

## ***e-Agriculture and WSIS+10: Looking back and moving forward***

In 2003 and 2005, the World Summit on the Information Society (WSIS) focused on Information and Communications Technologies (ICTs) and their role in the information society. The Summit enabled stakeholders to examine ways of bridging the global digital divide and increasing access to the Internet and ICT services in developing countries. E-agriculture is one of the WSIS "Action Lines" and looks at how ICTs can improve agriculture and contribute to rural development.

In September 2013, the Food and Agriculture Organization (FAO) of the United Nations and Grameen Foundation began working closely together after the signing of a Memorandum of Understanding (MoU). The MoU is designed to improve farming practices and innovation exchange, empower small-holder farmers, and support better access to agricultural and rural financial services as well as competitive value chains through greater access to technology.

In preparation for the WSIS+10 review and conference to be held in 2014, the two organizations hosted an online forum from 25 November to 6 December 2013. Its purpose was to understand the major achievements and challenges of using ICTs in agriculture. Participants shared their successes and failures and gave examples of possible models to emulate and upscale. More specific discussions focused on the challenges faced by women and youth, and on measuring impact of ICTs in Agriculture.

- Grameen Foundation is a leading "global non-profit that helps the world's poorest people reach their full potential by providing access to essential financial services and information on agriculture and health. It also develops tools to improve the effectiveness of poverty-focused organizations".
- The Food and Agriculture Organization of the United Nations (FAO) is the UN agency responsible for the e-agriculture Action Line follow-up. The e-Agriculture "Forum archive" is available under "Resources" in e-Agriculture's website ([www.e-agriculture.org](http://www.e-agriculture.org)).

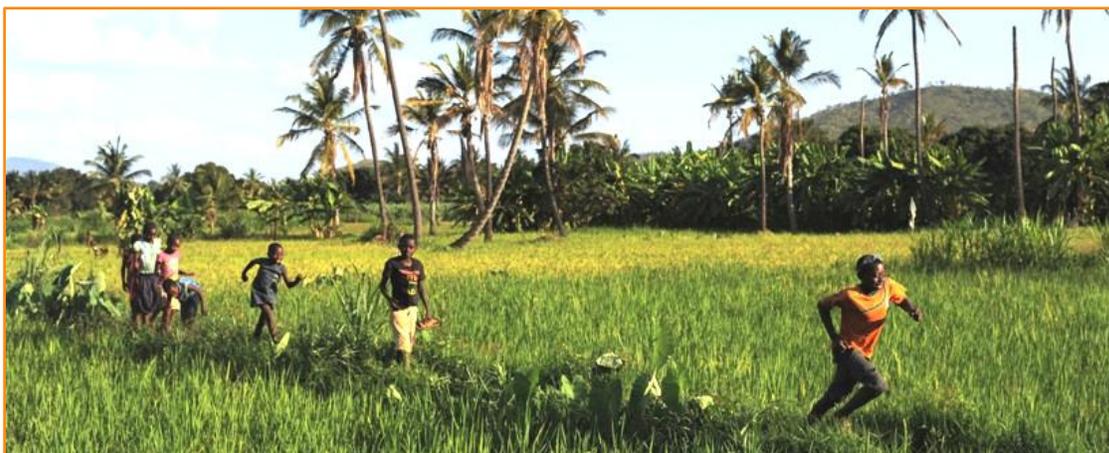


Photo: FAO/Daniel Havduk

## Key recommendations

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Based on the e-Agriculture forum discussion entitled "Looking back and moving forward", the following recommendations for governments and project implementers on the use of Information and Communication Technologies (ICTs) in agriculture and rural development were suggested:

- Technology:** A combination of different technologies strengthens the delivery of content. The appropriate mix depends on the context. A combination of radio and mobile phones appears to work well in many situations.
- Trust:** Farmers will change planting habits and adopt new technologies only if information is delivered by a source they trust; experience suggests that information best reaches target groups when services and content are delivered by trusted intermediaries and community level knowledge brokers.
- Approach:** A bottom-up approach, starting with farmers' or traders' needs, has worked best for defining useful content and services.
- Sustainability:** Identifying sustainable business models remains a challenge; collecting data and creating content requires important investments.
- Monitor and Evaluation:** More standardized indicators (for example, based on the value chain for specific crops) need to be developed.
- Gender and Youth:** Since women's access to ICTs is very limited amongst rural populations, ICT for development (ICT4D) projects should always include gender-specific considerations, as well as cultural and regional specificities, in both their design and implementation stages. Youth are often ICT savvy and their input should be included in strategies and projects.
- Policies:** Governments should formulate clear policies defining principles and practices, which the public and private sectors can use to engage in ICT4D. These should build on existing national communication or ICT policies.

