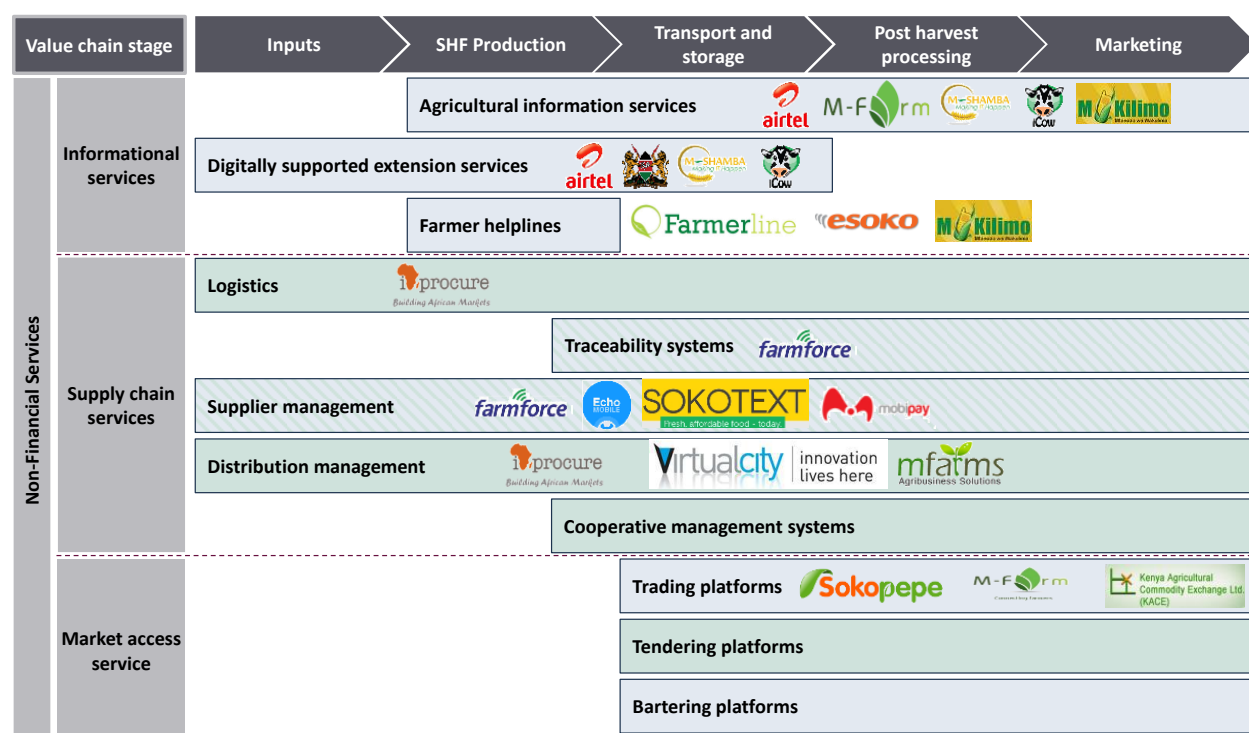
This study provides a landscaping review of innovative solution providers both in Kenya and across East Africa to identify promising technology firms which can positively impact SHF. Because of the early stage of development of many of these innovative companies, the study also includes a survey of funds and organizations that support technology startups in Kenya, such as accelerators and incubators, which can help increase the scale and viability of their work.

Table 35: Solution Scope for Non-Financial Services



The landscape of technology innovators targeting agriculture in Kenya (ICTforAg) is relatively deep and diverse, holding a significant percentage of the world's emerging digital solutions for agriculture today. While new firms emerge frequently, most solutions are struggling to reach scale and commercial viability, even with donor support. The most significant number of solutions provide SHFs with agrotips and information, however none except iCow provide services at major scale. Typically, business to business (B2B) services (such as Farmforce and iProcure) are more commercially viable than information and market access services that require SHF registration, engagement and payment.

Table 36: Landscape of Digital Non-Financial Service Providers for SHF



SOURCE: Dalberg analysis; Accenture segmentation model

B2C Services B2B Services

Multiple informational and extension service providers predominantly cater to the mass market, except for three value chain specific services: iCow (Dairy), National Livestock Marketing Information System (Livestock) and SokoShambani (Potatoes). The majority of services are still nascent, although three have managed to reach some scale by partnering with MNOs (Airtel Kilimo, M-Farm and iCow), though retention of users is unknown. Through our market analysis, we have found limited availability of supply chain services, particularly logistics, traceability and cooperative management services. However, Farmforce, iProcure and Virtual City have managed to bring their products to scale locally and in the case of Farmforce across the African Region. We have found limited availability of market access services with no tendering and bartering platforms. Importantly for AFA, the majority of trading platforms cater to larger scale farmers with the exception of M-Farm.

