



OVERVIEW OF FORTHCOMING e-SOURCEBOOK

INFORMATION AND COMMUNICATION TECHNOLOGIES FOR AGRICULTURE

Connecting Smallholders to Knowledge, Networks, and Institutions

MAY 2011



THE WORLD BANK



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Overview of Forthcoming e-Sourcebook

The *Information and Communication Technologies for Agriculture e-Sourcebook* is being designed as an e-publication to maximize its outreach, with the intent of maintaining it as a “living” updatable document following its release in Autumn 2011. The e-Sourcebook will be featured on a website currently being constructed at www.ICTinAgriculture.org. Given the quickly evolving ICT environment, the World Bank and its partners will build ongoing collaborations with other organizations, the private sector, and subject matter experts to expand and update the e-Sourcebook—by means of the website—as new knowledge becomes available. The e-Sourcebook is operational in nature, with practical examples and case studies from all five regions where the World Bank works. It aims to provide both technical and policy guidance to a diverse group of development practitioners and decision makers in:

- **Understanding current trends** in information and communication technologies (ICTs) as they pertain to agriculture as well as the contributions that ICTs can make to enhance agricultural strategies and interventions;
- **Designing and implementing appropriate and sustainable ICT components** for agriculture projects;
- **Building effective partnerships**—public and private—to promote ICT access and innovation for agriculture;
- **Evaluating the impact** of these interventions; and
- **Including ICT in policy dialogue and planning** with country counterparts on agricultural and rural development goals and priorities.

Information and communications play a vital role in agricultural development and in rural development more broadly. The role that ICT can play as an instrument

of change is potentially transformative, although its ultimate impacts will be contingent on getting affordable individual technologies such as mobile telephones into the hands of the most important agents. These include smallholder farmers and traders, with particular emphasis on women, and a variety of other agents to whom the technologies provide access including entrepreneurs, service providers, and researchers. The connectivity offered by new technologies, applications, and business models is a powerful means of inclusion, making smallholders in particular more knowledgeable in their understanding of opportunities, risks and options.

A variety of ICTs are being used to better-inform previously isolated agrarian communities and their service providers. Rapid development in telecommunications and bandwidth infrastructure has found many significant applications in agriculture. Mobile phones in particular are a relevant technology for small-scale farmers. Unlike previous technological developments, they have moved quickly into developing countries. In combination with the Internet and other ICTs such as remote sensors, geographical information systems

A handheld GPS device, which is one of the central technologies in a new CIAT (International Center for Tropical Agriculture) project on site-specific agriculture.



Photo: Neil Palmer, CIAT. (CC BY-SA 2.0.)

(GIS), meteorological instruments, and satellite imagery, mobile phones are connecting farmers to institutions, relevant information, markets, and other farmers faster than any other technology.

Given these rapidly unfolding developments and the major food challenges in the twenty-first century, an understanding of how these technologies can be employed to inform stakeholders—including poor farmers and policy-makers—is critical to improving smallholders' livelihoods and agricultural development. Technologies that serve as information "collectors," "analyzers," "sharers," and "disseminators" are already positively affecting agriculture interventions in developing countries. Mobile applications provide linkages to previously isolated actors: information on prices, good farming practices, soil fertility, pest or disease outbreaks, and extreme weather has expanded farmers' opportunities to capitalize on markets, react to unfavorable agricultural conditions more effectively, and better interact with public service agents. Satellite imagery and aerial photography have increased the capacity of scientists, researchers, and even insurance providers to study farm conditions in remote areas and assess damage from climatic challenges like drought. Increasingly affordable technologies like radio

Radio Maria's Participatory Radio Campaign listening groups of women in Kitete village, Tanzania.



Photo: Farm Radio International.

frequency identification (RFID) tags and other wireless devices are improving livestock management, allowing producers to monitor animal health and trace animal products through the supply chain. A persistent barrier to sustainable agriculture development, the lack of rural finance (including risk-mitigating instruments like credit), is also lifted by digital tools.

The *Information and Communication Technologies for Agriculture e-Sourcebook* describes a wide variety of ICT innovations and discusses the potential they carry for stakeholders engaged in agricultural development. The overarching challenge for agriculture in the international development community is to make the sector fulfill its potential as an engine for a certain kind of economic growth—*poverty-reducing* economic growth. The *e-Sourcebook* therefore focuses on support to poor smallholder farmers and the intermediate institutions that serve them, and within this classification of producers, on female farmers in addition to women who are otherwise employed in rural nonfarm economies. The text also considers how these smallholders can be linked to ICT-enabled improvements in larger-scale farming and agribusiness in developing countries, which can stimulate the rural economy more broadly and provide contracting and labor opportunities for smallholder families. In addition, the *e-Sourcebook* examines a number of new technologies used in OECD countries that may be applied in developing regions in the near future.

Each module within the *e-Sourcebook* also explores the practical challenges and key enablers associated with using ICT in agriculture interventions. Four key enablers found across all modules include demand-driven design and local participation; using the most appropriate technology in terms of infrastructure, human capital, and location; the promotion of inclusiveness with a focus on tapping the economic potential of women and youth; and employing good business models for financially sustainable interventions.