"Mobile technology improves any situation in which the limiting factor is communication; it cannot resolve the lack of capital, infrastructure, security, etc."

**Meghan Mayzelle, forum participant**

## Technology

Since 2005, there has been exponential growth in the use of mobile phones. Currently there are 6.8 billion active mobile phone connections worldwide, which means that there are almost as many mobile phones as people<sup>1</sup>. Concurrently, there has been an explosion of innovative ICT-based services aimed at the agricultural sector. This has been fueled by the fact that 89 percent of people in developing countries now have access to mobile phones<sup>2</sup>. Nonetheless, radios continue to be widely used.

### Combining different technologies

While the rapid increase in mobile phone penetration in rural areas offers great potential for increasing access to content, many barriers remain. These include illiteracy, limited skills in using complex devices and searching for information, and cultural issues such as women not being allowed to use mobile phones. Innovative technologies, such as Interactive Voice Response (IVR), can overcome some of these challenges by making content accessible in local languages to illiterate people.



Photo: UN Photo/TobinJones

Radio remains one of the most popular ICTs because people with low levels of literacy can easily use it. Moreover, due to cultural barriers, women are often not allowed to use more advanced ICTs. Even though the right mix ultimately depends on the specific context, experience suggests that a combination of radio and mobile technology is an efficient and effective way of delivering content to farmers: it maximises interactivity and, at the same time, it helps breaking down access barriers (e.g. using their mobile phones, farmers can take part in radio shows and share their opinions and doubts).

## Trust

### Better to build on existing relationships

While ICTs can deliver large amounts of information, this does not mean that the information will be used. For example, farmers will change their planting habits and adopt new technologies only if information is delivered by a source they trust. Information delivered by a known intermediary, such as an NGO staff or a community member who has worked with or lived in the community, will have better reception and consequently better adoption. To overcome the anonymity of ICTs, it is more efficient to build on existing relationships based on trust. Experience suggest that information best reaches target groups when services and content are delivered by trusted intermediaries and community level knowledge brokers.

<sup>1</sup> See International Telecommunications Union (ITU), *ICT Facts and Figures 2013*

<sup>2</sup> See International Telecommunications Union (ITU), *Key 2006-2013 ICT data for the world*

Input suppliers use ICT for marketing, policy documentation, enrollment, sales promotion, extending outreach, increasing customer loyalty and uptake, and reducing default risk.

## Approach

### *A bottom-up approach works best*

Content must be of high quality and truly relevant to users' needs. A bottom-up approach, starting with farmers' or traders' needs, has worked best for defining truly useful content and services.

One way of building up relevant localized content is through "crowd sourcing". In an example from India<sup>3</sup>, users can call a phone service to get answers for their specific questions. The answers become part of a knowledge base, which can then be queried by other users<sup>4</sup>.

Disaggregating mobile subscriptions by income, gender, etc., would be a good way to understand who is using the content, and how to make it more relevant for users. It would also be useful to first analyze usage by product or content area (e.g. cattle diseases vs. chilling hub services) and then develop appropriate services and content based on what users are looking for.

#### **Box 1. Community Knowledge Workers (CKW)**

The Community Knowledge Worker (CKW) approach, piloted by Grameen Foundation in Uganda and Colombia, is a good model for ICT4D. The approach uses both mobile technology and intermediaries to help smallholder farmers improve their businesses and livelihoods with accurate, timely information.

