

Kenyan smallholders agree that mobile apps are improving market access

ICTs are helping Caribbean agri-entrepreneurs to strengthen their businesses

Young peoples' affinity with ICTs is the key to moving mAgriculture forward



Linking farmers to markets



Revolutionising **finance** for agri-value chains



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Contents

- 3** Introduction
Mark Speer
- 4** Guest editor
Revolutionising finance for agricultural value chains
Lamon Rutten and Ben Addom
- 5** Plug & Play
- 6** Linking farmers to markets
Mawazo M. Magesa
- 9** Plug & Play
- 10** Unlocking the market
Fredrick Odhiambo
- 12** Infographic
- 14** Five ways of engaging the youth in agriculture
Yared Mammo
- 16** Plug & Play
- 17** Young voices
Discovery learning
Imarah Radix
- 18** How apps impact farming communities
Mary Wangari Mutiga, Simon Ndogo Ndong'u and Moses Mwangi Thiga
- 20** Dispatches
- 22** Apps for small agri-businesses
Keron Bascombe
- 23** Improving sales strategies for the cashew market
Serge Kedja
- 24** Tech Talk
How ICTs are empowering Ugandan farmers
Deogratious Afimani

ICT Update



ICT Update issue 77, April 2014.

ICT Update is a bimonthly printed bulletin with an accompanying web magazine (<http://ictupdate.cta.int>) and e-mail newsletter. The next issue will be available in June 2014.

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With thanks to FAO for distributing *ICT Update* through e-Agriculture (www.e-agriculture.org)

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Improving farmers' business practices

In October 2013, the Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA) put out a call for papers, case studies and synthesis papers. The purpose of the call was to publish and disseminate experiences and success stories in ACP countries – or experiences and success stories that were relevant to ACP countries – that can inspire the rejuvenation of smallholder agriculture there.

The call was broken down into three subject categories:

- Success stories of the adoption of ICTs for agriculture at the community level.
- The extent of ICT adoption by ACP farmers.
- Success stories of adopting innovative alternative energy systems to an off-grid village environment.

CTA received 44 papers in response to the call. In November and December 2013, the papers were reviewed by an evaluation committee. The three criteria used were quality of writing and readiness for publication, completeness of paper in terms of subject matter, and level of detail and hard information. Of these 44 papers, 34 were selected, and later this year CTA will publish them on its website.

As a prelude to the publication of these articles, *ICT Update* has chosen several of the selected papers and condensed them into articles. The choice has fallen on those papers that deal with the themes of the next two issues of the magazine. This issue, no. 77, explores how mobile applications have helped smallholder farmers improve their commercial farming practices and their access to information and markets. The theme of the next issue, no. 78, is family farming to support the international year of family farming.

The theme of using ICTs, and mobile applications in particular, to improve smallholders' business practices and access to key markets also ties in with the Fin4Ag conference being held in Nairobi, Kenya from 14–18 July 2014. There have been significant innovations in finance in some countries in recent years, but these have been slow to spread across borders and institutions. Indeed, agricultural finance institutions, and the policies, rules and regulations under which they operate, are lagging behind changes in the 'real economy'. Speakers at the conference will explore ways in which decision makers in farmers' organisations, financial institutions, government bodies and other institutions interested in agricultural finance can reinvent their business models instead of trying to improve on existing ones.

Building on the success of the Plug & Play day at the ICT4Ag conference in Kigali, Rwanda in November 2013, the Fin4Ag conference will host a similar event, this time featuring innovations in digital financial services for agriculture. The Plug & Play sessions are designed to allow demonstrators to share their skills and expertise in an interactive format, learn with participants who may be interested in these tools, and enable participants to have a hands-on experience.

This issue of *ICT Update* is devoting five pages to the 15 innovations chosen for the Plug & Play day. The innovations include web-based applications such as FarmDrive, which help farmers to electronically maintain revenue and expense records and a-Where, a platform that provides data for climate-smart agriculture, food security and agricultural finance. And finally, this issue's 'TechTalk' column features the founder of a digital agricultural commodity exchange in Uganda, and we continue with 'Young voices', Imarah Radix's experience at a 'training for trainers' workshop for young agricultural extension workers in Saint Lucia. ◀

Mark Speer (mark@contactivity.com) is editor of *ICT Update*.

Revolutionising finance for agricultural value chains

Lamon Rutten and Benjamin Addom discuss the far-reaching changes that are needed to revolutionise finance for agri-value chains.

Linking farmers to markets

The Oxford English Dictionary's first definition of 'revolution' is 'a forcible overthrow of a government or social order, in favour of a new system'. When discussing how to change agricultural finance, it sometimes feels that is how established bankers look at the whole issue – as a threat, and from a historical perspective as an experiment that is destined to fail. However, a revolution in finance for agri-value chains is more likely to correspond to another definition in the Oxford English Dictionary: 'a dramatic and wide-reaching change in conditions, attitudes, or operation'. These are changes that will have a positive impact if well-conceived and properly implemented – changes that offer banks valuable new opportunities.

A few simple facts. Agricultural production has to increase by 50% by 2050 to feed the world population, which according to the United Nations Department of Economic and Social Affairs, will reach 9.7 billion people that year. This increase will require massive investments: in developing countries, some US\$83 billion per year, an increase of 50% over current levels.

About 90% of the investments today are made by farmers themselves. In fact, it is highly unlikely that they will manage to scale up their investments to such a huge extent. So the lion's share of this increase will have to come from external funding, such as banks and investors. The value of Africa's food market is likely to triple to US\$1 trillion by 2030 – but processors and traders are already constrained in their capacity to finance trade flows and stocks. These challenges are an opportunity for those banks that manage to change their product portfolios to offer farmers and others operating in value chains new ways to finance production and trade.

At first sight, the revolution in payment systems, enabled by the rapid spread of mobile phones, seems to provide a sound basis for change in agricultural finance. After all, mobile phones now reach large numbers of the unbanked and have given many of them access to financial services. However, regulatory constraints in most countries mean that in order to move from mobile payment services to credit, banks need to get closely involved.

Some are, but they are mostly using the mobile phone as a delivery vehicle – or to put it differently, conditions may have changed, but banks' attitudes have not, and they are sticking to their old business model. This is not good enough – it means bankers continue to see agriculture as a risky venture and continue to offer the same products that are often not well adapted to the realities of farmers.

A much more far-reaching change is needed, one that incorporates mobile technology into new financing models. For example, crowdsourcing data from mobile phones can help banks to better model and manage risks, and offer new risk management and financing products to farmers and traders.



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Electronic platforms can link the various parts of value chains (and their service providers), permitting banks to provide finance in line with the actual flow of goods and services.

For financiers to truly grasp what ICT developers have to offer them, the two groups should spend more time thinking together – which goes beyond bankers using mobile technology, or developers selling their apps to banks. From 14-18 July, CTA is hosting the Fin4Ag conference in Nairobi, Kenya together with the African Rural and Agricultural Credit Association, the Central Bank of Kenya and the Kenya School of Monetary Studies. CTA is not only bringing together ICT developers and bank representatives, but also other stakeholders from the agri-value chain, in the hope of designing a blueprint that revolutionises finance for agri-value chains.

As a prelude to the conference on finance in agriculture, this issue of *ICT Update* explores various ICT initiatives on the ground – mainly using mobile applications – that are helping smallholder farmers improve their businesses. The various authors explore how these mobile apps are helping small and medium enterprises through numerous stages in the life cycle of their businesses, how agricultural market information services in Africa are helping to link farmers to markets so they can make better business choices and improve their bargaining power and how these apps are impacting communities in rural areas in ACP countries. ◀



Linking farmers to markets

M-Trader

M-Trader provides access to credit for small businesses who are considered unbankable by traditional financiers. It gives them advances against payments that are due for products or services delivered. Right now it focuses on small businesses in Kenya, but plans to expand its reach into East, West and Southern Africa. M-Trader is both a mobile and a web application. And unlike many current alternatives, it provides finance as well as information.

The web application is tailored to suit the needs of processors, while the mobile application, which runs on the Android platform, is designed for small-scale suppliers. The model of paying is transactional or freemium and the costs are borne by the users, such as farmers and traders. M-Farmer is an initiative of Umati Capital, a Kenyan non-bank financial intermediary focusing on the provision of supply chain finance across various value chains.

→ www.umaticapital.com

Ensibuuko

Ensibuuko is a mobile and web application that integrates automated SMS and mobile money services to enable cash transfers and payments by mobile phone. The app's special features allow users to make easy transfers of loans and savings to and for cooperatives that serve unbanked and under-financed farmers. Ensibuuko can be used both on smartphones and feature phones, making it especially convenient for ordinary rural farmers.

The application's special features enable farmers organised in cooperatives to modify it to their needs. For example, they can integrate their mobile money accounts with a common group account to enable secure and convenient transfer of either savings, loans or loan repayments. They can use the app to track and generate a credit and savings record in the back-end.

Ensibuuko has been introduced as a pilot project in Uganda. It targets farmers and non-finance organisations that are interested in providing finance to the unbanked and under-financed groups of farmers.



→ www.kiva.org/partners/360

FarmDrive

FarmDrive is a web-based record-keeping application that helps farmers to maintain revenue and expense records. It enables them to access visualised analytical data on farm performance, such as weekly expenses, revenues and an accurate reflection of overall performance. The greatest benefit of FarmDrive is that it bypasses traditional methods of acquiring finance, such as bank loans, and goes directly to individual or group investors for financing farmers.

