ICTs for Agriculture

By: Sara Gustafson

FSP Best Practices 01
March 2018

A best practice is a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means or because it has become a standard way of doing things. This document is part of a series of reports from the Food Security Portal on best practices for emerging topics in agriculture and food security policy.

Introduction

Information and communication technologies (ICTs), particularly mobile phones, can play an important role in development through two channels. First, these tools can increase rural populations' access to information and capacity-building opportunities, which can improve agricultural productivity, market access, access to financial tools, and health and nutrition outcomes. Second, ICTs can help policymakers and researchers gather real-time information regarding the problems and opportunities faced by rural populations, leading to improved policymaking and intervention design. While the use of mobile phone technology has grown significantly in developing regions over the past two decades, the penetration rate of mobile phones still varies between countries and between rural and urban populations within countries (Torero, 2014). For example, the 2013 Global Food Policy report found that mobile phone penetration rates in Brazil were 53.2 percent for rural areas and 83.3 percent for urban areas; in Malawi, these figures were 32.2 percent and 72.7 percent, while in India, they were 51.2 percent and 76 percent. In Ghana, rural mobile phone penetration only reached 29.6 percent, with 63.5 percent penetration in urban areas (Torero, 2014).

The following list provides some specific recommendations for best practices for ICT use in developing country agriculture, based on relevant recent research.

Access to Information

Make sure that the content provided via ICT interventions is relevant to the farmers receiving it.

Cole and Fernando (2014) conducted an impact evaluation of the Avaaj Otalo program among cotton farmers in Gujarat, India. This system used voice messages to both push content (providing weekly information on weather and crop conditions) and pull content (through a hotline allowing users to ask for specific advice). Calls from farmers to the hotline were processed by agronomists and answered through voice message. The preliminary results of the evaluation suggested that households participating in the Avaaj Otalo program adopted safer pesticides and were more likely to harvest cumin, a high-value cash crop. These findings suggest that the content provided through the voice messages, by being targeted and relevant to local weather conditions, was useful for farmers and was thus more likely to be taken up.

Take local contexts, traditions, and languages into consideration.

The Digital Green program utilizes training videos recorded in local languages in order to provide extension services to farmers. Rose (2016) found that Digital Green's model has led to high rates of adoption of improved agricultural practices and that the program's success is due in large part to its use of local farmers in its videos; results suggest that farmers appear to trust their peers more than they do outside experts. The program began in India and has expanded into Ethiopia, with pilot programs being explored in Ghana, Mozambique, and Tanzania. Van Campenhout et al. (2017) offer a similar example from a project in Uganda. This video utilized videos featuring a local farmer who provided training and information on the use of improved potato seed selection, handling, and storage practices. The videos were shown via mobile tablet and included a short quiz to ensure that farmers understood the content. The authors found that viewing the videos significantly increased farmers' knowledge about agricultural practices; interestingly, farmers who viewed the videos also appeared to more actively process the information provided and apply it in different contexts than the ones shown specifically in the videos. These two projects provide further evidence that ICT interventions should take into account local contexts (including language, traditions, and peer groups) and ensure that farmers feel engaged in and connected to a program in order to encourage local buy-in.

Actively engage with target recipients.

Cole and Fernando (2014) also showed the power of offering a dialogue with program participants rather than just the one-way provision of information. In a case study of a program in Kenya, Langat (2017) highlighted how giving producers the opportunity to voice their needs can lead to significant outcomes. In this DFID-led project, local climate change planning committees work directly with producers to establish climate change adaptation strategies; in one neighborhood, a women's cooperative expressed the need for detailed, reliable weather information so that they could plan when to dry their produce. This request led to an agreement with Kenya's Meteorological Department to send daily, localized weather forecasts to cooperative members' mobile phones. According to Langat (2017), this service has reduced women's losses.

Offer services as well as information.

ICTs have also been shown to improve access to important financial tools, such as savings tools and credit. M-Pesa is one such tool in use in Eastern Africa; this service allows mobile phone subscribers to transfer money via text message. Ouma, Odongo, and Were (2017) found that this service significantly increased rural access to financial services and increased both households' likelihood of saving money and the amount of money saved.

Information-Gathering

Improve data collection (and local research capacity) through the use of ICTs.

According to the World Bank (2016), conducting household surveys using mobile phones can make it easier and safer to collect data from remote or volatile areas. In addition, mobile phones can make data collection faster, allowing researchers and policymakers to respond to new or urgent data needs, such as the need to respond to a weather shock or other disaster. Data can also be collected on a more frequent basis using mobile technologies, improving the robustness and timeliness of the data used to make important policies. Finally, using mobile technology can make data collection more cost-effective. IFPRI's Picture-based Crop Insurance (PBI) project also

utilizes data collected by farmers' own smartphones to provide affordable, accessible crop insurance. This intervention allows farmers to take and upload pictures of their crops using their smartphones; local agronomists then analyze the pictures to verify crop losses. The project aims to minimize the cost of crop loss verification, which will help reduce the cost of crop insurance and make it more accessible to remote smallholder farmers.