Safaricom

- Safaricom offers a **variety of financial services that capitalize on its vast mobile money network (M-Pesa)**
- Users are able to access:
 - Savings and credit facilities through a partnership with CBA (M-Shwari)
 - Health insurance through Britam and Changamka (Linda Jamii)
 - Index insurance ACRE Africa (Kilimo Salama)

More than half of financial and non-financial service provider reviewed offer multiple or bundled services for farmers, which can be classified in three main archetypes. The first archetype is bundled financial services, typically provided by formal service providers such as commercial banks, MFIs,

insurance providers and mobile service providers typically offer multiple financial services. While banks and MFIs offer a range of credit, savings and transaction services, insurance providers typically offer multiple types of insurance. Mobile network operators, such as Safaricom, are able to leverage their vast mobile money networks together with financial institutions to provide services.

The second archetype includes the majority of non-financial service providers offering multiple service types, including most commonly information (weather and market price) and extension service. However supply chain services, such as traceability and supplier management services may also be bundled.



- One Acre Fund offers farmers **credit as well as extension services and market access services**
- It's services include:
 - Financing farm inputs
 - Distributing seed and fertilizer
 - Training on agricultural techniques
 - Market facilitation to maximize profits from harvest sales

The third bundling archetype is combination of financial and non-financial services more commonly found in built for purpose digital solutions. These services, including the One Acre Fund example provided here, are typically offered by a start-up with funding from a donor and provide financial services together with extension, information or financial literacy services.

Given the early stage nature of these companies, an important component of the AFA program is to identify and provide technical support to promising technology innovators reaching SHF, including sponsored accelerator cohorts and targeted business consulting. The landscape of organizations providing funding and technical assistance to technology firms is relatively robust in Kenya, with incubators and accelerators provide a holistic range of services and access to investment (such as Village Cap, iBiz Africa and GrowthHub), whereas the others either provide technical assistance/business development services and no funding (including academic organizations such as JKUAT), or passive funding and no technical assistance, as presented in the following table.

Table 37: Landscape of Support Services for Technology Innovators

	 Startup incubators/accelerators	 Challenge funds and competitions	 Sector funds/donors	 Co-working spaces/hubs
Typical model services	<ul style="list-style-type: none"> • Funding: Provide seed level funding for early stage high potential technology startups • Mentorship and training: Provide mentorship and training through experts in the field • Physical space and resources: Startups are housed in the accelerator space • Business development services: Provide BDS services as part of the program 	<ul style="list-style-type: none"> • Funding: Provide grant funding for startups at various stages of development • Mentorship and training: Provide minimal training and mentorship • Physical space and resources: None • Business development services: Provide minimal business development services 	<ul style="list-style-type: none"> • Funding: Provide grant funding for established businesses as well as startups at various stages of development • Mentorship and training: Provide minimal training and mentorship • Physical space and resources: None • Business development services: Provide minimal business development services 	<ul style="list-style-type: none"> • Funding: None • Mentorship and training: Provide training through peers in the community on a day-to-day basis as well as through organized lectures and guest speakers • Physical space and resources: Available for the tech community to use at zero, or very limited costs • Business development services: Provide minimal business development services
Prominent examples	     	 	 	 

SOURCES: GSMA digital entrepreneurship 2014, donor and investor websites, Dalberg analysis

Alternative Data Providers

The potential for alternative data, such as mobile phone records or warehouse receipts, and data hosting platforms presents an emerging opportunity to quantify and address risk, tailor product design, and provide farmers with digital records and identities.⁷⁷ Alternative data (“AD”) is information, not traditionally used by financial service providers that may be used to enable firms to assess credit or insurance risk of an individual. Farmers rarely have traditional data trails like debit or credit card use, or other payment obligations like mortgages or car payments. In the Global South, AD tends to be mobile data; whereas in the Global North, AD tends to be customer payments records such as utilities and e-commerce. AD is in theory highly beneficial for credit risk and pricing, as well as insurance policy and premium pricing, where traditional credit history data is either insufficient or unavailable. For this reason, AD is potentially transformative in the Global South where many people are unbanked or under banked.

⁷⁷ Babcock, Lee, “The agricultural mobile finance revolution”, Feb 2014, [http://ictupdate.cta.int/Feature-Articles/The-agricultural-mobile-finance-revolution/\(76\)/1392201374](http://ictupdate.cta.int/Feature-Articles/The-agricultural-mobile-finance-revolution/(76)/1392201374).

It can lead to greater financial inclusion, unlocking a client base previously unreached through traditional credit channels.

Traditional credit providers like banks are looking to access new clients in low-income segments where they have not been traditionally active. Specialized AD firms are creating new products (e.g. psychometric analysis) and selling to FSPs to utilize alongside their current credit risk analysis tools. MNOs realize they have a large mines of valuable data they can use to extend services to existing customers and acquire new ones, while technology innovators are capturing new forms of alternative data which may have strong relevance for credit risk analysis. Non-bank financial institutions, consumer lenders and far-sighted commercial banks are pioneering AD use to acquire core markets.

Key trends are already driving the increased relevance of alternative data at the SHF level. Smart phone ownership and access is increasing, handset cost is dropping drastically and mobile banking is growing rapidly. Increasingly, features of the mobile phone enable access, for example using the touch interface of smart phone and easy-to-understand mobile banking applications. Affordable, reliable internet is increasing across the continent with new fiber-optic cables increasing transmission capacity of data, with leading use cases of social networking tools and global search engines already in use by Kenyan smallholders, particularly through second-hand or low cost Android models.