CKWs are nominated and trusted by the community. The intermediaries are given a smart phone, useful apps, training and management support, as well as a business model which encourages high quality interactions. Using their smart phones, CKWs provide farmers with information on everything from weather and market prices to advice on growing crops and dealing with livestock diseases.



Photo: Grameen Foundation

For more information:

[www.grameenfoundation.org/what-we-do/agriculture/community-knowledge-worker](http://www.grameenfoundation.org/what-we-do/agriculture/community-knowledge-worker)

<sup>3</sup> See Annex: *LifeLines Agriculture*

<sup>4</sup> Rachel Zedeck, Founder and Managing Director of Backpack Farm Agriculture Program (BPF), points out that mobile solutions have yet to address the "compliance issue" for private sector certificates (e.g.: Global GAP, etc.); Not being able to meet international standards hinders smallholder farmers from entering regional and international markets.

## Sustainability

### Financing ICT services and data collection

Even where adequate infrastructure exists, collecting data and creating content requires a huge investment in human resources and in establishing suitable systems. Yet, both public and private funding is often limited and, in the case of most development projects, short-lived. However, farmers and traders are ready to pay for information when it meets their needs. Even when the service was not free, in many cases usage increased. Nonetheless, identifying sustainable business models remains a challenge.

Furthermore, since collecting and updating data is expensive, both private and public organizations may be reluctant to share the information collected from their projects. However, even when project managers want to share their information with others, this may be hindered by the lack of common standards. Large donors can play a key role in promoting data sharing, for instance by making it a requirement.



Photo: FAO

## Monitor and Evaluation

### What should be measured?

Measuring the impact of ICTs on agriculture is complex as there are no common indicators, evidence is often anecdotal and it is difficult to establish a direct link between the use of ICTs and increased productivity or income<sup>5</sup>. Project indicators thus tend to focus on usage statistics and outputs such as the number of new subscriptions, the number of users, calls to radio shows, etc.

Waverman<sup>6</sup> suggests that a valid way of measuring the economic value of mobile telephony is by examining the willingness of the poor to pay for mobile phones. Indicators could also focus on specific commodities and parts of the value chain (for example, the number of boxes of bananas rejected for ripeness each week related to SMSs sent out about when to harvest bananas).

Other suggestions for what to measure include:

- new investments that ICTs have attracted to the community;
- tasks that have become more cost- or time-effective;
- new businesses which were created;
- ICT related policy shifts;
- increased participation by women, youth and marginalized members of the community.

<sup>5</sup> In this regard, forum participant Kiringai Kamau (VACID Africa) presented "Easyway ERP", by Octagon Data Systems, a business software solution which integrates traditional tools with modern ICTs, specifically designed for agriculture. See Annex for further details.

<sup>6</sup> See Waverman, L., Meschi, M., Fuss, M., *The Impact of Telecoms on Economic Growth in Developing Countries*

## How should we measure the impact of ICTs?

Measuring the impact of ICTs on agriculture and development is crucial for understanding how effective ICT4D projects have been. Examples of cost-effective ways to measure impact include the Progress out of Poverty Index® (PPI®) and the Base of Pyramid (BoP) Impact Assessment Framework. Another way of measuring impact would be to get a baseline of household poverty levels using simple socio-demographic indicators and compare it with post-project poverty levels. The PPI® has been suggested as an appropriate tool for doing this. The PPI® is a simple 10-question survey that measures household's characteristics and asset ownership (e.g.: "What material is your roof made out of? How many of your children are in school?")<sup>7</sup>. The relationship between PPI® data and those from other indicators (socio-demographic, financial, agronomic, technological, etc.) can also be analyzed to keep track of results.

It is important to ask farmers how satisfied they are with the services provided and the results achieved.

## Gender and Youth

It is essential to do a gender assessment before designing an ICT4D project because gender is almost always a critical issue. Women often have limited or no access to cell phones and their access is controlled by men. For instance, in some countries women are strongly discouraged from calling in to radio shows and voicing their opinions publicly.

Moreover, women are already overburdened by multiple duties and project designers should be careful not to increase their load. Finally, as well as men, women have gender biases that come from traditions which are hundreds or even thousands of years old.