FarmDrive is accessible from any device with an internet connection and is not platform-specific. It addresses a major challenge facing smallholder farming enterprises, namely their lack of access to financial services and key information that will help improve their businesses. This challenge is a major bottleneck preventing smallholder farming enterprises from exploiting their potential to develop into fully fledged agri-businesses.

The model of paying for FarmDrive is transactional or freemium. It has been introduced as a pilot in Kenya. Its target audience consists of farmers and investors interested in agri-business. FarmDrive's slogan is 'the name of the game is using technology to innovate for smallholder farmers'.



→ www.farmdrive.co.ke

→ <http://goo.gl/GY36oS>

CIS

CIS is a credit information sharing system. As such, it is a highly innovative mechanism for collecting and collating borrower loan data from financial institutions, through credit reference bureaus licensed by the Central Bank of Kenya. The intention is to enhance credit risk management among lenders and reward good borrowers with favourable credit terms such as reduced reliance on tangible collateral and lower cost of credit. CIS also aims to unlock access to affordable credit. It collates a borrower's information from multiple sources (banks, monetary financial institutions and public registries, for example) into one record, called a credit report. Lenders then access and use the credit report in appraising loan applications.

CIS helps to address the challenges of accessing credit by reducing the information imbalance between borrowers and lenders. As such, reduced reliance on tangible collateral and a faster turnaround time processing credit result in increased access to affordable credit for farmers who are often locked out of the credit market. The system works on mobile phones and computers that can access the internet. The target users include farmers, researchers, policy makers, traders, bankers and other credit providers. It is currently limited to Kenya but will be expanded to other countries in East Africa in the near future.

→ www.akcp.co.ke

→ www.metropolcorporation.com

→ www.crbafrica.com

Farmer management system

Vest Farm Tanzania's farmer management system was developed by South African firm Finico Technologies as a management instrument in the value chain to aggregate the different individual activities performed by the various actors. This, in turn, aggregates the various supply and demand activities within the value chain. The system is an extremely flexible management platform that can mitigate risk especially if structured to relate to farmers' organisations. The system is essentially a tool that – within farmers' organisations – makes it possible to control and manage credit given to farmers. It gives farmers access to accredited input suppliers and the benefit of better prices due to economies of scale.

The farmer management system serves as an electronic wallet for the producer. The producer, in turn, is linked to specific suppliers within a defined ecosystem. This electronic wallet has various accounts which enable the production and trade transactions to be captured in the detail required by the actors within the ecosystem or value chain. The management services include financial management, procurement, marketing, process management, monitoring and evaluation, audit trail, and the coordination of farmer services.



→ <http://finico.za.com>

→ <http://vestfarm.wordpress.com>

Linking farmers to markets

Linking farmers to markets helps farmers to escape the greed of middlemen and traders as it improves their knowledge of market prices and increases their bargaining power. Better roads in rural areas, for example, will encourage them to transport their produce to distant markets themselves and bypass middlemen. Similarly, the expansion of mobile network services into rural areas will effectively connect farmers to local and distant markets. Agricultural market information services (AMIS), several of which have been launched across Africa (see box), hold great promise for enhancing agricultural value chains.

Agricultural market information services are a set of tools for collecting

farmers to find buyers for their produce and buy their farm inputs directly from manufacturers at favourable prices.

Learning quickly

Agricultural market information services usually make their services available via websites, though some also distribute their information via radio, newspaper and television. But increasingly their services are available as mobile agricultural value-added services through mobile networks and social media such as Facebook and Twitter.

The number of farmers using agricultural market information services is on the rise. Many of these

lessons quickly about what does and does not help farmers. So knowledge of these services is developing rapidly.

Financial sustainability

One of the biggest challenges facing agricultural market information services to date has been how to achieve financial sustainability. These mobile value-added services must be built on robust business models. Moreover they also need coherent business plans that convincingly outline how initial pilot activities will be scaled up to achieve long-term financial sustainability.

As with so many other donor-supported agricultural development programmes, services operating with

Linking farmers to markets

Agricultural market information services help to link farmers to markets so they can make better business choices and improve their bargaining power.

and processing agricultural and livestock market information and delivering this information to farmers, as well as traders, food processors and government functionaries. These services aim to increase the transparency of the agricultural marketplace. Informed farmers can make better business choices, for instance which crops to plant or how long to store their produce until prices improve. Information from local and distant markets also helps farmers to decide how to price their products and where to sell them. Eventually, better business decisions improve their bargaining power and increase their income.

Many AMIS initiatives make more than just market information available to farmers. Indeed, they also provide agricultural extension advice, weather forecasts and prices for agriculture-related inputs. Some services even help

services, such as Esoko, Manobi, LINKS, KACE and M-Farm, have been successfully employed by farmers. Many more of these services, however, have been less successful, often because they have either failed to provide timely, accurate and cost-effective market information or have not made their information easily accessible for the intended users.

Indeed, it is easy to underestimate the time and resources that are required to gather and process agricultural price information from local, regional and national markets. It is also difficult to adequately package information for customer groups that have levels of illiteracy. Another common problem is underestimating the challenge of reaching out to farmers in remote rural areas and the impact of the absence of government policies to create enabling environments.

Nevertheless, in their many forms agricultural market information services are an effective way of linking farmers to markets. Mobile value-added services have been introduced into the agricultural sector in most ACP countries, and people are learning

donor support do not tend to survive when a project ends. They should therefore opt for business models that are geared towards financial independence, so they can break even or ideally even make a profit and sustain themselves.

Sustainability requires that these services scale up operations, following the initial pilot and testing phases, to accommodate regular customer bases – not consisting of hundreds of farmers, but thousands if not tens of thousands of farmers. Governments, donors and development organisations may choose to subsidise these services for certain groups of farmers, but these services' tools should be principally offered on a fee basis.

An agricultural market information system that has successfully scaled up its services is the Ghanaian platform Esoko. Launched in 2005 with funding from USAID, Esoko is now a profit-making company with private investors. One of its strengths is that it is able to operate independently from government or donor funding. Right from its start, Esoko adopted a tiered franchise-subscriber business model. It then made a targeted effort to expand

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A common problem is underestimating the challenge of reaching out to farmers in remote rural areas and the impact of the absence of government policies to create enabling environments

its customer base, which substantially enhanced its technical platform and agricultural information services. Esoko now works in Ghana, Burkina Faso, Cote d'Ivoire and Malawi.

Esoko's business model includes private franchises, a reseller programme and public-private partnerships. Franchise holders seek private equity investments and sell subscriptions to Esoko's SMS-based agricultural information services, and training and consulting support. The franchise holders must meet minimum performance standards and share their revenue with Esoko. Resellers sell Esoko's subscriptions, training and consulting services, and target companies that wish to use Esoko's services as a complement to what they are already doing.

Other successful services, such as Manobi, KACE, M-Farm and LINKS

have all adopted profit-making models and expanded their customer base to become financially independent from external funding. As a government programme, LINKS is the exception, but it can rely on secured funding and sustained support from a government that considers market price information an important public good.

Lessons learned

Clearly, identifying key target users of market information is just as important for the success of an AMIS as is a profit-making business model and a business plan that is geared to scaling up the number of customers in order to become financially independent.

Over time, farmers' information needs may shift from information on market prices and demand to information on new markets and product development opportunities. But

there are more lessons to be learned from both good and bad experiences. Following are some of the actions that need to be taken to ensure success:

- Secure political commitment in order to ensure that the government supports policy
- Focus on target users' information and service needs
- Ensure that a wide range of information services are provided to the people who really need them
- Make sure that farmers are introduced to a rich combination of business models to benefit their enterprises
- Ensure that farmers' organisations, trade associations, NGOs and any other important parties are linked to each other
- Increase cellular network coverage in rural areas
- Reduce mobile communication costs
- Promote AMIS activities

Some constraining factors include:

- High cost of mobile phones and communication
- Low literacy rates and consequently difficulties in reading text messages
- Strong preference to listen to voice services in local native languages

Not only can market sellers receive and transfer money on their mobile phones, but they can also access key agricultural information and cut down on communication costs.

Related links

- Esoko www.esoko.com
- Manobi www.manobi.net
- LINKS www.lmistz.net
- KACE www.kacekenya.co.ke
- M-Farm www.mfram.co.ke

- Lack of knowledge on how to use complex market information
- Poor mobile network coverage in large parts of rural areas
- Poor road infrastructure in rural areas, making it difficult to transport produce to markets
- Sharing market information among farmers, as a result of which AMIS are used less frequently
- Lack of political commitment because politicians fail to recognise benefits

Agricultural market information services hold great promise for linking smallholder farmers to markets, but most of these services are still in their infancy. Initial successes have demonstrated that these mobile value-added services have great potential for enhancing agricultural value chains. They are effective in promoting

Over time, farmers' information needs may shift from information on market prices and demand to information on new markets and product development opportunities

communication between parties in the chain and provide farmers with real-time information on market prices and demand, weather forecasts and agricultural advice.