An element of the AFA program is to support the identification and pilot testing of applications of alternative data and data platforms to support expansion of services to SHF. Our review of alternative data in this study worked to identify what types of experience and opportunities exist in Kenya to expand access to credit, insurance and other financial services and how AFA can best support those initiatives. We have assessed alternative data (“AD”) models globally, regionally, and in Kenya across the five main categories of AD: (a) mobile data (b) personal spend data (c) agricultural data (d) informal groups (e) psychometrics. These firms are finding innovative ways to determine credit and insurance risk of hard-to-reach clients (including SHFs).

Table 38: Landscape of Alternative Data Firms in Kenya, Regionally & Globally

	Kenya	Regional	Global
Mobile Transactions 	   	    	     
Personal Spending 	    	   	      
Agricultural Data 	    	   	  
Informal Groups 	<ul style="list-style-type: none"> ★ Murata Sacco Society Ltd ★ Wakenya Pamoja Sacco Society Ltd ★ Wakulima Dairy Sacco Society Ltd 	 	     
Psychometric 		 A member of Standard Bank Group	     

As the space in Kenya is relatively nascent, opportunities exist to bring in players who have had success elsewhere. Nevertheless, diverse “adjacent” firms in Kenya are collecting new forms of AD as a byproduct of some other primary business, such as MKopa, which is providing solar solutions and related asset financing to over 300,000 rural households. Many Kenyans, especially those in rural areas, are also members of groups that sit on a potentially rich mine of paper-based data, including SACCOs and chamas. MNOs, like Safaricom and Airtel, have only recently started to mine mobile usage data as AD – as such they are still working out different uses and are limited in their partners. AFA will move forward to support these types of AD firms to support increased services for SHF as the program develops.




Conclusions and Opportunity Identification








In summary, findings from the Kenya Ecosystem Study in 2015 support the AFA technical approach around product bundling on digital platforms for farmers. Given the highly fractured and diverse nature of agricultural value chains, which each involve myriad actors, including input suppliers, buyers, mobile network operators, financial institutions, distribution companies (fast moving consumer goods), farmer unions and government, no single player can solve this problem on their own. But given the study findings

and the clear potential for increased productivity across Kenyan agriculture, there is fertile ground for digital platforms to bring these actors together to deliver value to farmers in a cost effective way.

Based on the ecosystem analysis, we focused on identifying pain points for SHFs and opportunities to address these challenges, the role of digital services in addressing these challenges and critical questions for actors within the ecosystem. Our initial focus in this paper is around understanding and meeting the needs of SHF, which are summarized in the table below across financial and non-financial services. Key unmet needs include bridging the gap between informal and formal savings, credit and insurance products to address farm productivity needs, supported by requirements and pricing that they can realistically supply. There are clearly also behavioral and attitudinal barriers for farmers, particularly for women, which need to be addressed during product design to ensure uptake. Improved non-financial services, particularly given the weak extension support for farmers, can augment both the access to and impact of financial services.

Table 39: SHF Unmet Needs for Financial and Non-Financial Services

Key:
 high
  medium
  low

		Level of Need	Unmet Need
Financial Services	Credit		<ul style="list-style-type: none"> Current borrowing is done via informal channels – formal institutions have strict requirements Transparency in cost of credit is required to improve farmer perceptions and trust in formal institutions Credit offerings should address seasonality of smallholders' production and income cycles Delayed payments make warehouse receipting systems less attractive to SHFs
	Insurance		<ul style="list-style-type: none"> Farmers currently lack awareness of the existence of agriculture insurance products Terms and conditions of products should be clearly explained to farmers Minor disturbances in cash flows and small shocks force families to forego or postpone spending
	Savings		<ul style="list-style-type: none"> Proximity of financial service points is important for accessibility especially for mobile money and banks Misconception that banks are only viable when farmer has 'big money' 91% of low income households used informal savings platforms¹, in some cases leading to loss of funds
	Transactions		<ul style="list-style-type: none"> Improvement in transparency of the costs related to bank and mobile money transactions is required
Non-Financial Services	Info. Services		<ul style="list-style-type: none"> Greater focus on SHFs as only 50%² of extension providers specifically target SHFs Currently only 6.7%² of extension services have national coverage, therefore greater geographical scale is required
	Supply chain services		<ul style="list-style-type: none"> Lack of farmer data and monitoring systems limit the outreach and effectiveness of farmer interactions
	Market access services		<ul style="list-style-type: none"> Poor understanding of required quality and safety standards lock SHFs from accessing formal markets Produce bulking for collective marketing is yet to be achieved among SHFs in loose VCs

Source: 1 Financial Diaries, 2 ICRAF Working paper, Dalberg analysis

We have identified opportunities to address these gaps which include both universal services and products tailored to value chains, given the fact that nearly all Kenyan farm households engage in more than one value chain. Mercy Corps has learned through its pioneering AgriFin Mobile program working in Indonesia, Zimbabwe and Uganda, that farmers must be actively engaged through the design and pilot phase and in a meaningful way over full product implementation. Farmer behavior change is a significant challenge, given the constraints that they have faced and dealt with over time. Recent trends to incorporate human centered design into product development, led by CGAP and others, have yielded promising results in developing more holistic solutions for farmers and farm families, while also leveraging learning and innovation from outside the worlds of development finance. Breakthroughs of these types will need to be tried and tested through multiple iterations in order to develop successful models that can serve more marginalized farmers, including women and youth.