Photo: UN Photo/F. Charton

Gender affects the choice of technology because women - who have higher rates of illiteracy and less access to mobile phones - generally prefer to use radios. ICT service designers should keep in mind that in developing countries women represent 50 percent of the labour force. By giving women the same access to productive resources as men, yields on farms would increase by 20–30 percent<sup>8</sup>.

Adopting a Family Farming focus in Information Communication Technology for Agriculture (ICT4Ag) projects is a good way of making sure that women and youth are included in strategies and projects. Youth are often ICT savvy and could be engaged to help develop apps and identify useful ICT services. The use of ICTs, social media and websites can also help "re-brand" agriculture and make it more appealing to youth.

<sup>7</sup> See: Progress out of Poverty Index® in Annex

<sup>8</sup> See: Food and Agriculture Organization of the United Nations, *The State of Food and Agriculture 2010-2011*

## Policies

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### *ICT Policies and Public-Private Partnership*

Because of the cost involved in setting up large-scale ICT4D initiatives, public-private partnerships are often necessary. However, without clear policies they can become unmanageable and difficult to regulate. Governments should formulate clear policies that define the principles for their involvement in ICT4D. These should build on existing national communication or ICT policies. Finally, closer collaboration between various stakeholders can also lead to better solutions and help avoid the duplication of services.

## Conclusion

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Although ICTs are not a silver bullet for improving agricultural productivity and raising farmers' incomes, they can make a big difference in contexts where services delivered closely match farmers' needs. They also create new opportunities for improving livelihoods, and help empower poor communities and marginalized people. All these contribute to the rural development process. E-agriculture is in constant evolution since new technologies and applications are continually being developed. Even if considerable progress has been made and key lessons have been learned from previous experiences, e-agriculture's full potential still needs to be unlocked. It will need to re-invent its approaches as new trends in the use of ICTs for agriculture and rural development emerge.

