



## ICT TO ENHANCE FARM EXTENSION SERVICES IN AFRICA

### INTRODUCTION

This is one of a series of briefing papers to help USAID missions and their implementing partners in sub-Saharan Africa use ICT more successfully to improve the impact of their agriculture related development projects including FTF (Feed the Future) projects. This paper focuses on ICT applications that support and enhance farm extension services.

Before turning to the potential role of ICT, it is useful to review some basics about extension services. No matter what the name of the system, approach or program (e.g., cooperative extension, advisory services, technical assistance or linking research to practice), the function remains the same: the transfer and exchange of practical information for the farmer to improve his/her outcomes.<sup>1</sup> This transfer and exchange and link to agriculture research become what has been termed an 'engine for innovation' in agriculture and economic development.<sup>2</sup>

Extension services help farmers decide what and when to plant, how to prepare for planting and best practices related to growing, dealing with pests and disease, harvesting, and post harvest practices such as packing and storage.

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<sup>1</sup> We are using a narrower definition of farm extension services than is sometime used. See for example, the broader definition used (relating to a wide variety of information provided to farmers from information on agricultural process to market prices and much more) in [Mobilizing the Potential of Rural and Agricultural Extension](#), by Ian Christopolos, FAO, Rome, 2010.

<sup>2</sup> Rivera, W.M. and V.R. Suliaman. "[Extension: object of reform, engine for innovation.](#)" *Outlook on Agriculture*. 38: 267-273 (2009).

Extension services combine educational methodologies such as farmer field schools and demonstration plots as well as advice from extension agents. They include the dual challenges of informing farmers as well as keeping extension agents themselves well trained with access to back up experts for tough problems. They are delivered by public and private entities via extension agents. National ministries of agriculture have hundreds and sometimes thousands of extension agents, and large buyers often have their own private agent networks. Still, farmers often go years without having direct contact with an extension agent.

To increase access to these critical services, both public and private providers have been using a variety of delivery "channels," such as radio, print media and, increasingly, ICT-enabled channels, some of which are often combined. Mobile phone networks are the ICT channel most often used, given the recent dramatic increase in access to such networks, even in rural areas, and affordability even for the poor.

This paper focuses particularly on approaches to delivering farm extension services via these ICT channels in sustainable (i.e., without on-going donor support, although often with government support) and scalable ways (i.e., to reach tens of thousands or millions of farmers). Often, more "high tech" ICT channels such as mobile phone services are combined with an older ICT channel, like radio, that has been used well for many

years in sub-Saharan Africa and for decades in the US and elsewhere.<sup>3</sup>

### PROMISING EXAMPLES OF USING ICT FOR FARM EXTENSION SERVICES

There are currently a wide variety of approaches being tried to use cell phone networks to enhance extension services. Few have managed to scale to millions of farmers and it is not clear yet (due to the paucity of research and the relatively short time periods of the implementations) which approaches have the most impact. Clearly, a variety of approaches (or combinations of approaches) may prove successful. The approaches vary in several ways:

- Whether text or voice is used and, for text, if searches or queries are made via SMS or more advanced data queries (which require a more capable and expensive phone handset).
- Whether video or digital photos or images are used or other ICT tool such as GPS coordinates (pinpointing geographic location of farmers or plots).
- Whether farmers use the mobile phone services directly or via a mediator such as a farm extension worker.
- Whether they enable one- or two-way communication. Using other terms, whether farmers or intermediaries "pull" information (i.e., initiate the query, or information is "pushed" to the farmer or interme-

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<sup>3</sup> See for example, Sansoni, Silvia, "[Silicon Mali](#)", *Forbes* (2/4/2002) and Mbongo, Steve, "[Found in translation: farm radio goes local.](#)" *New Agriculturalist* (July 2008)

diary via a text message, a voice phone call or voicemail). This capability to enable two-way exchanges (synchronous or asynchronous) is an important enhancement to farm extension service delivery because it allows the service deliverers to re-

ceive frequent feedback regarding the most important information for farmers and how well they understand the information being delivered to them.

- Business model used: farmer pays individually, farmer group pays, gov-

ernment pays, private organization pays (i.e., large buyer, processor, or agrodealer). Also, whether the service is subsidized by other related services (such as surveys of farmers for market research or donor organizations).

The following table summarizes some examples along these dimensions:

Service	Description
<a href="#">Reuters Market Light</a>	Reuters Market Light provides information on market prices, weather conditions, agricultural policy news, and tips on farming cycles via SMS to fee-paying subscribers in India. Information can be personalized based on the type of crop, region of the country, and local language. The service employs a staff of 300 full-time content professionals to provide news and data on more than 250 crop types, 1,000 markets, and weather forecasts for 2,500 locations.
<a href="#">Google SMS: Farmer's Friend</a>	Farmer's Friend enables farmers to search for agricultural information and tips via an SMS-based database, which includes information on regional weather forecasts, planting, storage and harvesting, and pest and disease control information for crops and livestock.
<a href="#">KenCall's Farmers Helpline</a>	The Farmers Helpline operated by KenCall, a for-profit call center in Kenya, is a real-time call center service staffed by agricultural experts that provides agricultural information, advice and support to small holder farmers over the phone, using voice and voice call-back to farmers, not SMS. The service has received funding from GSMA and the Rockefeller Foundation.
<a href="#">Digital Green</a>	Digital Green disseminates targeted agricultural information via digital media to small-scale and marginal farmers in India. The system includes a digital video database that is produced for farmers by farmers. Participating villages are provided with a TV, DVD player and camcorder operated by local NGO staff and managed by farmers, along with DVDs that are shipped to the village. Nightly viewings are set up on a rotating basis around different areas of the village for small groups of 10 to 20 farmers.
<a href="#">Grameen's Community Knowledge Workers (CKW)</a>	Grameen is currently working with approximately 200 CKWs in Uganda to provide free agricultural information and advice to rural farmers via a content database (including crop information, market prices, and inputs) on their smart phones. Grameen estimates that CKWs earn upwards of \$2/day after costs (for things such as phone repayment, insurance and airtime) for providing information to and collecting surveys from farmers in their community.
<a href="#">IFFCO Kisan Sanchar Limited (IKSL)</a>	IKSL was piloted in 2008 in India by Bharti Airtel and the Indian Farmers Fertilizers Cooperative (IFFCO) as a mobile information provider to rural farmers. The service is offered to rural farmers through 38,000 IFFCO societies throughout India and provides farmers with real-time agricultural information through a call center and daily voice messages.
<a href="#">Mali Shambani</a>	Mali Shambani is a weekly hour-long radio program featuring agricultural news and responding to the business and market access needs of small, rural farmers in Kenya. The program covers a wide range of topics, including market prices and trends, farming techniques, weather and seasonal issues, financing opportunities, inputs, land use, and quality standards. Each program also offers an interactive call-in component where farmers are given the opportunity to pose agricultural questions to a panel of experts either via phone or SMS.
<a href="#">Farmer Voice Radio (FVR)</a>	FVR is a radio extension service currently operating in Kenya, Malawi, Tanzania, Mali, Ghana and Zambia that targets smallholder farmers. FVR's radio extension agents provide regular, on-site extension support to a small group of pre-selected farmers, which are then documented and broadcast via radio.

## COMMON CHALLENGES

All of these approaches to using ICT to enhance farm extension services face some common challenges:

- *Converting the vast amounts of farm extension information available in paper form to digital and searchable form.* For just one of many examples, the many farmer field school manuals available from USAID funded projects alone are rich sources of information on recommended farming techniques and practical solutions to problems for specific crops. Extracting this information and converting it to a form that is digitally searchable by crop, then symptom or problem category is an enormous task. Many ICT-enabled farm extension projects are trying to tackle this formidable challenge alone.
- *Reaching the right information fast.* Even if all information is in digital and searchable form, the inquirer (whether a farmer, extension worker or call center agent) must be able to search the information quickly and receive a correct and useful answer. This means search techniques must be intuitive or well taught. If a search results in an unhelpful (or no) answer, the user must take more time (and, often, pay more) to try again or give up in frustration.
- *Local languages.* Farmers in sub-Saharan Africa speak dozens of languages. The farm extension information provided to them must be in a language they understand—or translated by an intermediary.
- *Literacy.* Many farmers in sub-Saharan Africa are illiterate or, if literate, may have trouble spelling correctly. ICT-enabled farm extension services may need to be delivered via voice, an intermediary, or via a system that accommodates approximate spelling of key words.
- *Impact.* There is little if any information on the impact of such ICT-enabled farm extension services. Do they increase the effectiveness of farm extension services to increase farmers' productivity and income? Are they worth their cost given other alternatives? How best can they be combined with other delivery channels? How can they be designed to maximize impact? At least two studies underway (in 2010) may offer some answers: one of the Reuters Market Light service in India and one of a SMS-based service to enhance a private farm extension agent network in sugar cane in Kenya.
- *Who pays?* Without sustainable business models, ICT-enhanced farm extension services will not scale to millions of farmers. How can government and other resources be combined to offer effective ICT-enabled farm extension services? If, and if so, how, can private sponsors be used without reducing the trustworthiness of the information provided? How can cell phone service providers be involved in "win-win" models of service delivery? Such win-win models include service providers being able to gain customers or reduce their "churn" (the number of customers jumping from network to network), while delivering the service to customers discounted rates.
- *Digitized Information.* How can the challenge of converting the vast amount of information to digital form be tackled collectively?

## RESOURCES

For good general information on extension services, see:

[http://www.usaid.gov/our\\_work/agriculture/extension\\_services.htm](http://www.usaid.gov/our_work/agriculture/extension_services.htm)

Christoplos, Ian, "[Mobilizing the potential of rural and agricultural extension](#)", (FAO, 2010)

Mucemi Gakuru, Kristen Winters & Francois Stepman, "[Inventory of Innovative Farmer Advisory Services using ICTs](#)", *The Forum for Agricultural Research in Africa* (2009).

Rivera, W.M. and M. Kalim Qamar, "[Agricultural Extension, Rural Development, and the Food Security Challenge](#)," (FAO, 2003)

Rikin Gandhi, et al, "[Digital Green: Participatory Video and Mediated Instruction for Agricultural Extension](#)," *Information Technologies and International Development*, Vol. 5, No. 1 (USC Annenberg School for Communication, Spring 2009)

Rivera, W.M. and V.R. Suliaman. "[Extension: object of reform, engine for innovation](#)," *Outlook on Agriculture*. 38: 267-273 (2009).

Rivera, W.M. and G. Alex. "[The continuing role of government in pluralistic extension systems](#)," *Proceedings of the 20th Annual Conference of the AIAEE, Dublin, Ireland* (2004).

## DISCLAIMER

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