Table 40: Strategic Opportunities for SHF Financial Products

Archetype	Description	Proposed prioritized services types ¹
Universal services that address broader farmer needs	These services are not necessarily value chain specific and can be used by a large number of SHFs	<ul style="list-style-type: none"> – General savings products: One of the most important mechanisms to smooth income and enable loan provision – Extension services: An integral part of financial and non-financial service bundles – Trade platforms: An important mechanism for creating broader market opportunities for farmers
Tailor made services that address farmer seasonality and income volatility	These services aim to address challenges that farmers face as a result of unpredictable or seasonal income flows	<ul style="list-style-type: none"> – Seasonal based loans: This type of loan respond most directly to farmers seasonal income requirements
Services that facilitate linkages within value chains	These services do not necessarily target SHFs directly, rather ensure that value chain actors operate more efficiently, ultimately benefiting SHFs	<ul style="list-style-type: none"> – B2C transactions: This service significantly reduces transaction costs for aggregators and ensures greater transparency and record keeping for farmers – Traceability systems: These systems create improved food safety and quality standards, creating better opportunities for sales both domestically and for export – Supplier management: These services improve data and monitoring systems and facilitate effective of farmer outreach and interaction

A critical driver for the innovation needed to transform services for low income farmers are technology companies focused on solving the tough problems faced in agriculture, including access to markets, information, improved inputs and key services, such as mechanization and irrigation. Again we see that Kenya is fertile ground for this innovation and is already a leader in Africa in experimentation and initial

scale models. Companies providing direct services for farmers such as iCow, Arifu and iProcure and alternative data providers such First Access, Juntos Finanzas and Acre Africa are laying the groundwork for successful, and impactful service to SHF which must be tapped together with financial service providers to reach full fruition. The market still lacks, however, successful business models and commercial and impact proof points to drive the scale needed to overcome the huge and complex environment for millions of African smallholders. In order to support the potential of these ICT leaders in agriculture, AFA includes specific support programming for technology firms innovating in this space, including product development support, a Technology Challenge Fund and sponsored accelerator cohorts, which will be rolled out in 2016.

Table 41: Opportunities Identified for Non-Financial Services and Alternative Data

<ul style="list-style-type: none"> • Traceability: effective traceability allows for improved food safety and quality standards, creating better opportunities for export sales • Supplier management: improved data and monitoring can facilitate effective farmer interaction including: payments, extension, input provision, quality tracking, linkages, etc. • Trading platform: provide farmers an opportunity sell their crops beyond the market gate cutting out the middle men, giving the farmers visibility over broader market prices • Logistics, Tendering and Bartering platforms: emerging logistics platforms are addressing key infrastructure gaps and helping farmers access markets and improve income 	<ul style="list-style-type: none"> • Agricultural information services: informational services complement extension services with climate and market information • Cooperative and chama management platforms: allows group members to transparently track contributions and investments mitigating some of the risks of the service for consumers • Extension services: extension services provide training on full agricultural cycle from field preparation to post harvest techniques • Farmer helplines: are an effective means of communicating with farmers (particularly the illiterate) providing extension and information services 	<ul style="list-style-type: none"> • Transfer successful global AD models to Kenya - by facilitating partnerships with local players and buying down risk of market entry • Leverage new customer data by adjacent firms - by supporting firms (e.g. PAYG energy firms, retail) to leverage their customer data as AD and help package and market it to FSPs • Digitize paper sources of data - by supporting organizations (e.g. cooperatives, SACCOs) to digitize, aggregate and leverage data • Facilitate partnerships with MNOs to mine mobile data, by facilitating partnerships with specialist data firms and FSPs to utilize mobile data
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In terms of overall ecosystem development, the role of market enablers, including donors, investors, buyers and government, will be vital the development of DFS for farmers. The digitization of basic payment flows through agro dealers, agroveter and other channels to farmers could present major impetus for improvement and is very realistic within the Kenyan context. The following table presents a number of critical questions that market actors should be thinking about as they engage with SHFs:

Table 42: Considerations for Enabling Actors in Ecosystem

Donors	<ol style="list-style-type: none"> 1. Are there high-risk high-reward value chains that donors can invest in to accelerate progress that helps the poorest farmers? 2. How can donors better fund start-ups to replace the missing angel and seed capital? 3. Given limited 3G/4G and smart phone penetration among SHFs, what program structures can donors use that allow SHFs to access the benefits of digital-based mobile interventions?
Investors	<ol style="list-style-type: none"> 4. Which value chains are ripe for commercial investment? E.g., poultry – the indigenous chicken market could potentially be a high value VC but no private sector players have invested in it; potatoes; currently only 9% of potatoes is processed – potentially a market for food processing such as crisps 5. Is there a better way to quantify the trade-off between investments in farmer productivity and increases in profitability?
Buyers	<ol style="list-style-type: none"> 6. Most SHFs are in unstructured value chains yet they contribute to ~80% of total production in the country – how can buyers access this informal markets? For example, can more buyers adopt New KCC's approach of introducing real time payments to tap into the informal milk market? 7. Given Kenya is dependent on rain-fed agriculture, can buyers invest in storage facilities in order to stabilize availability of produce and consequently, stabilize prices?
Government Bodies	<ol style="list-style-type: none"> 8. How can government encourage Safaricom to lower payment fees on M-Pesa and be more transparent about APIs to promote a more robust digital payment ecosystem? 9. How can government encourage more interoperability between the MNOs? 10. How can government parastatals replace the lack of activity among agriculture commercial actors in certain value chains?

The digital space in general is highly dynamic and hard to predict. Digital agriculture will likely be popularized by a few appealing technologies that will quickly change how people think about the potential. We can draw on certain insights to predict where digital agri- solutions may be headed in the near to medium terms (3-5 years):

- Products will evolve and scale the quickest around adjacent solutions that are already penetrated. Links to existing financial services solutions will drive the first waves of scalable solutions to transform the way that SHF manage their farms and access markets;
- Subsidy will continue to stimulate the emergence of new markets and the involvement of new actors. Subsidy will be important, significant and somewhat distortionary in the next 3-5 years;
- The accessibility of more advanced technologies will create new service design possibilities and smartphone prices will likely drop below \$20, regulators and competition will start to push data service prices lower and modular data options will start to become commonplace.

Within this evolving environment, farmer utility and scale of digital services to millions of SHF must remain our goal. Large data gaps remain to be filled to help providers better understand and serve women and youth,

as well as promising agricultural value chains that lack clear aggregation. There is still a weak understanding of SHF income and how best to drive productivity gains, as well as how SHF access and use of different services. We look forward to addressing some of these gaps and working with the ecosystem of providers over the coming years of the AFA program. AFA will continue to share its learning on all of these fronts actively with market stakeholders to help support this shift. In 2016, the program will publish findings from ecosystem surveys in Tanzania and Zambia, along with ongoing updates of from all three countries over the life of the program.

AFA looks forward to working with ecosystem partners to make this happen.

Annexes

Annex A: Landscape Analysis of Financial Service Providers⁷⁸

Key: ● Highest ○ Lowest

	Type of product	Current situation
Credit	Seasonal based loan*	<ul style="list-style-type: none"> There are 9 notable players in this space, prominent examples include Musoni, the Agricultural Finance Corporation (DFI), and Cooperative Bank Agricultural Finance Corporation's transaction costs for seasonal loans are very high: the minimum loan ceiling for supervised seasonal credit for SHFs is KES 50,000, with transaction fees before interest of approximately KES 8,500 (17%)¹ Farmers express the need for financial products with flexible payment terms as one of the most important considerations and Musoni's current digital offering is helping to lower the transaction costs of providing the service
	Asset financing	<ul style="list-style-type: none"> There are 10 notable players in this space, prominent examples include Juhudi Kilimo, Opportunity International and Equity Bank These loans are typically a mixture of individual and group based loans The assets including livestock as well as farming equipment, vehicles and infrastructure such as greenhouse and irrigation equipment Successful providers such as Juhudi Kilimo, combine financial services training together with loan provision to ensure that farmer groups fully understand the loan mechanisms
	Trade finance	<ul style="list-style-type: none"> The majority of commercial banks, regardless of bank size, provide trade financing Kenyan service providers have been focusing on both large scale businesses and SMEs Notable examples of banks with an SME focus include Equity Bank and KCB
	Working capital loan	<ul style="list-style-type: none"> The majority of commercial banks and microfinance institutions that service farmers provide this type of loan. Farmers are also able to access working capital through informal means. Prominent examples include Equity Bank, Cooperative Bank, and KWFT These loans are offered to individuals, groups and societies Cooperative bank offers a variety of working capital loans to coffee and dairy farmers. These value chains are typically more structured and make targeting large numbers of aggregated farmers with financial services products more effective

⁷⁸ IFPRI 2013, 2. KENFAP, 3. FinAccess 2013, 4. Business Daily 2014, Service provider websites, Dalberg Analysis