As these success stories demonstrate, if providers manage to keep subscription costs low and if the information continues to be timely and reliable, farmers will use their mobile phones to access these services. This requires investing more in mobile phone network coverage in rural areas, developing more specialised and interactive mobile value-added applications that will help farmers to increase the productivity of their farms, and developing national ICT policies that will promote the use of mobile value-added information services. ◀



CHARLES O. CEELI/LAMY

Established agricultural market information services

Esoko – Ghana

Esoko is a private initiative operating from Accra, Ghana. Esoko's website offers a range of mobile and web applications for collecting and sending out agricultural information using simple text messages. The Esoko platform can be used by individual farmers, agri-businesses and organisations in agricultural value chains. Esoko's tools enable farmers to negotiate better prices, choose different markets or time their sales better. Annual subscriptions to Esoko's services vary from US\$35 (for individuals) to US\$1,500 (for corporate businesses).

Manobi – West Africa

Manobi, a company based in Senegal, offers mobile and web-based tools to improve agricultural value chains. Its Time-to-Market application enables farmers to check market prices on their mobile phones via SMS, WAP, MMS or mobile internet. Manobi provides price information, collected from different markets in different countries. Entry level services are free for farmers earning less than US\$2 per day.

LINKS – Tanzania

Operating in Tanzania, Kenya and Ethiopia, LINKS, the Livestock Information Network Knowledge System, monitors prices of concluded livestock transactions, and provides information on breed, age, gender and grade. This information is brought together in weekly and monthly 'summary livestock market information reports' that are disseminated via email, newspapers, radio and TV programmes and available on the LINKS website. LINKS costs US\$0.04 per SMS.

KACE – Kenya

KACE, Kenya Agricultural Commodity Exchange Limited, is a firm in Nairobi that offers reliable and up-to-date market information to farmers, producers and consumers, as well as sellers and buyers, and exporters and importers of agricultural commodities. One can sell or buy commodities or services through KACE on any of its physical or virtual trading floors.

M-Farm – Kenya

M-Farm is a transparency tool for Kenyan farmers which they can use to send text messages to get information on retail prices of their products, buy their farm inputs directly from manufacturers at favourable prices and find buyers for their produce. M-Farm costs US\$0.01 per SMS request.

Linking farmers to markets

UWIN

Unleashing the Wealth of Nations is a mobile and web-based system designed to create an eRegistry of local assets, such as farmlands, livestock and all other assets of farmers and small and medium enterprises. The eRegistry will enable them to use non-productive assets to secure loans that will improve their businesses and livelihoods. UWIN provides periodic valuations of these assets so owners can use them to secure capital at an affordable cost to further develop their businesses. The system also provides a virtual marketplace by matching up demand with supply based on a matchup algorithm that will open up new markets, especially for local commodities. The system hopes to gradually eliminate the need for middlemen and empower rural farmers.

The main objective of the platform is to alleviate poverty and to move citizens in developing economies from a mode of daily survival to one of wealth acquisition and growth. The system will provide values for local assets that can be used as security for loans, which in turn will decrease the risk of lending to farmers. Likewise the 'commodity platform' will allow local farmers and smallholders to participate in the national and eventually in the global economy, where they can benefit from market prices and freedom of trade. The application will first be piloted in Senegal and Botswana, but it can be used globally.



→ <http://goo.gl/GeU4wb>

Tangaza Pesa

Tangaza Pesa is a platform that automates agricultural financing processes by digitally registering participating farmers and connecting them to participating financial services institutions. The registration process captures the applicants' details, such as name, photo, biometrics, telephone number, GPS position of the farm and any other information required of the farmer by the financier. Tangaza Pesa is a mobile and web platform that works on all mobile phones, including the cheapest. Participating farmers can make orders and pay for agricultural inputs from participating suppliers on the platform, for example for fertilizers and seeds. Farmers can also 'post' the products that are ready for the market. Agricultural products processors and brokers are able to make

orders directly from the farmers, and make payments for the same, cutting middlemen costs.

→ www.tangazapesa.com

e-Krishok

In Bangladesh, many farmers still do not consider agriculture a business and therefore do not keep the necessary documents and records of transaction on file or up to date. Indeed, the awareness level of farmers is very low when it comes to assessing business cases for agri-projects. All this reduces their chances of successfully applying for financing. Commercial banks and other investors are reluctant to finance farmers who have no records of their businesses' financial history.

e-Krishok is a service package to help farmers solve the problem of applying for financing. It offers them solutions such as Amar Hishab, which means 'my money'. The service identifies farmers' financing needs and offers help with capacity building, mentoring and finding finances. Farmers can apply online or can visit the nearest telecentre to use the service.

e-Krishok offers its services through a Grameen Phone Community Information Centre (GPCIC), at the heart of which is an agricultural information repository. The mechanism also has a link to direct e-mail consultation with an agriculturist. Farmers do not necessarily have to own the necessary technical equipment but are encouraged to come to a GPCIC when they have a particular problem to solve.

If the problem cannot be solved on the website, a query is forwarded to a specific email address that is used and maintained jointly by the Bangladesh Institute of ICT in Development and an agriculturist dedicated to reply to these queries on daily basis.



→ <http://goo.gl/oMyfrl>

→ <http://goo.gl/GMRmk4>

Agrilife

Agrilife is a cloud-based technology platform targeting groups of smallholder farmers in various value chains in the African agricultural sector. It addresses challenges faced by smallholder farmers

mainly by providing them with access to finance, markets and agricultural inputs. Agrilife makes credible data visible to other parties, which was never the case in the past. Credible data means information such as bio data, produce data, data on the status of farms and historical data of individual farmers. Farmers' produce is valued in order to determine credit-worthiness, and subsequently farmers can submit requests to the Agrilife platform via their mobile phones or computers for financial services, such as cash advances, purchases of inputs, and market linkages.

Agrilife involves a variety of players in the agricultural sector, including banks, monetary finance institutions, insurance companies, cooperatives, investors, schools and agricultural input providers. Agrilife's partners include financial organisations, farmer development organisations and technology companies.



→ <http://goo.gl/X3HU8N>

Zoona

Zoona is a social enterprise that helps micro and small enterprises grow by enabling 'easy-quick-safe' payments and financing in emerging markets. The e-voucher platform was designed specifically to deliver agricultural subsidies and crop payments. It provides organisations and government agencies with a web platform that they can use to administer, send and track 'easy-quick-safe' bulk payments directly to recipients via SMS or scratchcards. It is designed to deliver payments intended for use for specific purposes, which makes it easier for governments and donors to track the use of funds. It also allows farmers to store money safely, in voucher form, for specific purposes. For example, it enables farmers to hold money for seed that is not yet available without the risk of the funds being stolen or used for other purposes. Developed and delivered by an African company, Zoona provides a suite of products designed specifically to help small businesses grow across the continent.



→ <http://ilovezoona.com>



Unlocking the market

A 2013 study entitled *Market in their Palms* conclusively shows that the use of mobile apps by smallholder farmers in Kenya has helped them to gain access to markets and market information and improved their businesses.

Linking farmers to markets

Agriculture plays a key role in reducing poverty. The *World Bank's World Development Report 2008* estimated that growth in the agricultural sector is twice as effective in reducing poverty in developing countries as growth in other sectors. Commercialising smallholder farmers' production by introducing ICTs would give them better access to markets and boost growth in the agricultural sector.

In Kenya, agriculture is the mainstay of the country's economy. According to the Kenyan government's 2009 *Agricultural Sector Development Strategy*, agriculture accounts directly for 24% of the country's GDP and another 27% indirectly as a result of

business with the service, manufacturing and distribution sectors. Agriculture is responsible for 65% of Kenya's total export revenue, and in rural areas it provides work for over 80% of the population. These figures make agriculture the single-most important sector for Kenya's general economic and rural development.

One of the most persistent problems for smallholders in Kenya's agricultural sector is accessing information and markets, which prevents them from pushing through commercialisation. But attempts are being made to tackle these problems through the introduction of ICTs, such as mobile phones, the internet and mobile phone applications.

In 2013, I completed a study entitled *Market in their Palms*, which explored the use of mobile phone applications in Kenya by smallholder farmers to access information and markets. More specifically, I wanted to find out what

kind of an effect the use of the apps had on these smallholders' farming businesses and whether the apps helped them to improve their marketing ability. I explored four key areas while interviewing these smallholder farmers:

- The types of mobile phone apps used by smallholder farmers
- The cost of using the mobile phone apps
- The impact of apps on the smallholder farmers' access to information and markets
- The impact on smallholders' production

Type and cost of app

The 12 smallholder farmers in five counties in Kenya (Nairobi, Kajiado, Narok, Nyandarua and Nandi) were interviewed using three mobile phone farming application services: M-Farm, mFarmer and the National Farmers Information Service (NAFIS). M-Farm and mFarmer are privately run agri-

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business companies based in Nairobi and provide a platform for farmers to access markets, information and inputs through their mobile phones. NAFIS is run by the Kenyan ministry of agriculture. Its integrated mobile app and internet service provides farmers with broader access to key agricultural information, which farmers can access by sending a text message or by calling.

The smallholder farmers used these applications in different ways. The concept of contract buying was important for those using M-Farm, for example. 'First I had to send a text to M-Farm with all the information about my produce, its quantity and quality, and the price I would prefer,' one female M-Farm user in Nairobi county farmer explained. 'Then I was linked up with a buyer. The buyer and I agreed on the price, the quality and quantity. I then signed a contract with M-Farm, as did the buyer, containing all the information we had agreed on.'

For the other two applications, mFarmer and NAFIS, the process of contacting a potential buyer involves sending a text message through the app containing information about the produce on offer, the price, the quantity and quality, and the area where the farmer is based. Once the information is in the application system, it is sent to other buyers in the system. Interested buyers then contact the farmer directly, after which they can agree on the price, quality and quantity, and the mode of delivery and payment.

