Modern ICTs and rural extension: Have we reached the tipping point?

Today, it would be difficult to imagine agricultural extension without modern information and communication technologies. What they can do, where they fit in, and where they reach their limits is shown in the following examples.

Extension and advisory services are relevant to agricultural and rural transformation processes, especially for millions of smallholder farmers, who remain the bedrock of the agricultural and food supply chains in developing countries. However, extension alone cannot lift millions out of poverty unless there is the right mix of policies, technologies, and market opportunities. This must be complimented by farmers who have the knowledge and skills, trust the system and the information and knowledge sources, and are willing and able to make the necessary investments. Extension agents also need to continuously develop new capacities and keep abreast of technological developments. The Nairobi Declaration, emanating from the 2011 international conference on *Innovations in Extension and Advisory Services,* states inter-alia that "the renewed national, continental and global interest and commitments for increasing investment in agriculture, provide an opportunity for delivering extension and advisory services that are farmer-centred, participatory, well-funded, demand-driven and performance oriented" (Nairobi Declaration, 2011). This article draws on examples from various case studies and published papers to demonstrate the diversity of Information and Com-

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Smartphones let farmers access real-time agricultural information.

munication Technologies (ICT) applications used and derive some lessons for future intervention.

■ The changing policy context: Implications for extension delivery

Policy shifts and fiscal austerity programmes have impacted negatively on extension services, especially on public extension, in developing countries. This can be elaborated using the case of Kenya, where policy shifts over the period 1965–2007 led to changes in extension services from being a centrally managed, government controlled service to a partially privatised, demand-driven and diversified, pluralistic system with multiple actors. Public extension was expected to link farmers with other research and extension service provid-

ers and remain free of charge for smallholder subsistence farmers. Most of the budgetary allocation for extension was used for the salaries of the 5,000 plus extension staff employed by the ministry (Bolo & Makini, 2012). The implications are that under the updated system, smallholder farmers had to rely on multiple sources of information from a variety of extension service providers and, where applicable, pay for services.

■ ICTs in extension

While traditional media such as radio and television have played a major role in extension and development communication, growth in the Internet and increased access to and use of mobile technology are seen as game-changing. The architecture of information communication has moved from centralised to decentralised and has become increasingly democratised in the digital age. "Communication technologies" are converging, while multiple communication channels are still used for agricultural and rural development. Redesigning and upgrading the infrastructure and building capacity of stakeholders to take advantage of the new ICTs is critical.

■ Radio: Making mass media more participatory

The outreach of the traditional media, such as radio, in communicating with vast rural audiences has been enhanced with new ICTs. **Farm Radio International** (FRI) has been integrat-

ing mobile technologies with radio to provide interactive, 2-way, and participatory radio programmes for rural communities. Through the **African Farm Radio Research Initiative** (AFRRI), farmers have been encouraged to make informed decisions about improved practices. Participatory Radio Campaigns (PRCs) have been piloted and evaluated in five countries – Ghana, Malawi, Mali, Tanzania and Uganda. It was found that *"in communities where broadcasters had interacted with the farmers through visits and phone calls and mentions on-air, on average, 80 per cent of local farmers listened to at least half of the PRC programming and about 40 per cent of farmers who listened adopted the improved agricultural practice"*, although passive listening also led to adoption by 20 per cent of farmers. However, farmers still needed reliable regular programmes giving them the opportunity to be heard (Ward, 2013). **Lessons:** Integrating traditional media and new ICTs can expand the reach of extension, but a high adoption rate requires farmers to be engaged in determining relevance and developing content and allowed to interact with information/service providers.

■ Videos: Democratising the use of ICTs

Access Agriculture offers an Internet-based platform for agricultural research and development (R&D) staff, service providers, extension agents, communication professionals and representatives of farmer organisations to support the production, translation and sharing of agricultural training videos in various languages. However, the Internet platform is not sufficient as the videos, either in VCD or DVD format, must be *"mass multiplied and made*

Using ICTs is only worthwhile when they are tailored to match the capabilities of both the extension agents and the farmers and the social and policy context is well understood.

widely available through a well-planned communication distribution strategy" (Van Mele, 2013).

The production and use of videos for sharing farmer-to-farmer extension videos and promoting a more inclusive approach to extension services in the **Katoloni Mission**, a community based organisation in Kenya, was researched. It was argued that low-cost, portable and rural-friendly videos provide opportunities to support farmer-led extension. A network of community based information and extension officers received basic ICT and video production training, XO laptops and portable, compact video cameras. The final products were popular with the farming communities, but there were challenges such as cultural differences, language barriers and infrastructural deficiencies, e.g. a lack of electricity, hardware and software incompatibility as well as inadequate IT support (Vallauri, 2013). **Digital Green** in India trained rural communities to produce videos by farmers, of farmers, and for farmers to exchange best agricultural practices to boost farm productivity and improve nutrition. This improved the efficiency of existing government and NGO extension systems by a factor of ten per dollar spent (Gandhi et al., 2009). **Lessons:** The context, choice and compatibility of tools and the communication platforms are important.