Key: ● Highest ○ Lowest

	Type of product	Current situation
Credit	Non-agriculture general loans	<ul style="list-style-type: none"> Most formal and informal service providers offer this type of loan In some instances, SHFs turn to informal moneylenders (who charge even higher interest rates) for short-term loans to cover immediate needs such as repayment of formal debt¹ M-Shwari is one the most well known general loan products in Kenya; part of its success is due to Safaricom's consolidation of several financial activities onto one mobile platform, in particular, saving, borrowing, and conducting money transfers between M-Shwari and M-PESA
	Warehouse receipt systems	<ul style="list-style-type: none"> Warehouse receipt systems (WRs) are typically run by parastatals, commodity exchanges and donor funded programs, notable examples include National Cereals and Produce Board, Kenyan Agriculture Commodity Exchange, and the East African Grain Council WRs in Kenya have focused on maize, catering to SHFs There is no existing legislature in Kenya governing warehouse receipt systems and uptake has been hampered by a lack of trust in the system due to delayed payments to farmers²
Insurance	Personal insurance	<ul style="list-style-type: none"> Personal insurance products, particularly health and life insurance products are offered by multiple insurance providers in Kenya As of 2013, about 17% of the population had ever accessed insurance products. This reflects an increase in uptake as a result of government mandated use of NHIF, with 15.6% of respondents using the service³ Britam, Changamka and Safaricom have partnered to offer health insurance coverage to low income populations, however lower than expected uptake (36,000 customers in 2 years) has led to a change in focus to SME clients⁴
	Crop & livestock insurance	<ul style="list-style-type: none"> There are 9 notable players in this space, prominent examples include UAP, Heritage and APA insurance. There are no prominent examples of digital crop and livestock insurance and the majority of the players serve larger scale farmers, given their limited rural reach

Key: ● Highest ○ Lowest




	Type of product	Current situation
Insurance	Index insurance	<ul style="list-style-type: none"> There are only 5 notable players in this space, the most prominent example is ACRE Africa (formerly Kilimo Salama) Kilimo Salama was an insurance product offered by a partnership between UAP insurance, Safaricom and Syngenta foundation; it could be purchased by individual farmers at their local stockist, when buying inputs. Payouts (through M-Pesa) were based on comparing local rainfall measurements to an agronomic model of specific crop's rainfall needs
Savings	Commitment savings for Ag	<ul style="list-style-type: none"> The majority of commitment savings is done through informal channels. There are no notable formal service providers offering commitment savings products specifically for agriculture In 2013, ROSCAs were used by over 20% of respondents¹ ROSCAs create an ideal environment for commitment savings, in a 2007 Kenyan study, 21% of respondents said that that they can't save alone and got 'strength to save from sitting with others'²
	General savings products	<ul style="list-style-type: none"> As with commitment savings, a large proportion of farmers save through informal channels, of the 65% of farmers who had saved money in the past 12 months, 50% of them had done so through informal groups³ Savings in Kenya have increased since the introduction of mobile money products; a World Bank study in 2012 revealed that 65% of M-Pesa users reported having some savings compared to 31% of those who were not M-Pesa users⁴ The most well know digital savings platform in Kenya is M-Shwari with over 9 million customers, however the service continues to face competition from informal groups Users reported in a survey that besides M-Shwari, 47% of them saved their money in Chamas (ROSCAs) in the last 90 days⁵
Transaction	C2C	<ul style="list-style-type: none"> Kenya has a very well established transaction sector, and 61.9% of farmers have access to transaction services¹ The most used digital transaction platforms in Kenya is M-Pesa, however the majority of C2C transactions are urban to rural remittances as SHFs find the transaction fees too expensive²

Key: ● Highest ○ Lowest




	Type of product	Current situation
Transaction	G2B (to C)	<ul style="list-style-type: none"> A small proportion of Kenyan farmers currently receive funds through the Government's National Safety Net Programs, in the agricultural sector, only 1.3% of farmers had accessed "formal registered" financial products which include government programs¹ However a new EU, Ministry of Agriculture program offers much-needed tools, fertilizers and seeds to farmers, through a voucher scheme enabled by mobile technology The funds will likely be sent to participating agro-dealers and farmers can receive inputs, avoiding the risky cash handouts that have characterized government schemes in the past
	P2G	<ul style="list-style-type: none"> Tax payers are able to pay Kenya Revenue Authority using M-Pesa (as of 2012) and Airtel Money (as of 2014) Currently KRA have availed Traffic revenue service payments through mobile. These include: Driving License application and renewal payments, Logbook payments and Motor vehicle inspection payments
	C2B	<ul style="list-style-type: none"> The major commercial banks offer C2B payment services through international payment platforms such as VISA and MasterCard Mobile money service providers are also offering C2B payment services at zero transfer fee rates to consumers Safaricom have a variety of C2B services including Lipa Na M-Pesa (a partnership between Safaricom and Kopo Kopo) which has now overtaken the volume of transactions registered through debit and credit cards One Acre Fund now use the "Buy Goods" feature to receive payments, this has relieved the high transaction fee from farmers; One Acre Fund pay a fee of 1% to receive the payments
	B2C	<ul style="list-style-type: none"> There are limited players in the digital B2C payments space, with Safaricom dominating the market owing to their large mobile network Aggregators and outgrower schemes use the service, for example Mace Foods, as of 2010 they make 100 percent of their payments to farmer M-PESA mobile wallets, which has substantially reduced costs and improved accurate accounting and data records Other financial service players use this type of service to disburse money to farmers, for example Opportunity International uses M-Pesa to disburse loans to it's farmers

Annex B: Landscape Analysis of Non-Financial Services Providers





The following are leading companies providing agrotips to farmers based on varying models.