The farmers using these two services often completed sales without meeting each other, since payment was made via mobile money payment systems such as M-Pesa. 'When my produce was ready,' said a male mFarmer user in Narok county, 'I would send a text to the number 8988 indicating the number of bags of Irish potatoes I had and the price I was offering per bag. The message was then relayed to interested buyers by mFarmer who could contact the service. mFarmer would then send me the buyers' details, and from that point on I contacted the interested buyer myself to conclude the business.'

In terms of accessing price information, the farmers simply need to send a text message containing the name of the produce and the city of interest to the service provider. The service then replies with the price of

the produce in the particular city of interest. M-Farm, for example, has developed a permanent mobile phone app for Android phones that farmers can download and install on their phones. The app enables them to easily access current price information as long as the phones have internet access. Access to production information via these apps is limited because production information is bulky and accessing it via text messaging is complicated.

Not only did these three apps help farmers gain better access to the market, but all the farmers interviewed agreed that the cost of using these apps was affordable. Sending a text message or making a call through these apps did not cost more than the normal rates for texting or calling in Kenya. The farmers who installed M-Farm on their phones also felt that the cost of accessing price information via the internet was affordable. 'For me the cost is not an issue,' a male M-Farm user in Nyandarua county said. 'Even if the cost goes up a little bit, I would not mind as long as I have better access to markets.'

Overall impact

What difference, if any, has the use of mobile phone apps made to the smallholders' farming businesses? Has better access to information affected these farmers' marketing and production? All agreed that these apps made accessing information easier, faster and cheaper. The services were affordable, and communication with buyers and others was faster. Moreover, the information was reliable and current, and so particularly useful for farmers. It enabled them to make quick marketing decisions yielding them higher returns.

'One of the advantages,' said a female NAFIS user in Nandi county, 'is that I now know the prices that my produce is fetching. Even if I still decide to go through a middleman, at least now I know what my produce is selling for, so I can insist on a better price. If he doesn't like my price, I am now at liberty to tell him to go away since I can access another market more easily.'

The farmers interviewed agreed on an additional benefit. Because the various apps made communication easier, farmers were able to link up and form networks among themselves and with traders. Some even said that these

networks have become their main source of information on production.

Thanks to these marketing opportunities, farmers no longer have to rely on middlemen or greengrocers, for example, as they have a larger pool of buyers to choose from. 'Can you imagine,' said a male M-Farm user in Nyandarua county, 'that now I sometimes get more than two responses from different buyers interested in my produce? I then simply choose the buyer who offers me a better price and who accepts that he has to pick the Irish potatoes right here at my own farm at his own cost.'

M-Farm, mFarmer and NAFIS have brought the world closer for these farmers. Previously, rural smallholders had to transport their produce, which was time-consuming given the poor road infrastructure in many rural areas in Kenya. But now, farmers with contracts via M-Farm, for example, can remind buyers about the agreed date of sale as their produce is harvested and also remind them to pick it up. As a result, the produce does not have a chance to spoil, which cannot be underestimated since most of these farmers lack good storage facilities.

The answer to the question I posed in my study *Market in their palms?* is yes. These three apps have unlocked the door to better market and information access for smallholder farmers in the five Kenyan counties mentioned above. In that sense, the next step is to spread the word of these services to as many smallholder farmers in Kenya as possible. In addition, the interviews have shown that the apps did not encourage smallholders to access agricultural extension services, which is another issue that can be improved on in the future. ◀

By improving efficiency in communication, transport and production, mobile applications have brought the world closer for smallholder farmers.



KWANJIA NATHAN EAGLE-MIT



ACP GOES MOBILE

MOBILE MONEY IN AFRICA



21 MILLION PEOPLE

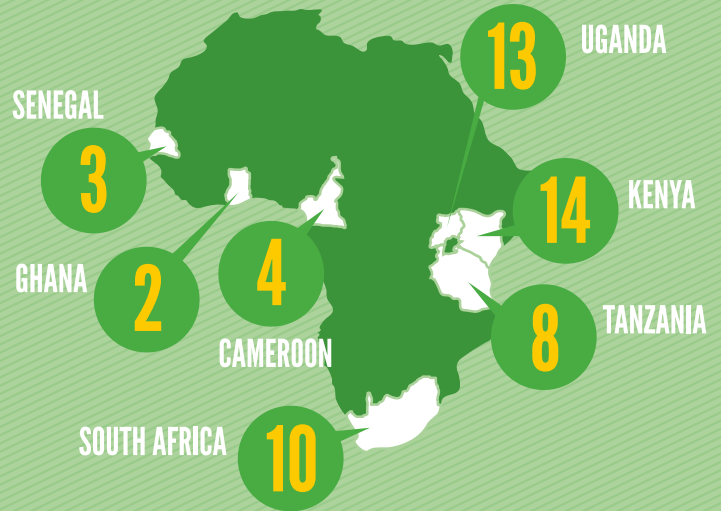
ABOUT HALF OF KENYA'S ESTIMATED 43 MILLION PEOPLE USE M-PESA.

30 MILLION ACTIVE USERS

TOTALLING **\$4.6** BILLION

PERFORMING **224.2** MILLION TRANSACTIONS

NUMBER OF AGRICULTURE FOCUSED MOBILE APPLICATIONS PER AFRICAN COUNTRY



TWICE AS MANY MOBILE MONEY USERS AS FACEBOOK USERS IN SUB-SAHARAN AFRICA.

70%

AGRICULTURE ACCOUNTS FOR 70% OF AFRICA'S LABOUR FORCE AND 32% OF GROSS DOMESTIC PRODUCT.



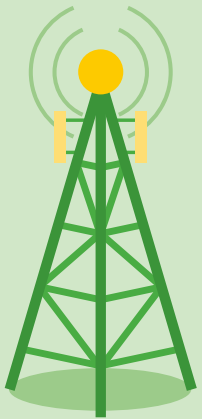
"SEVENTY PERCENT OF EMPLOYMENT IN AFRICA COMES FROM AGRICULTURE, SO YOU CAN ARGUE THAT, IN AFRICA, AGRICULTURE AND ECONOMY ARE SYNONYMOUS. IN EFFECT, YOU CANNOT MODERNIZE THE ECONOMY IN AFRICA WITHOUT STARTING WITH AGRICULTURE."

PROF. CALESTOUS JUMA - THE NEW HARVEST

BOOSTING FOOD SECURITY IN AFRICA,

MOBILE IN AFRICA

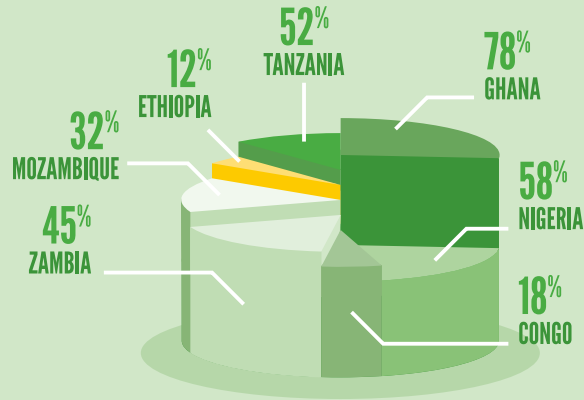
2ND BIGGEST MOBILE MARKET IN THE WORLD



MOBILE SERVICE PROVIDERS WILL SPEND

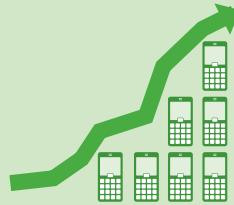
\$1,5 BILLION

ON INFRASTRUCTURE BY 2015 TO IMPROVE ACCESSIBILITY



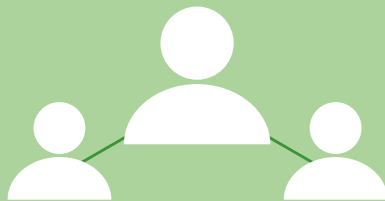
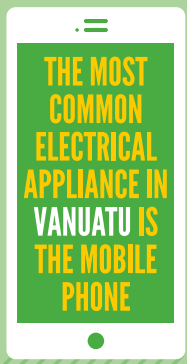
65%

MOBILE PENETRATION



FASTEST GROWING MOBILE MARKET IN THE WORLD

CARIBBEAN AND PACIFIC



97

JAMAICAN SUBSCRIBERS PER 100 HABITANTS



60%

PACIFIC ISLANDERS WITH MOBILE PENETRATION

THE CARIBBEAN AND THE PACIFIC.

WWW.ICT4AG.ORG



Flickr/C. ROBINSON CLIMAYT

Five ways of engaging youth in agriculture

Young peoples' affinity with ICTs and their ability to innovate is the key to moving mAgriculture forward and attracting the youth to the agricultural sector in ACP countries.

Linking farmers to markets

m Agriculture, the use of mobile platforms and applications by agricultural smallholders, has been welcomed in developing countries since its introduction more than a decade ago. As the coverage of mobile networks increases in ACP countries, the discussion on introducing mobile applications in the agricultural sector has moved from 'whether' to 'how'.

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Mobile finance and value-added information services are an obvious and promising example of the many new mAgriculture initiatives. Indeed, mobile money has great transformative potential and could change entire economies in the ACP region if introduced broadly across sectors such as agriculture, commerce and health care.