■ Mobile phones and using SMS to reach farmers

The **African Cashew Initiative** (ACi) was an innovation on an ICT-based price and weighing system used by about 400 registered farmers only during the marketing season. Interactive training sessions were introduced during the cropping season which were complemented by radio messages and short message service (SMS). About 20,000 cashew farmers in Ghana received key messages that were developed collaboratively by farmers, extension agents and other actors, adapted to farmers' needs and delivered as appropriate, during the year. Although there were delivery problems with the SMS and older farmers were challenged in using the cell phones, farmers were willing to pay between Euro 1.38 and 2.31 for the service because they found it valuable (Kachelriess-Mathess et al., 2013).

The **Grameen Foundation AppLab** has established a network of community knowledge workers (CKWs) who serve as "knowledge hubs" for smallholder farmers in Uganda. The farmers are trained to use a suite of ICT applications on a smartphone for addressing multiple challenges along the value chain. An SMS-based service, designed to reach the broadest possible audience, provides real-time agricultural information and extension services to farmers and also pulls data from the users for decision-making (Campen-

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hout, 2013). **Lessons:** Formulating the right messages for and with farmers, addressing illiteracy and empowering farmers to use mobile phones can lead to increased adoption of new technologies and improved practices.

■ Integrating ICTs in national extension systems

The **Rural Agricultural Development Authority** (RADA) of Jamaica has been proactive in using ICTs in its extension programmes. The ICT programme has been financed through its core budget and grant funding. Staff have access to computers with Internet access and multimedia projectors. Field agents have been provided with cell phones, GPS, digital cameras and soil testing kits. There is a dedicated website and an agricultural business information system with links to the Ministry of Agriculture and the Jamaican Agricultural Marketing Information System. RADA extension agents have been trained in the use of ICTs for enhancing service delivery. Social Media and Web 2.0 tools such as Skype and SMS text messaging are used to maintain close contact between farmers and extension agents (Lindsay, 2011). **Lessons:** One size does not fit all – design and deployment of ICTs must be targeted and focused based on the capabilities of users – farmers, extension agents. Governments need to invest in developing the ICT capacity of public extension.

■ ICTs and demand-driven extension: Rejuvenating traditional services

For several years, CTA provided a demand-driven Question and Answer (QAS) service which evolved into a QAS voucher system using a mix of ICTs that enabled two-way communication. Field agents in the **Uganda Q&A service** recorded famers' requests using a standard form, took photos using digital cameras and submitted the documentation online. The questions were reviewed by experts who provided timely responses which were shared with the field agents for transmission to farmers and published online as well, to serve as additional resources. Radio scripts were also prepared using the most frequently asked questions, translated into local languages and widely distributed to farmer listening groups (Kassangaki and Oguya, 2013). **Lessons:** No single extension agent, communication tool or channel can meet farmers' diverse needs given the complex nature of the agricultural sector.

■ ICTs and strengthening linkage between extension, research and farmers

Weak linkages between researchers, extension and farmers have been a major constraint in the application and uptake of new knowledge. **e-Afghan Ag**, an Internet-based resource, provides access to credible, relevant information to agents working with farmers in Afghanistan. It has developed over 500 demand-driven fact sheets on different crops, livestock, and a range of farming topics such as irrigation, post-harvest and watershed management (Bell, 2013). Its "Ask the Expert" service offers a 24-hour turnaround service that can be easily accessed by users. **Lessons:** Extension and advisory services need to be client-focused and needs-driven. They need to provide timely, relevant, credible, beneficial and actionable content through trusted sources and allow for user feedback.

■ ICTs and the knowledge ecosystem for extension

In Costa Rica, the *Instituto Nacional de Innovación y Transferencia en Tecnología Agropecuaria (INTA)* and its partners developed technologies that were relevant and freely accessible but were not used. The **Technological Platform for Agricultural and Rural Information Communication** (PLATICAR), a knowledge ecosystem, was set up using a Web 2.0 portal that created a virtual environment for communities of farmers, researchers, and other intermediaries to interact and exchange both scientific and local knowledge. This ICT-based approach promoted through PLATICAR sought *"to develop an information and computer culture for farmers"* so that they could make educated decisions, maximise profits and at the same time reduce the digital gap. The use of ICTs in business and communications grew and became democratised as growers and farmers took advantage of the Internet for product placements, making product offers, getting quotations and receiving early alerts (Cordero and Ramírez Cartín, 2013). **Lessons:** ICT integration provides opportunities for knowledge management which increases access to information and knowledge. Capacity building reduces the digital gap, thereby contributing to democratisation of information and communication and reducing the time taken for the adoption of new technologies/knowledge.

■ Looking ahead

Can the rapid growth and increased access to modern information and communication technologies (ICT) contribute to improving the delivery and effectiveness of extension and advisory services, especially for the benefit of millions of smallholder farmers? The answer is yes, but the agricultural innovation system is complex and information and knowledge asymmetries exist which can facilitate or hinder learning. The social and policy context must be well understood when designing and implementing ICT solutions. In twenty-first-century agriculture, there is no silver bullet for optimising ICT use in extension and advisory services. Farmers and extension agents must be capacitated for achieving the desired agricultural transformation and rural prosperity.

Links, references and further reading:
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