Invest in new data-gathering technologies.

In recent years, satellite images and remote-sensing technologies have gained ground as tools for the collection of data on agricultural yields and production, weather patterns, and agro-ecological conditions. According to Dr. Benjamin Addom of CTA, these technologies can provide location-specific data that can help policymakers and international organizations design interventions and policies that respond to the specific needs of each area. In addition, Addom emphasizes the need to combine these new technologies with other tools like soil sensors and moisture sensors in order to increase the value of the data collected and the services provided to farmers.

Managing Constraints

Consider subsidies and other policies to increase ICTs' affordability.

In a recent virtual dialogue held by the SSA FSP on the use of ICTs in African agriculture, Dr. Mercyline Kamande from Mount Kenya University discussed subsidies for Internet services; according to Kamande, the adoption of Internet-based ICTs increased in Rwanda and Kenya after the creation of government subsidies for Internet services, as well as the establishment of tax exemptions for ICT hardware such as mobile phones. These policies can help reduce the initial cost of ICT technologies, making the technologies more affordable and accessible to greater portions of the population.

Enact and enforce regulations to allow for fair competition and reduce costs.

Torero (2014) suggests that a lack of competition among service providers or a lack of government regulation can play a role in the high cost of mobile services in some countries. Policymakers should focus on strengthening and enforcing regulations to encourage healthy competition among private-sector ICT providers, as well as to ensure that all ICT providers can access ICT infrastructure at a reasonable fee.

Encourage public-private partnerships, as well as partnerships with civil society actors.

In the SSA FSP virtual dialogue, Dr. Addom of CTA stressed the need for coordinated effort among a variety of stakeholders, including governments, donors, and private sector actors. These partnerships can stimulate innovation and spread the risk and cost of ICT development among stakeholders, reducing the burden on governments and on farmers themselves. For example, CTA's Apps4Ag database connects investors with entrepreneurs who are developing new ICT applications; the database also helps policymakers and development partners learn about projects and technologies in use in certain areas in order to integrate these technologies into their interventions.

References

Cole, Shawn A. and A. Nilesh Fernando. 2014. "The value of advice: Evidence from the adoption of agricultural practices." Harvard University Working Paper. Cambridge, MA: Harvard University. http://scholar.harvard.edu/files/nileshf/files/ao_paper.pdf

Langat, A. 2017. Kenya's bottom-up approach to adaptation. In Unjust burden: How smallholder farmers in Africa are adapting to climate change to improve their food security (pp. 92-95). Kenya: IRIN.

Ouma, S. A., T. M. Odongo, and M. Were. 2017. "Mobile financial services and financial inclusion: Is it a boon for savings mobilization?" Review of Development Finance 7(1): 29-35. https://doi.org/10.1016/j.rdf.2017.01.001

Rose, G. (ed.). 2016. "African farmers in the digital age: Overcoming isolation, speeding up change, and taking success to scale."

Foreign Affairs special issue. https://www.foreignaffairs.com/sponsor-anthology/african-farmers-digital-age

Torero, Máximo. 2014. "Information and communication technologies: Farmers, markets, and the power of connectivity." In 2013 Global food policy report. Eds. Marble, Andrew and Fritschel, Heidi. Chapter 6 Pp. 63-74. Washington, D.C.: International Food Policy Research Institute (IFPRI). http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/128049

Van Campenhout B., S. Vandevelde, W. Walukano, and P. Van Asten. 2017. "Agricultural Extension Messages Using Video on Portable Devices Increased Knowledge about Seed Selection, Storage and Handling among Smallholder Potato Farmers in Southwestern Uganda." PLoS ONE 12(1): e0169557. https://doi.org/10.1371/journal.pone.0169557

World Bank. 2016. Mobile Phone Panel Surveys in Developing Countries: A Practical Guide for Microdata Collection. Washington DC: World Bank. https://openknowledge.worldbank.org/handle/10986/24595

Sara Gustafson is a Communications Specialist with the Markets, Trade and Institutions Division of the International Food Policy Research Institute.

FOOD SECURITY PORTAL
FACILITATED BY IFPRI

SUPPORTED BY
European Commission

https://www.foodsecurityportal.org/

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
A world free of hunger and malnutrition

1201 Eye Street, NW, Washington, DC 20005 USA
T. +1-202-862-5600 | F. +1-202-862-5606 | ifpri@cgiar.org | www.ifpri.org