Firm	The innovation	Results to-date	Partners
	iCow is a SMS subscription service that provides agrotips for dairy cows . Farmers register cows at events (e.g., insemination) and iCow sends reminders / tips at specific intervals (e.g., check for pregnancy). It may be expanding into chicken too	<ul style="list-style-type: none"> ~150,000 paid subscribers A 2011 study found that 42% of farmers had increased their incomes, and increased incomes had come from higher yields 	<ul style="list-style-type: none"> Safaricom USAID Accenture BioVision Indigo Trust
	M-Farm's is primarily a transparency tool that allows Kenyan farmers to access updated market prices by SMS . Also, an aggregator tool allows farmers to buy and sell produce / inputs in a group, with settlement handled by M-pesa	<ul style="list-style-type: none"> ~7,000 subscribers in 2013 	<ul style="list-style-type: none"> Safaricom M-Pesa
	A mobile-based platform that allows firms to interact with farmers via SMS or a call center . Firms hire Esoko to disseminate agrotips, weather forecasts, market price data, advertising, or collect M&E/survey data	<ul style="list-style-type: none"> A NYU 2014 study found that Esoko's pricing data increases farmer incomes by 7% 	<ul style="list-style-type: none"> USAID GIZ FAO






These are other solutions focused on helping agribusinesses with supply chain management and logistics:

Firm	The innovation	Results to-date	Partners
	Virtual City's Agrimanagr is an integrated, mobile platform to manage an agribusiness , including purchasing, produce tracking, and mobile payments to farmers. The platform is adapted for dairy farming and horticulture , among other value chains	<ul style="list-style-type: none"> Acumen estimates that farmers using Virtual City's software see a 50% rise in income 	<ul style="list-style-type: none"> Heifer International Safaricom Samsung Acumen
	A last mile distribution system that connects retailers with ~5,000 small agrovets and agriculture input shops . Shops order digitally and iProcure fulfills the orders. iProcure also offers advertising and predictive analytics to suppliers	<ul style="list-style-type: none"> Unknown 	<ul style="list-style-type: none"> Village Capital Alumni Received investment from impact investors Invested Development
	Farmforce is a Software-as-a-Service solution that simplifies the management of small-holder farmers, increases traceability and enables access to formal markets .	<ul style="list-style-type: none"> Currently working in 12 countries worldwide 8 major customers: Doreo Partners; Fair-Fruit; World Bank; Corredor Agro; Wilmar; Acceso; Legumex, SA; Frutesa 	<ul style="list-style-type: none"> Syngenta (owner), SECO (co-investor) Partners: Global G.A.P, KHE, Mercy Corps





There are new, earlier-stage digital solutions emerging across traceability, supply chain & logistics, market and pricing information, trading:

Firm	The innovation	Results to-date	Partners
	Mucho Mangos mobilizes farmers who are losing money on mangos, provides extension services and training to the farmers, helps identify credit sources for farmers , and purchases the mangos for export to Europe	<ul style="list-style-type: none"> The firm is currently looking for funding 	<ul style="list-style-type: none"> The group is currently looking for partners
	Sokopepe has two major products, Farmis and Soko+. FARMIS is a farm management and diagnostic tool used to expand access to credit, track profit and loss, and provide agrotips. SOKO+ is a digital trading platform to match SHFs with bulk buyers	<ul style="list-style-type: none"> As of April 2015, the service had 6,000 registered farmers 	<ul style="list-style-type: none"> ALIN Kenya Infotrade Uganda
	SokoNect is a trading platform designed to connect SHFs directly with buyers without any brokers . The platform also allows input providers to advertise to SHFs	<ul style="list-style-type: none"> As of June 2015, it only has 135 listings on its virtual market place 	<ul style="list-style-type: none"> Unknown
	FarmDrive is a web-based bookkeeping app for farmers to track revenue and expenses . Using this data, FarmDrive provides data analytics and helps farmers access credit by giving MFIs better insight into farmer creditworthiness	<ul style="list-style-type: none"> The firm is currently looking for funding 	<ul style="list-style-type: none"> C4D Lab, Univ. of Nairobi

In terms of specialist financial services providers, there are notable ICT innovation for financial services in weather-based insurance, credit scoring, service delivery.