IMPROVING SMALLHOLDER AGRICULTURE: PRIORITY TARGETS FOR ICT-ENABLED CHANGE

Overall, the ICT in Agriculture Sourcebook discusses ICT in the context of the following themes:

1. Making farmers more productive, innovative, and responsive to changing market and environmental conditions, thereby improving their incomes;
2. Increasing the transparency and effectiveness of the markets and institutions with which farmers interact and on which they depend for a variety of services;
3. Increasing the capacity of farmers to organize, network, advocate, learn, and share;
4. Strengthening the positive linkages between developing-country farmers and changing regional and global agricultural value chains and food markets;
5. Promoting innovation in business models and tools to serve the needs of farmers and of the agricultural sector;
6. Promoting cutting-edge, participatory, and locally appropriate agricultural research and extension;
7. Effectively managing agricultural and natural resources, including improved land administration and land markets;
8. Promptly and effectively responding, at both individual and collective levels, to weather and environmental risks; and
9. Creating policy and regulatory environments conducive to agricultural growth and smallholder empowerment.

These are the modules featured in the ICT for Agriculture e-Sourcebook. See the abstracts following this page for more detailed information.

- Increasing Livestock, Crop, and Fishery Productivity through ICT
- Strengthening Agricultural Marketing with ICT
- Broadening Smallholders Access to Financial Services through ICT
- Making ICT Infrastructure, Appliances, and Services More Accessible and Affordable in Rural Areas
- Strengthening Governance, Rural Institutions, and Citizen Participation using ICT
- Anytime, Anywhere: Mobile Devices and Services and Their Impact on Agriculture and Rural Development
- ICT as Enablers of Agriculture Innovation Systems: Research, Extension, and Advisory Services
- ICT Applications for Smallholder Inclusion in Agribusiness Supply Chains
- Global Markets, Global Challenges: Improving Food Safety and Traceability while Empowering Smallholders through ICT
- ICT for Land Administration
- ICT Applications for Agriculture Risk Management
- Farmers' Organizations Work Better with ICT
- Using ICT to Improve Forest Governance

Abstracts

INCREASING LIVESTOCK, CROP, AND FISHERY PRODUCTIVITY THROUGH ICT

Eija Pehu, Cory Belden, Suvranil Majumdar, and Teemu Jantunen

Given the increase in food price volatility, rising demand for grains and meat products, more frequent weather-related disasters, and constrained resources, sustainably intensifying yield outputs in male and female small-scale farms is more critical to food security and poverty reduction than ever before. Recent developments in ICTs have created new opportunities to achieve these increases. This module discusses these opportunities, beginning with a thematic note on soil and land management. GPS, satellite images, and wireless sensors are improving soil fertility by providing accurate measurements of soil carbon and nitrogen, which can inform producers on nutrient application, planting time, and other farming practices. This has furthered the possibilities associated with precision agriculture, as have sensors that monitor pasture health, livestock movement, and fish feedings. The second thematic note in this module focuses on disaster prevention and early warning systems. Meteorological technology has provided farmers with micro-climatic information, allowing them to prepare for extreme conditions like drought. Other ICT-enabled prevention strategies include pest and disease identification and advisory services through mobile phones, video, and radio. Irrigation

Improvements in communication tools can help in increasing rice-farmers productivity.



Photo: International Rice Research Institute. (CC BY-NC-ND 2.0.)

systems, which have often been fraught with challenges in construction and maintenance, are also benefiting through ICTs like LiDAR, aerial photography, and cameras. The first two technologies provide accurate land assessment for planning canals and drainage systems; the latter allows producers to monitor construction and alert policy makers even in remote locations. Two in-depth studies, the Seeing-is-Believing Project in West Africa and weather forecasting in Turkey, provide a more complete outline of investment costs and impacts. Finally, key enablers and challenges associated with ICT for productivity are discussed—this including human capacity, regulatory environments, and timing.

STRENGTHENING AGRICULTURAL MARKETING WITH ICT

Grahame Beaumont Richard Dixie and Nithya Jayaraman

This module focuses on the use of ICTs to support marketing of inputs and agricultural products more generally. An overview of the use of ICTs in marketing reveals the key role of mobile phones, which are being used among other things to create networks of contacts that can be tapped for immediate information on an “as-and-when” needed basis. The phones are also useful in co-coordinating logistics, in conducting real time market research, and in sourcing inputs. This module provides an account of the role of cell phones in relation to the emerging role of special ICT applications which have been developed to facilitate more efficient marketing. The further development of such applications is a promising area of future public-private sector partnerships. A number of studies treated in this module quantify the benefits of ICTs for farmers’ income, trader margins and on consumer prices. The studies suggest that ICTs are being employed to reduce costs and improve efficiency in market chains. They are directly applicable to improving market information: both the immediate information on which farmers base their selling decisions, and the longer-term build-up of market intelligence through which they develop an understanding of consumer demand based on their interaction with traders. Finally the module covers access to inputs, and the role of the cell phone in determining which sources to purchase inputs from. Other technologies can then be employed to deliver digitally-enabled advisory services that can inform farmers about when their inputs should best be applied.