The youth will play a major role in the further growth of mAgriculture as young people have a natural affinity with ICTs. Indeed, to a certain extent mAgriculture is banking on the youth to move it forward. But keeping young people, the next generation of farmers, involved in agriculture is an intricate

problem and involves more than merely replacing old farmers with new. It is about rejuvenating smallholder agriculture as a whole, and accepting the youth as today's partners and tomorrow's development architects. Providing training and farm inputs is not enough to attract these young people to a career in agriculture. Rather, they should be supported with easy access to information and markets through the use of mobile technology.

Mobilising the youth

Many young farmers in developing countries are aware that agriculture can be a worthwhile business that could earn them a good livelihood.

Keeping young people involved in agriculture is an intricate problem and involves more than merely replacing old farmers with new

Still, many of them are leaving their families' farms for an uncertain future in the city. ICTs are a way of changing this trend, according to *Youth, ICTs and Agriculture*, a report published in November 2013 by the non-profit foundation IICD (see box).

Efforts to improve 'access to market information, production techniques, new technologies and financing opportunities' are a start, but they should be complemented by seizing 'the youth's affinity for using ICTs, their capacity to innovate and their propensity for taking higher entrepreneurial risks'.

Another way of changing this trend is to change the perception of agriculture. In Ethiopia, for example, it has been more than half a century since agriculture was introduced as a topic of study at the university level. Yet students are still reluctant to join the agricultural sector.

Five areas of change

Universities, governments and international partners must give smallholder farmers more recognition and support them by giving them better access to market information, developing tailored mobile applications and training farmers in their use. The youth will only be attracted to agriculture once smallholders tangibly improve their livelihoods and if policy makers, planners and professionals are the drivers of change. There are five main areas of focus.

- First, the focus must shift away from the affordability and accessibility of mobile phones, networks and applications. The agricultural sector's biggest problem is not a lack of resources. What it lacks, and what farmers need, are better ways of accessing markets to sell produce. And there are too few applications around that target farmers' specific needs.
- Second, a substantial part of the national budgets in African countries is spent on developing agricultural sectors, mostly by supplying farmers with improved seeds, fertilizers and information on how to use them. However, budgets are rarely allocated to the development of

mobile applications that promote inclusive agricultural value chains. Realistic budgets targeted at developing and rolling out mobile applications would transform smallholder agriculture by empowering farmers with knowledge related to their produce and putting them in better bargaining positions.

- Third, even if smallholder farmers are given better seeds, fertilizers and other farm inputs, and even if they are given access to information on how to improve productivity, they can still only improve their livelihoods and contribute to global food security if they are able to sell their produce. Providing market information to farmers and securing their access to national and international markets should be a top priority in any mAgriculture government policy.
- Fourth, farmers across the world have one thing in common: their information needs fluctuate according to the agricultural calendar, and according to global developments in agriculture. Understanding that these kinds of factors determine smallholders' needs for knowledge and information is half the battle in developing mobile applications for agricultural information services. So

to understand exactly how mAgriculture can work most effectively in given circumstances it is important to carefully analyse the information needs of all those in the agricultural value chain. Take India, for example. For the past 30 years, the focus there has been on increasing farm productivity. Today, India's agriculture has entered a post-green revolution stage and farmers' demands for agricultural information have been changing and diversifying. Their main concern has shifted from higher farm production to higher and better returns on their investments. As a result, their interest has moved from technical information to market prices and information that could add value to their produce.

- And fifth, resources need to be pooled so people can experiment with new support structures and different forms of partnership, such as public-private, public-private-NGO and private-private at the local, national, regional and international levels. For example, value-added applications can be developed by private individuals, students, university researchers, NGO staff and software solution firms.

These developers need to team up with traditional government services, such as extension services, marketing boards and the telecom companies, all of which have the capacity to scale-up the use of mobile applications, in particular in remote rural areas. These kinds of partnerships will ensure that we get the best of both worlds. ◀

ICTs and young farmers in western Kenya

Youth, ICTs and Agriculture based its findings on research in western Kenya. It examined how the use of ICTs in farming there affected the interest of youth in agriculture. The farmers interviewed were between 24 and 38 years old, 80% male and 20% female. Of these, 65% had completed secondary education and 15% had completed a degree at a college or university.

As many as 90% of those interviewed used ICTs on their farms. The ICT tools used most often were Excel and Word; the internet (computer and mobile); FrontlineSMS; video, radio and TV; and online newspapers, magazines and brochures.

One of the report's most interesting discoveries was a difference in attitude towards ICTs and agriculture among single farmers and farmers who are married and have children. Single farmers initially view ICTs as a gateway to better jobs and employment outside farming, according to the report. Young farmers with families, on the other hand, immediately focus on using ICTs to improve productivity and profitability.

The report's complete findings and recommendations can be found on <http://goo.gl/6bvWZy>

Linking farmers to markets

Farmforce

Farmforce was created to help smallholders gain access to formal markets and improve the effectiveness of outgrower schemes. Formal markets can increase the number of potential buyers for smallholder produce but these markets require traceability and compliance to food safety standards – something which has been traditionally challenging and time consuming. Farmforce is helping to change the game by using mobile technology to make traceability and compliance an integral part of smallholder production and to redefine the relationship between growers, manufacturers and markets.

It is a cloud-based mobile platform that focuses on the agricultural 'first mile' and specifically the management of outgrower schemes. Farmforce increases management information, transparency, compliance with any food and sustainability standards, such as GlobalGAP, Fairtrade and Organic. It simplifies audits and provides traceability within smallholder farms to the field level. Farmforce technology gives fresh produce exporters immediate visibility on the performance of their farmers, and the origin, safety and quality of their produce.



→ www.farmforce.com

Creditinfo

Finance is often a barrier to growth for many businesses. A credit bureau provides better information to banks, monetary financial institutions and other financial agencies in order to support the granting of credit. Creditinfo's credit bureau is not just about traditional credit data. Rather, all information (alternative data) that is gathered can support and improve lending decisions. Participants will be able to see the type of data held by a credit bureau, review sample scorecards and add their details to the credit bureau database. The latter will start the process of creating a financial footprint and improve their access to credit.

Being a non-traditional credit bureau, Creditinfo's focus when entering a new market is both on the banking sector and on improving financial inclusion for the underserved. It often works with the International Finance Corporation to develop a formal education process.

Creditinfo is also leading service provider of credit information and risk management solutions worldwide, being the preferred partner of many local credit bureaus. It has also been shortlisted and awarded in several tenders supported by the World Bank, IFC, the Millennium Challenge Corporation and other international organisations. Creditinfo has developed numerous products and services to facilitate best practice decisioning in credit risk management, saving time and money for both financial institutions and consumers.

→ www.creditinfo.com

AgroCentral

AgroCentral is Jamaica's first digital agricultural clearing house to use Web-to-SMS and SMS-to-Web technology to connect small farmers and businesses. Through AgroCentral, businesses will have the ability to source large amounts of crops directly from farmers, and farmers will be able to sell their available produce directly to businesses. AgroCentral facilitates effective linkages among farmers and businesses, and it operates on a database structured to hold complete profiles, on both farmers and businesses. Farmer profiles include farm location, crops grown, supply capability and cell phone contacts. For businesses, profiles include business location, product requirements and ease of transaction. This information along with our two-way SMS portal allows for efficient communication of market information that promotes commerce. One of the platform's advantages is its ability to synchronise with modules developed on this platform using APIs. With its search and query facility, users will find the locations of farmers, buyers, prevailing crop prices and data on diseases and weather conditions. This information will allow farmers and businesses to develop business relations with ease by removing some of the noise within the market.

→ www.agrocentral.co

Musoni System

The Musoni System improves the efficiency and reduces the costs of providing financial services in rural areas. The innovative platform enables monetary financial institutions and agri-suppliers to easily manage their clients and loans. It also offers a comprehensive range of portfolio and financial reports, and includes its own accounting module. The system integrates with both M-PESA and Airtel Money, enabling all transactions to be carried out

over mobile money, which makes it easier to penetrate rural areas. Crucially, the Musoni app (which integrates with the system) enables field officers to register clients, apply for loans or view key reports while travelling in rural areas. It is integrated with mobile money, enabling clients to repay their loans and deposit their savings on their mobile phones. The Musoni system is cloud-based, so all clients need to access the system is a reliable internet connection and a modern web browser, both of which are widely available in ACP countries. The fact that it is a cloud-based system also means it costs less than traditional platforms, which removes barriers to entry for rural institutions. Musoni has already served over 32,000 clients and licensed the system to monetary financial institutions in Uganda, Kenya and Tanzania.



→ www.musonisystem.com

aWhere

The aWhere Platform harnesses the power of data for climate-smart agriculture, food security and agricultural finance. The solution processes a billion new data points every day for hyper-local information specific to any farmer around the globe. Climate-smart agriculture integrates very high resolution weather data with 'big data' processing to generate farm-level recommendations and alerts deliverable directly to farmers. Smallholder farmers can double or triple their production by just receiving better agronomic information without waiting for more expensive technologies.

Most importantly, aWhere's solution delivers smart content – actionable recommendations and alerts – not just 'data'. New agri-value financing mechanisms and instruments will be most effective if farm-level risk is reduced and agricultural value chain participants have better, timely information for evidence-based decisions and risk monitoring. The aWhere Platform provides both. Critically, it enables all participants across an agricultural value chain to identify opportunities and understand risk with the full and combined context of impact from price, weather, market access, pests, diseases and more.