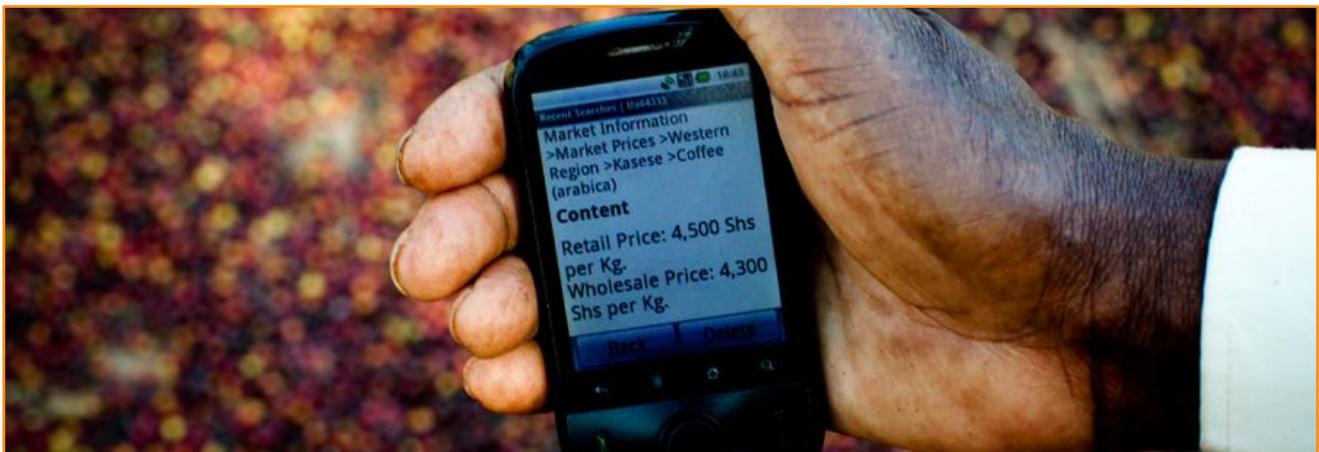


Photo: Grameen Foundation

## ANNEX

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### References

- Food and Agriculture Organization of the United Nations (FAO), *The state of food and Agriculture 2010-2011*. Document available at:  
<http://www.fao.org/docrep/013/i2050e/i2082e00.pdf>
- Jones, G., Molina, M., Makarov, D., Page, M., *The Mobile Economy 2013*, GSMA 2013 – Document available at:  
[http://www.atkearney.com/documents/10192/760890/The\\_Mobile\\_Economy\\_2013.pdf](http://www.atkearney.com/documents/10192/760890/The_Mobile_Economy_2013.pdf)
- International Telecommunication Union (ITU), *ICT Facts and Figures 2013* – Document available at:  
<http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2013-e.pdf>
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[http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2013/ITU\\_Key\\_2005-2013\\_ICT\\_data.xls](http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2013/ITU_Key_2005-2013_ICT_data.xls)
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<http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2013.aspx>
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<http://www.fao.org/docrep/017/i3074e/i3074e00.htm>
- United Nations Educational, Scientific, Cultural Organization (UNESCO), *ICT in education in Latin America and the Caribbean - A regional analysis of ICT integration and e-readiness*, Montreal 2012 – Document available at:  
<http://www.uis.unesco.org/Communication/Documents/ict-regional-survey-lac-2012-en.pdf>
- Waverman, L., Meschi, M. & Fuss, M., *The Impact of Telecoms on Economic Growth in Developing Countries*, Vodafone Policy Paper Series, 2, 2005 London, United Kingdom
- The World Bank, *ICT in Agriculture Sourcebook* – Document available at:  
<http://www.ictinagriculture.org/content/ict-agriculture-sourcebook>

### Online articles

- Celebrate Solutions: Improving Literacy and Driving Change Through SMS Text Messaging (Senegal, Bill and Melinda Gates Foundation) – Document available at: <http://www.impatientoptimists.org/Posts/2013/03/Celebrate-Solutions-Improving-Literacy-and-Driving-Change-Through-SMS-Text-Messaging>
- [Mobiles fuel literacy drive](#) (Times of India) tells the story of illiterate farmers who learned to read and write in English by using mobile phones – Document available at: <http://timesofindia.indiatimes.com/india/Mobiles-fuel-literacy-drive/articleshow/1489219.cms?referral=PM>

### Monitoring and evaluation: tools, reports, examples

- *Baseline Survey*, by Borderlands Coffee Project, Colombia – Document available at: <http://coffeelands.crs.org/wp-content/uploads/2012/04/Borderlands-Colombia-Baseline-Survey-FINAL.pdf>
- BoP Impact Assessment Framework – Document available at: <http://trasi.foundationcenter.org/record.php?SN=151>
- *Cell Phones and Cattle: The Impact of Mobile Telephony on Agricultural Productivity in Developing Nations*, Daniel Houghton Duke University Durham, North Carolina 2009 – Document available at: [http://econ.duke.edu/uploads/media\\_items/houghton-daniel.original.pdf](http://econ.duke.edu/uploads/media_items/houghton-daniel.original.pdf)
- *The Global Open Data for Agriculture and Nutrition (GODAN)*, an initiative that seeks to support global efforts to make agricultural and nutritionally relevant data available, accessible, and usable for unrestricted use worldwide – Document available at: <http://godan.info/>
- Open-access indicators by the World Bank, accessible via web – Document available at: <http://data.worldbank.org/indicator>
- *Teleuse at the bottom of the pyramid* (Teleuse@BOP), an initiative by LIRNEasia, consisting in a unique series of cutting edge demand-side studies on ICT use among the BOP – Document available at: <http://lirneasia.net/projects/icts-the-bottom-of-the-pyramid/>

### Indexes suggested by participants

- Household Dietary Diversity Score (HDDS) – Available at: <http://www.fantaproject.org/monitoring-and-evaluation/household-dietary-diversity-score>
- Months of Adequate Household Food Provisioning (MAHFP) – Available at: <http://www.fantaproject.org/monitoring-and-evaluation/mahfp>
- Multidimensional Poverty Index (MPI) – Available at: <http://hdr.undp.org/en/statistics/mpi>