Firm	The innovation	Results to-date	Partners
	First agricultural insurance program worldwide to reach SHFs using mobile technologies (launched in June 2014). Products offered: Weather index, area yield index, satellite-based index, hybrid weather index and MPCI, dairy insurance	<ul style="list-style-type: none"> • # of farmers: 233,700 farmers (2014 - Kenya: 89,200; Rwanda: 144,500) Insured • VCs reached: Maize, beans, wheat, sorghum, coffee, potatoes, sunflower. Livestock mortality by accidental causes. 	<ul style="list-style-type: none"> • Insurers: UAP, APA, SORAS (Rwanda), Century UAP (TZ) • Reinsurers: Swiss Re, Africa Re • Delivery Channels: agri-businesses with outgrowers, SACCOs etc.
	Musoni is the first MFI offering loans 100% through mobile. Products offered: group business loans, individual business loans, agri-business loans, emergency loans, and education loans	<ul style="list-style-type: none"> • To date, over 75,000 loans valued at US\$ 21 million have been disbursed 	<ul style="list-style-type: none"> • MasterCard • Grameen Foundation
	Provides asset-backed loans to Kenyan SHFs to access quality agricultural assets that enhance their productivity. Use mobile messaging and tablets to lower costs of loan evaluation and administration, as well provide channel for client feedback	<ul style="list-style-type: none"> • 10,000 borrowers (as of March 2013) and has invested \$1.6 million since 2011 	<ul style="list-style-type: none"> • KIVA, Rockefeller Foundation, Grameen Foundation, Ideo, Acumen, Deutsche Bank, Swiss Contact, Ford Foundation, AMSCO, FEFISOL, Safaricom, AlterFin
Firm	The innovation	Results to-date	Partners
	Employs M-Pesa and FrontlineSMS:Credit , a nonprofit software provider specializing in mobile financial services, to offer micro insurance policies independent of savings and credit groups. The model involves using M-Pesa to collect premium payments and FrontlineSMS to monitor individual policies in real time	<ul style="list-style-type: none"> • Currently serving 15 million people in 17 countries around the world with insurance, the majority of whom have never been insured before 	<ul style="list-style-type: none"> • Opportunity International • Bill & Melinda Gates Foundation • Health Insurance Fund (KE) • Grameen Foundation • Airtel
	Umati Capital offers financial solutions to cooperatives, traders, and processors to bridge working capital gaps caused by delayed payment from customers and the need to pay suppliers faster Platforms: Aida for payments, M-Trader a management tool, a web-based mgmt. information system	<ul style="list-style-type: none"> • Currently working with ~70,000 farmers, mostly in Eldoret with a portfolio size of US\$ 5 million 	<ul style="list-style-type: none"> • Advance Global Capital • Accion • FSD Kenya • ApexPeak • EAGC • TechnoServe • Airtel Money

The following firms are leading examples of global and regional ICT financial services and / or agriculture:

Firm	Activities	Results to-date	Partners
	Enables organizations to communicate with program recipients . Services include; SMS or voice blasts; surveys; interactive voice response information; reminders & curriculums; SMS text auto replies among others	Mercy Corps used platform to make and send over 1 million voice calls and SMS messages	Mercy Corps , MEDAIR, United States Institute of Peace
	GeoTraceability uses GPS mapping, GIS technology, mobile phones and barcoding systems to collect geographical information linked to traceability information , along value and supply chains	3,000 cotton farmers and 10,056 cocoa fields in Ghana have been mapped 10,000 coffee producers in Vietnam used the tool	PWC has acquired GeoTraceability They have also partnered with CARANA, Armajaro and the Peru Cocoa Alliance
	Bima creates mobile insurance platforms . In addition Bima provides distribution, product development and daily management support	Bima now covers 7m people in eight countries across Africa, Asia and Latin America	Tigo, Robi, Dialog, XL Axiata, Golden Crescent Assurance Tanzania, UASen Vie Logo, Equity Life Insurance
	Farmerline provides three services: i) outbound information and extension messaging and voice alerts ; ii) mobile surveys ; iii) a support line linking farmers to expert advice	Unknown	Business call to action, Village Capital , The indigo trust, AFRINIC, World Wide Web Foundation, Advanced information technology institute, Aqua Fish

The following organizations provide training / extension services to farmers in Kenya and other SSA countries

Firm	Activities	Results to-date	Partners
	Uses digital platforms to share knowledge on improved agricultural practices, livelihoods, health, and nutrition, using locally produced videos and human mediated dissemination	<ul style="list-style-type: none"> Currently implementing projects in India and parts of Ethiopia, Afghanistan, Ghana, Niger, and Tanzania As of April 2015, had reached over 660,646 individuals 	<ul style="list-style-type: none"> Africa partners*: World Cocoa Foundation, Oxfam, AGRA Research/Tech*: AfricaRice, IFPRI, Agro-know Investors*: BMGF, DFID
	Syngenta has developed its own capability building app, delivered on tablets through agro-dealers, with a more limited direct-farmer SMS app also. Tablet shows training videos, information on techniques and diseases, product recommendations, and linked to mFarm for pricing	<ul style="list-style-type: none"> Tablet app has 1,000 users through 10 stores Mobile SMS app has 5,000 users Tracking, but not yet reported on, impact of capability building tools on farmer productivity and yields 	<ul style="list-style-type: none"> Ministry of Agriculture, Ministry of Water and Irrigation, Ministry of Fisheries, Syngenta Seeds, ICRISAT, ILRI, Swiss School of Ag.
	iKilimo is a subscription SMS and HTMS agrotips platform that provides farmers with answers to FAQs on animal husbandry, plant production, farm equipment, and marketing	<ul style="list-style-type: none"> Program is expected to link 50,000 farmers through the MoALF extension program 	<ul style="list-style-type: none"> Ministry of Agriculture, Livestock and Fisheries

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