→ <http://goo.gl/7PysCz>

Discovery learning

Imarah Radix tells us about her experience at the 'training of trainers' workshop for young agricultural extension workers conducted by the Caribbean Farmers Network and COLEACP in Saint Lucia in December 2013.

Linking farmers to markets

In December 2013 the Europe–Africa–Caribbean–Pacific Liaison Committee's PIP programme (COLEACP–PIP) and the Caribbean Farmers Network (CaFAN) held their first ever 'training of trainers' workshop on the Caribbean island of Saint Lucia. Thirteen participants from the Caribbean region were trained in agricultural extension. I attended as well, representing Guyana. It was an intensive 14 days filled with exciting and educational farm visits to observe good and bad agricultural practices, conduct group assignments, give individual presentations, and attend lecture sessions and live demonstrations. We had four excellent trainers from different countries who each brought their own style of teaching to the vast number of topics that were covered. We were trained using COLEACP's fair training system (see box).

Even before we flew into Saint Lucia we were given material to prepare for our own individual presentations, with strict instructions not to use PowerPoint. It was incredibly challenging for some of us because we were thrown into the deep end the moment the training began. The trainers taught us that clear and simple communication is one of the greatest tools we can use as trainers in

A fair-trade banana farmer at work in Saint Lucia.



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The five principles of the fair training system

- The training begins by carefully identifying the organisation's capacity building needs. This initial assessment puts the trainers in tune with the beneficiary's projects and avoids duplication with other aid programmes.
- These needs are considered by the COLEACP Training Unit in Brussels, Belgium, which ensures that the educational methods and tools used are best adapted based to the organisation's aims, materials and skill levels.
- COEACP's PIP programme has been working to replace European expertise with ACP expertise as much as possible, to favour knowledge of the terrain, accessibility, cost control and capacity building.
- The training forms part of a continuous, voluntary approach by both the organisation and COLEACP, and may bear fruit only over the long term.
- COLEACP strives, as far as possible, to increase the reach and impact of its training through partnerships with other development stakeholders, a knowledge-sharing policy, and adaptation of its training tools and methods to other areas of intervention.

Original article: <http://goo.gl/OQQCRv>

agricultural extension. We learned training methods and field training strategies for a variety of topics. The trainers gave us practical exercises, including warm-up activities and experiments that we had work on and present to the rest of the group. Afterwards, the trainers assessed our presentations and gave us constructive feedback on our training techniques.

We covered a broad spectrum of topics, including adult learning, using the 'subject, interest, objective and method' technique (the SIOM technique) in presentations, integrated pest management, the safe use of pesticides and reading pesticide labels correctly, traceability, communication techniques, the importance of hygiene and sanitation (on farms, in the packaging houses, etc.).

The practical presentations were especially useful and fun. I was given personal hygiene as a topic, specifically how to be clean and stay clean during packaging. This training session consisted of a series of exercises designed to create awareness of best practices in the packaging house. One of the key messages was: hands spread germs.

For each exercise there was an instructor manual that we read

beforehand so that we could guide our audience of farmers and ask them to connect the dots of how germs are spread, what the sources of contamination are and how often you should wash your hands, to name but a few. The exercises also encouraged lively interaction between the group and the trainer, through the fun and educational experiments and identification activities. Rule one of adult learning, I found out, is let the audience discover.

At the end of the training we were joined by Guy Stinglhamber, managing director of COLEACP. He listened as each young country representative presented an action plan for future follow-up training with the assistance of COLEACP. He was also on hand to help present the participants with their training certificates at the closing ceremony. I am now empowered to train others and am more confident in my ability to communicate and present on many agricultural topics in a simple and succinct way. This training has not only expanded my knowledge of agricultural extension but it has helped the other participants to develop their personal and professional skills as well. ◀



How apps impact farming communities

The success of mobile applications in the agricultural sector has been largely measured in terms of numbers, but what has the impact of these apps been on communities as a whole?

Linking farmers to markets

Considerable resources have been invested in creating mobile applications for the agriculture sector in ACP countries. These developments have helped to speed up the evolution of mobile networks and reduce the price of mobile handsets. So far, the success of these apps has been measured largely in terms of subscriptions to these services and by means of case studies of individual farmers.

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Simon Ndogo Ndong'u (ndogosim@yahoo.com) is sub-county agri-business and marketing officer at Kakamega Central Sub-County in Kenya.

Moses Mwangi Thiga (mthiga@kabarak.ac.ke) is ICT manager and lecturer in information systems at Kabarak University, Kenya.

What has not been measured adequately is the impact that these farming apps have on communities as a whole. Three Kenyan academics, Mary Wangari Mutiga, Simon Ndogo Ndong'u and Moses Mwangi Thiga, conducted a study in 2013 entitled 'The role of farming mobile applications in community development', which monitored the impact of M-Farm on the Kinangop community in Kenya. It shows that this particular app has helped communities to adopt commercial farming practices, increased their incomes and improved their livelihoods. Indeed, the impact has been felt on the economic, social and cultural levels.

M-Farm introduced in Kinangop

M-Farm is agri-business software that provides important information to its clients, often farmers, suppliers and

manufacturers via mobile phones. It helps farmers to connect and work with other farmers at any time. Registered farmers can SMS a number to get the information they are looking for, such as the current market prices of different crops in different regions. M-Farm also helps farmers to sell and buy goods collectively at a fair price in order to maximise profits and protect themselves against unscrupulous middlemen.

The M-Farm application was introduced in the Kinangop district in Kenya in 2010. Kinangop is a highly populated and well-watered region in Nyandarua county, just north of Nairobi. It receives an average of 1,000 mm of rainfall a year making, it an ideal region for farming activities all year round. Over the years, most of the region's farmers have been practicing subsistence farming with crops such as maize, beans, kale,

cabbage and potatoes. More recently, crops such as snow peas and sugar snap peas have been introduced in an attempt to diversify crops and commercialise farming activities.

The app was piloted with a few farmers in order to establish its applicability in that specific region. The entire farming community was then shown how to use the app and told how they could benefit from it. This was followed by training activities, which gave farmers the chance to register and start entering their produce and prices into the system.

Economic impact on community

The 2013 study on farming applications was conducted to establish M-Farm's economic, social and cultural impact on the community. The following factors were analysed to assess the app's economic impact on the community:

- crop yield
- spending
- savings
- living standards

Improvements were reported in all four cases. Farmers said that their crop yields had increased. They also spent less as they benefitted from a lower average cost of fertiliser (from KES 4,000 to KES 2,500 per bag) as a result of better access to information on inputs. This reduction in cost has also helped these farmers to increase their farming acreage. Some reported that they have tripled the area that they farm. In terms of savings, farmers reported a fivefold increase in savings as a result of using M-Farm.

Farmers were also interviewed about a number of aspects related to their living standards. As many as 92% of the farmers stated they have managed to improve the type of dwelling their families lived in, from mud structures to semi-permanent or permanent types of housing. The farmers were now able to afford high-quality second-hand clothes, as opposed to the low-cost second-hand clothes they used to buy.

There was a change in family diet among these farmers. They could now afford a variety of starches such as rice and maize meal, compared to potatoes and maize previously. Fruits and animal protein such as eggs, meat and milk are now more affordable as well. In terms of education, the farmers could afford school supplies for their children since they started using M-Farm.

Social impact on community

The social impact of the use of M-Farm was assessed after analysing the following factors:

- change of social status
- formation of groups
- introduction to new organisations
- new farming practices
- employment of youth

The farmers that were interviewed for the study said that social status had changed for the better. They were now able to send their children to better schools, entertain their families and even buy cars. Farmers in Kinangop had also started to form groups with a total of 1,283 members in order to improve productivity and help them to market their produce better.

Using M-Farm enabled farmers to learn about new organisations, opening new avenues of collaboration. Examples include the Kenya Cooperative Creameries, a milk processing company; the Food and Agriculture Organization of the United Nations; and Amiran, a provider of agricultural technologies, greenhouses, seeds, chemicals and fertilizers. They also learned about new farming practices, such as using the expertise of agricultural officers, growing different crops and using mobile technologies to obtain farming information.

Another key improvement concerned the employment of youth. The diversification of crop production created jobs for the youth on farms in activities such as planting, spraying, weeding and harvesting, selling inputs, providing transport and teaching young farmers new farming methods. Employing young people has a huge positive impact on the community, as it helps to reduce crime and dependency caused by a lack of regular income.

Cultural impact on community

The cultural impact of the use of M-Farm was assessed after analysing the following factors:

- new ways of marketing
- new ways of obtaining information
- new belief system
- involvement of women

M-Farm has introduced farmers to new methods for marketing their produce. It has also shown them new ways to obtain information, through extension officers, mobile phones, the internet and radio. These new technologies have changed farmers' belief system regarding farming. Their view of farming has shifted away from

subsistence to more commercial, market-oriented farming. This shift in attitude, in turn, has created acceptance among farmers of new crops in the region. And finally, women's role in farming has significantly improved since M-Farm was introduced in the district. Women are no longer only involved in the physical farming but also in managing and selling the produce.

Better picture of impact

M-Farm had a major impact in the Kinangop district, both at the community and individual farmer levels. A great deal still needs to be done, however, to improve the development and increase the use of mobile applications in the agricultural sector in ACP countries. While the use of the application has led to the formation of groups, they need to grow and diversify so they can venture further into the retail and export markets to sell their produce. For example, the farmers did not form any savings or credit organisations, which are useful in encouraging farmers to save and secure financing for farming activities.