- Necesidades Básicas Insatisfechas (NBI) [in Spanish] – Available at:  
<http://www.dane.gov.co/index.php/estadisticas-sociales/necesidades-basicas-insatisfechas-nbi>
- Poverty Assessment Tool (PAT) – Available at:  
<http://www.povertytools.org/>
- Progress out of Poverty Index® (PPI®) – Available at:  
<http://www.progressoutofpoverty.org/>

### Examples of ICT for Rural Development Initiatives

- CAADP: Comprehensive Africa Agriculture Development Program (CAADP) is about bringing together diverse key players - at the continental, regional and national levels - to improve co-ordination, to share knowledge, successes and failures, to encourage one another, and to promote joint and separate efforts to achieve the CAADP goals  
<http://www.nepad-caadp.net/index.php>
- *Community Knowledge Worker (CKW)*: initiative by Grameen Foundation which combines mobile technology and human networks to help smallholder farmers get accurate, timely information to improve their businesses and livelihoods  
<http://www.grameenfoundation.org/what-we-do/agriculture/community-knowledge-worker>
- *E-Afghan Ag*: a project that aims at providing credible relevant information to those helping farmers in Afghanistan; supported by USDA and managed by UC Davis  
<http://eafghanag.ucdavis.edu/>
- *Easyway ERP*: an Enterprise Resource Planning (ERP) solution by Octagon Data Systems, designed for agricultural sectors where weighing is considered crucial, for instance Dairy, Horticulture, or Tea Picking. It integrates farmers' records with an organizational management system through the use of different tools, for instance Bluetooth-enabled digital scales, functioning as remote data terminals to capture farmer records  
<http://www.octagon.co.ke/>
- *E-krishok*: initiative launched in 2008, it aims to bridge the information gap that exists in the agriculture sector and build awareness and capacity of farmers to use ICT-enabled information and advisory services (Bangladesh).  
<http://www.ekrishok.com/>
- *Esoko*: an agricultural commodity index that tracks the prices of selected agricultural products across Ghana, has introduced a Farmer Helpline that enables farmers to access answers from a group of agricultural experts available on call  
[https://esoko.com/?page\\_id=11](https://esoko.com/?page_id=11)
- *Farmable.me*: a Crowdfunding platform that aims to create a new form of global collaborative farming called 'Crowdfarming' (Ghana)  
<http://www.farmable.me/>

- *Farmer Voice Radio (FVR)*: represents a different, sustainable, model of agricultural extension that overcomes many of the limitations of traditional extension by linking extension officers, and farmers, with radio and other information and communication technologies to enhance farmer productivity and prosperity  
<http://www.farmervoice.org/content/consortium>
- *LifeLines Agriculture*: a service that provides advice and guidance to farmers through critical agri-advisory and livelihood information (India)  
<http://lifelines-india.net/agriculture>
- *mPesa*: is a mobile-phone based money transfer and microfinancing service for Safaricom and Vodacom (Kenya and Tanzania)  
<http://www.safaricom.co.ke/?id=257>
- *Salam Watandar*: a radio station that puts agricultural experts on the air several times a week, and returns farmer's "missed calls" to respond to their queries. The station tracks queries and general reports from farmers and are in the process of creating a map based on that data to help predict where future agricultural "events" (drought, infestations, etc) are likely to occur  
<http://www.salamwatandar.com/index.php/en/>

### Audio visual resources

- *Agrosfera*: a television documentary on the use of remote sensing and data from the field to reference crops (in Spanish)  
<https://acceso360.acceso.com/cocacola/es-ES/?mod=TrackingAVPlayer&task=openAV&companyNewsId=203034774&mediaType=2&sig=5a2872ead73921f90e5bbc072e79872a61edb3a6020d148296861e4ea799282d>
- *Digital Green*: a platform for farmer-to-farmer videos on crop planning and intercropping  
<http://www.digitalgreen.org/>
- *The man who stopped the desert*: one hour feature documentary telling the story of Yacouba Sawadogo, an illiterate African farmer who, through ingenious farming methods, has achieved what experts have failed to do: stop the desert  
[http://www.dailymotion.com/video/xvxk07\\_the-man-who-stopped-the-desert\\_news](http://www.dailymotion.com/video/xvxk07_the-man-who-stopped-the-desert_news)