We also need to have a better picture of the precise impact mobile apps are having on farming communities, but this will only be possible with more detailed information. The study conducted in Kinangop, for example, revealed that farmers in that district are not keeping accurate records of income, expenses or production figures. A clear understanding of the impact of mobile applications at the community level will undoubtedly secure continued investment in their development. Similarly, the large-scale use of these apps is likely to guarantee further development of new and even more innovative apps for the agricultural sector. ◀

Groups formed by farmers in Kinangop

- Young farmers (30 members)
- Hot farm enterprises (8 members)
- Umoja dairy (100 members)
- Muki farmers (1000 members)
- Memo outgrowers (10 members)
- Mwanzo Mpya (20 members)
- Memo central (25 members)
- Kariko self-help group (30 members)
- Ndinda self-help group (15 members)
- Kambata outgrowers (45)



Flickr/Carsten Ten Brink

Cheetah

What is Cheetah? It's an acronym for 'chains of horticultural intelligence: towards efficiency and equity in agro-food trade along the trans-Africa highway'.

Cheetah amplifies the voice of value chain players – such as transporters, consumers, growers, and officers from public and private agencies – by allowing them to communicate value chain shortcomings. The app also enables players to tap into chains of horticulture intelligence, which leads to better-informed decision making. This in turn reduces costs and increases profits for businesses, leads to lower market prices for consumers, fairer prices for growers, and better interventions by public and private agencies. Cheetah was developed by Ujuizi Laboratories, a spin-off company of the faculty of geo-information science and earth observation at the University of Twente in the Netherlands, in collaboration with several other ICT experts.

For the techies among our readers: following is the formula for data in use: Profit = f(T, H, L, Dur, Rq), with T = temperature, H = humidity, L = Light, Dur = journey duration, and Rq = Road pavement quality. Dur is provided by Cheetah (crowd-sourced); T, H and L are derived from satellite data (Copernicus Sentinel-4 and MSG-3). Rq is provided by Sentinel-1 and smartphone motion sensor data (crowd-sourced). Cheetah Food obtains crop-sourcing information from Copernicus Sentinel-2 (and MERIS) land cover and crop phenology products. Market price information is partly crowd-sourced augmenting existing third-party crop market value services.

Confused? Don't worry. For lay people, these are Cheetah's customer benefits: it offers fairer prices for growers and transporters, lower market prices for consumers, road maintenance planning through labour-intensive public works, and because the value chain information is crowd-sourced, it saves money compared to traditional data collection techniques.

→ <http://cheetah.ujuizi.com>

Transforming gender relations

The Swedish International Agricultural Network Initiative published a free book in late 2013 entitled *Transforming Gender Relations in Agriculture in Sub-Saharan Africa*. The aim of the book was to explore the role of gender in agriculture and identify the main barriers to women's

success in agriculture. Equality between men and women in agriculture results in better, more successful farmers – to the extent that if there is no equal footing, then the standard development interventions – more extension services, better information, more fertilizer, better

Ariary.net

Ariary.net is a financial innovation from Madagascar that is targeting the country's entire population, and rural areas in particular. The name comes from ariary, the Malagasy currency, and 'net', a nod to the technological aspect of the project and the use of ICTs. The project aims to lead the way in establishing a new virtual currency service in Madagascar that is fast, secure and accessible to the entire population. The service is sorely needed: only 3% of country's population of 22 million have a bank account.

This project is an innovative service that is sure to have a significant impact on the evolution of consumer practices in Madagascar in terms of social cohesion, including people who have little or no access to banking services. Ariary.net will integrate the three telecom operators who have been providing mobile money services in Madagascar since 2011 so all mobile banking customers can buy, pay and transfer online. Its target audience includes farmers and traders. It has been introduced as a pilot initiative in several regions in Madagascar.

→ <http://goo.gl/xUGEBW>



Flickr/Michael Sale

machinery – will not fully achieve their goals. *Transforming Gender Relations* is a practical book meant to be used by people working in agriculture and development, policy makers, the private sector, and researchers and students working in Africa. → Full article: <http://goo.gl/OP0840>

Farmers, markets and the power of connectivity



Flickr/RIWANJA

In the *2013 Global Food Policy Report*, Maximo Torrero highlights two major constraints that prevent farmers in developing countries from accessing mobile technology, 'the two Cs': 'The first is connectivity: significant differences remain between urban and rural areas. Even low-cost mobile phone services are

prohibitively expensive for rural households. These high costs can stem from a lack of competition among service providers and a lack of adequate government regulation and investment in infrastructure,' writes Torrero. In addition, 'penetration rates may exaggerate true access to mobile phones.'

'The second constraint is content: the information distributed through mobile phones needs to be useful to farmers, such as offering real-time market prices on the goods they're trying to sell. The more farmers see the value in using mobile phones, the more willing they will be to adopt the technology and fully harness its potential. The same logic holds true in the use of these technologies for extension.'

→ www.ifpri.org/gfpr/2013/ict

Nine wisdoms



Flickr/CHUMAT

How to get the youth interested in agriculture:

1. Link social media to agriculture. Social media act like a magnet to young people.
2. Improve agriculture's image. Promote greater awareness of the benefits of agriculture as a career.
3. Promote agriculture in higher education. Link teaching

materials to ICTs to attract young people.

4. Make greater use of ICTs – not just to educate and train but also to spread knowledge and build networks.
5. Empower young people to speak up. Engage the youth in policy discussions.
6. Improve access to land and credit.
7. Put agriculture on school curricula. Teach young students about growing and marketing crops so they see agriculture as a potential career.
8. Increase public investment in agriculture. Make farming a more attractive career option.
9. Make agriculture more profitable. Reduce the costs of farming and doing business, and increase productivity.

→ Full article: <http://goo.gl/XXKITJ>

Rural Finance Learning Centre

The Rural Finance Learning Centre (RFLC) is a web platform dedicated to spreading knowledge that promotes rural and agricultural finance and investment in developing countries. It provides access to materials for capacity development and policy design, and spreads the word about news, events and multimedia.

RFLC reaches out to public and private organisations working towards greater financial inclusion and rural and agricultural development, such as financial institutions, governments, civil society organizations and development agencies and academia. RFLC disseminates materials such as training manuals, policy guides and on-line training sessions with the purpose of further developing clients' capacity to deliver improved financial services that meet the needs of rural enterprises and households.

Founded in 2004 and managed by the Food and Agriculture Organization of the United Nations, the RFLC has grown to become one of the largest information gateways specialised in rural and agricultural finance and investment. It has over 3,000 documents with their abstracts in the library, including on-line and ready-to-use training materials. In addition, RFLC disseminates current events, news highlights and multimedia to over 5,000 registered members from 150 countries. Furthermore, RFLC members also receive a monthly newsletter, which has become an important way to disseminate information among the community of professionals engaged in rural finance and agricultural development.

The RFLC's editorial team encourages people working in the field to submit materials they have used and developed so they can be added to the resource database and reach a wider community of professionals.

→ Original article: <http://goo.gl/mJCKXj>



Flickr/GATES FOUNDATION

65 % of Africa's labour force works in agriculture and smallholders account for 80% of the food produced in sub-Saharan Africa.

50 % of the world's uncultivated land is in Africa, and only 6% of all cultivated land is irrigated – but irrigation could double output.

313 US\$ billion is the current estimated value of Africa's food markets, but this could exceed US\$1 trillion by 2030.

Apps for small agri-businesses

ICT applications are helping entrepreneurs in the Caribbean agricultural sector through every stage of the business cycle.

Linking farmers to markets

An increasing number of young agricultural entrepreneurs are using ICTs to run their business in developing countries, and Trinidad and Tobago is no exception. Running the business is still the main challenge facing these innovative and forward thinking agri-youth, but ICTs are helping them get a head start. It is important, however, that the apps used in the agricultural sector in the Caribbean dovetail with business demands. So developers must understand the business environment that their apps are targeting.

All agri-businesses, whether large or small, go through a life cycle, from concept and start-up, growth and maturity to rebirth or decline. And there are a series of common problems that complicate the decision-making process for these businesses, such as limited financial resources, lack of labour and access to key business inputs. Entrepreneurs must employ different strategies during each stage of business development to address these

problems and improve their enterprises' efficiency and profitability. And ICTs remain indispensable tools, as they enable entrepreneurs to communicate with their customers, suppliers and other players in the market.

Social media have had a major impact in the Caribbean, especially among the region's young inhabitants. According to Socialbakers, a social media analytics platform, Trinidad and Tobago has over 486,000 Facebook users. Of these, 155,400 people are in the age group of 25–34 years, by far the largest group. This is followed by the age group of 18–24 years. These numbers are growing steadily. The figures for Jamaica are even higher, with 688,000 users of social media. With a population of 1.3 and 2.8 million respectively, these are significant figures.

Online farming

One of the emerging agri-innovators in Trinidad and Tobago is Isaac Holdings Limited (IHL), a modern brand dealing in agriculture, outdoor maintenance and estate management. IHL is owned and operated by agri-entrepreneurs Atkin Isaac and Arvin Isaac. They started their business as a landscaping and home gardening service but have experienced major growth after rolling out their online farming concept.

The company's Facebook page offers consumers the opportunity to choose a vegetable crop and manage its development via social media. Land, labour and other inputs such as seedlings, fertilizers and pesticides are provided after customers make a single, small investment. They can monitor the progress of their investment online via IHL's Facebook page without having to leave their home or workplace.

Crops include lettuce, chives, celery, eggplant, okra and cucumbers. Once a crop has been harvested, customers can choose whether to have their produce sold at the fresh market or have it delivered to their own storage facility. IHL and the client agree in advance on a percentage for each party of either

Related links

'The Business Life Cycle'
→ <http://goo.gl/ZSt6zs>

'An ICT-based development framework'
→ <http://goo.gl/NCXhbN>

'Towards Caribbean e-agriculture'
→ <http://goo.gl/cAaH7W>

'Country Profile: Trinidad and Tobago'
→ www.socialbakers.com/

the earnings from the produce or the produce itself.

FruitCaravan is a simple fruit delivery operation in Trinidad trying to emulate IHL's success. The company presents itself professionally and uses clever product bundling. FruitCaravan is still at the growth stage in its business cycle, seeking to build a consumer base. By using social media outlets such as Instagram and Facebook, FruitCaravan shares pictures of its product bundles that highlight the quality of the produce and other features. These simple social media tools have great promise because they provide entrepreneurs with excellent ways to connect with their regular clientele and target potential customers.

The experiences of these young Caribbean agricultural entrepreneurs show that ICT applications in small and medium enterprises can greatly benefit the development of the agricultural sector. It is crucial, however, that the actual technology is set up and used properly so that it meets the particular demands of each business. Indeed, both the numerous stages in the life cycle of a business and the specific goals of the entrepreneurs in question are the principal factors that will determine the type or combination of ICTs that should be used. Once these ICTs are in place, entrepreneurs must explore the other avenues that will improve the success of their business. ◀

Fruit being weighed at a market in Port of Spain, Trinidad and Tobago.



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Improving sales strategies for the cashew market

N'Kalo, a service in West Africa that provides information about cashew nuts and sesame seeds, is helping farmers improve their sales strategies and increasing their profits.

Linking farmers to markets

N'Kalo, which means 'I am informed' in Dioula, a West African trade language, is a service that provides information and advice about the market for cashew nuts and sesame seeds in West Africa. The N'Kalo project is promoted by RONGEAD, a French NGO, and Offre Et Demande Agricole, an independent organisation that provides support to agri-businesses. Unlike most market information services, which merely extract and disseminate the prices charged on a number of reference markets, N'Kalo has quickly evolved into a 'method' based on a 'training-information-advice' model.

In 2011, 9,600 cashew producers in Côte d'Ivoire were trained directly by eight advisors-trainers (ATs). These ATs also carried out advanced training for 280 lead farmers, who also passed on information, and 150 traders. The information reached approximately 20,000 people.

Thirteen thousand producers subscribed to the SMS broadcasting service, which was initially free of charge. After three years in operation, the service began to charge a

subscription of XOF500 a year or about US\$1. In 2013, it had only 1,267 paid subscribers, but by April 2014, it reached 7,000 paid subscribers, which means a subscription renewal ratio of 54%.

Operation N'Kalo

N'Kalo has continued evolving to reflect the situation on the ground. The training has been improved by diversifying the content and making it more suitable, and by revising the teaching methods. More training options have been introduced to equip more of the population with a firmer foundation for using the information received via SMS.

The ATs are also market analysts with the resources to reach isolated and inaccessible areas. There are only eight consultant trainers, too few to cover all the producing areas, so they visit the villages on a rota basis. During their visits, they explain the SMS messages again to ensure that they have been properly understood. When trainers cannot be on location, they rely on intermediaries to pass on the information.

The cost of training is borne by the cooperatives and producer organisations, the wholesalers and the exporters (specifically in relation to quality assessment) and the processing agents. The service is now supplying content in order to improve its economic model and provide a quality guarantee as well as information. The international mobile network operator Orange has deployed a new value-added service based on N'Kalo, which allows farmers to subscribe to weekly text messages by sending a keyword to the short number 7818 in Ivory Coast. N'Kalo is also building services for other crops, such as shea, onion and maize.

N'Kalo's impact

Anyone who needs the information can obtain it. Widespread dissemination of information narrows the gap between the farmer and the customer, which

improves the level of trust between them and makes for equitable transactions. Sanogo Abdoulaye, a wholesaler in the Bandama Valley, points out that producers avoid keeping their products back pending a price rise while relying on the market tracker. This makes for better transactions for all parties.

The training sessions on quality and sales, combined with the weekly information bulletins and the continuous follow-up by the ATs, aim to help farmers to adopt a less 'homespun' sales method, thus protecting their incomes. This goal is usually achieved, as they adjust their sales strategy to local market conditions. But this is not always the case, as many farmers are still tied by debts to customers before the market opens, and so are obliged to sell under conditions that have been set beforehand.

Where they belong to a cooperative which has advance funding, farmer's sales may be made on the basis of contracts signed in advance. Some farmers therefore have relatively little room for manoeuvre and little independence vis-à-vis the buyers. Finally, a current loyalty pact between a farmer and a buyer will have some impact on the effectiveness of the service.

Information on current prices sometimes could be more specific. Even where the prices are differentiated according to region, they are issued within a variable value range of XOF25 to XOF75 for the same region. This situation allows for an additional and sometimes excessive margin for the trackers, and therefore less income for the producers.

The overall development of sales strategies has been noteworthy for most of the beneficiaries, however, and in the regions where the 2010 and 2011 seasons are the most comparable (namely Denguélé and Worodougou) the additional profits were largely attributable to the service. ◀

Cashew nut buyer weighing nuts in the Gambia.



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How ICTs are empowering Ugandan farmers

Linking farmers to markets

I founded tech4farmers in Kampala, Uganda in 2012. The main idea was to use my experience with ICTs to develop a digital agricultural commodity exchange. There were several ideas behind the exchange. For one thing, I hoped it would help farmers in rural Uganda sell their produce directly to consumers or traders. My hope was that it would help them to negotiate for better prices in a transparent manner and also reduce the need for middlemen. And finally I wanted to make it easier for farmers to access genuine agricultural input supplies with warehouse receipts. I felt this would go far in promoting more structured trade along the value chains and give those at the base of the economic pyramid a better income.

In my experience, traditional extension services are still quite expensive and face many obstacles. Field extension workers have difficulty reaching some areas due to poor road networks, and they face subsistence farmers who are reluctant to adopt modern farming and post-harvest handling techniques. Since most of these rural farmers have access to mobile phones I reasoned that it would be practical to provide market prices, weather information and knowledge via these low-cost devices. Farmers would get better deals for their crops and hence generate more revenue.

Linking farmers to traders

In the Ntungamo district in western Uganda I went with my outreach team to

meet Nalongo, a housewife who doubles as a smallholder farmer. She described to me the challenges she faces selling her fruits and vegetables. Since her produce consists of perishable items, they need to be turned over quickly to minimise spoilage. Through the tech4farmers initiative, I have been able to initiate a positive impact in rural communities. I have managed to successfully link numerous other women like Nalongo to traders who buy their food items at fair prices and transport them to be sold in city markets and restaurants.

At the household level I have seen many farmers storing food items like maize in their kitchens, verandas or granaries, where humidity levels cannot be controlled properly. And others suffer high post-harvest losses when their stocks are damaged by weevils or rats. At tech4farmers we have managed to organise these farmers into small groups so they can bulk their produce together in order to access certified warehouses and store grain under reliable conditions. As a result, they can offer higher quality produce, for which buyers are willing to pay a premium price. The results in the Kamwenge district have been particularly remarkable. There are many maize farmers there, who now bulk and grade their produce and also fetch better prices through collective marketing.

Still, some people in rural areas still treat ICTs and mobile money with suspicion. So I have been spending a lot of time encouraging the more progressive farmers in my community to act as role models and ambassadors to the more sceptical farmers. It is important to get as many farmers as possible to trust mobile money, because it has opened a whole new frontier for them. It is a powerful tool that promotes financial inclusion for the rural poor, who still carry out most of their business transactions in cash.

ICTs and literacy

Getting people in rural areas to trust ICTs and the tools it provides is one challenge. Another is getting the government to support these initiatives. I have personally canvassed the government's support on



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several occasions. I did this by lobbying the relevant line ministries, essentially trying to increase these initiatives' chances of success by persuading the government to nurture and develop a good policy and regulatory environment. But I also strongly believe that the private sector has to play the leading role in attracting sufficient capital and investment to boost the agricultural sector.

The high rate of illiteracy in rural areas in Uganda is still alarming. It is much higher than in urban areas. Literacy is not only a key tool in everyday life, but an important one for using ICTs as well. Much of the agricultural information accessed on mobile phones requires a minimum level of literacy.

That is why I have spent a great deal of time engaging locals who are educated to become trainers for people in their communities. If you consider that about 65% of the Ugandan population works in agriculture, most of whom are peasants and smallholders (only a small number are commercial farmers), then it is the agricultural sector – more than any other – that has a good chance of transforming the economy.

Uganda has fertile arable land with good rainfall and is famous for the cash crops it exports, such as coffee and tea. If the agricultural sector is professionalised and made profitable, then I will remain confident, motivated and energized at all times to reach out and explore ways in which I can empower more farmers with ICTs in a sustainable and progressive manner. ◀



FLICR/KWANJA