BROADENING SMALLHOLDERS ACCESS TO FINANCIAL SERVICES THROUGH ICT

Henry Bagazonzya and Soham Sen

This module identifies how ICT has been used in various countries to provide financial access to rural dwellers including farmers and entrepreneurs. The module specifically concentrates on informing the reader of innovative financial mechanisms and technologies that are being used in the rural environment. The effective provision of financial services in the rural sector depends greatly on the underlying infrastructure, which makes electronic transactions efficient and reliable. The module discusses the new delivery channels that aid in the provision of financial products and services to the rural sector, highlighting the potential that the ICT-enabled channels have to directly provide access to finance to farmers, entrepreneurs and other rural dwellers. Governments can also make use of ICT-enabled delivery channels to oversee and regulate the agricultural and rural sectors, which is also explored in this module. A diverse number of stakeholders that are involved in the provision of access to finance are, in some cases, in partnership with governments to provide necessary infrastructure and technology to users. Countries like India have taken this approach, where the private sector is in partnership with the public sector to provide ICT-enabled financial services. Finally, the module suggests that any proposed technology solution should be a self-sustaining model, with a clear revenue generation plan and finance model.

MAKING ICT INFRASTRUCTURE, APPLIANCES, AND SERVICES MORE ACCESSIBLE AND AFFORDABLE IN RURAL AREAS

Mira Slovoa and Michael Barrett

The potential of ICTs to raise incomes in developing countries has often not been fulfilled in more remote rural areas, where low population density and the large areas separating communities limit the profitability of providing services. In many places this has made it difficult for rural populations to access and leverage ICTs. Where these difficulties can be overcome, ICTs can increase agricultural productivity and raise rural incomes. The complex challenges of making ICT infrastructure, appliances and services more accessible and affordable in rural areas is the subject of this module. It begins by defining the concepts of access and affordability and examines challenges that face the service provision chain on both the demand and supply side using an “Access Rainbow” framework. This framework provides a socio-

technical approach to ICT access that includes enablers such as locally-relevant content, ICT literacy, proximal ICT use and social mechanisms for governance of ICT use. A number of current technology trends and policy strategies that are intended to increase rural access to ICTs are examined. The module focuses on three key areas, namely: the role of public innovation in achieving universal access to infrastructure and appliances, content creation for mobile agricultural services, and financial services for agriculture in rural areas. In each of these areas, the module compares key enabling factors surrounding regulation, business models, partnerships, and infrastructure, and draws together lessons that have been learned throughout their development.

Connecting to digital tools through rural satellite technologies in the Amazon.



Photo: Neil Palmer, CIFOR (CC BY-NC-ND 2.0).

STRENGTHENING GOVERNANCE, RURAL INSTITUTIONS, AND CITIZEN PARTICIPATION USING ICT

Cory Belden and Regina Birner

Well-functioning public institutions in rural areas are critical to agriculture development and sustainability. However, these public institutions are often neglected as a result of under-financing, isolation, a lack of technical support, and low levels of human capital. This Module focuses on how ICTs can help governments and line departments provide public services to the agriculture sector. The proliferation of Internet portals, coupled with the spread of bandwidth, has promoted e-governance—where Ministries provide policy and program information, e-services like licensing, taxes, price and agriculture information, as well as outlines of regulatory frameworks

online. These information portals can be accessed through kiosks, telecenters, and sometimes cell phones in remote areas. Governments have also benefited from internal ICT tools like intranets, databases, and electronic data collection software. E-government interventions result in reduced bureaucracy and corruption, improved targeting, and more effective human resource management. This is true for most public services that use ICTs for agriculture. The module examines digitized systems, satellite imagery, cameras, GPS, biometrics, and cell phones used in land administration, insurance, agriculture programs, irrigation systems implementation, and market information systems improve government efficiency, accountability, and responsiveness. Civil society participation in the provision of e-services is also improving governance. Watch dog functions are greatly facilitated by ICTs, which can disseminate information to more citizens at a faster rate. Rural areas are experiencing increases in democratic participation through ICTs. Electronic consultation on policies can be arranged via cell phone or Internet. Innovative forms of communication like blogs, citizen report cards, virtual communities, and Intranet kiosks that allow information sharing between communities also hold potential to improve government accountability and political and agricultural knowledge exchange in the agrarian sector.

ANYTIME, ANYWHERE: MOBILE DEVICES AND SERVICES AND THEIR IMPACT ON AGRICULTURE AND RURAL DEVELOPMENT

Kevin Donovan

This module focuses specifically on one form of ICT, the mobile phone, and its use in agriculture and rural development. With more than five billion global subscribers, the meteoric rise of mobile phones has made them the most widespread ICT in the world. This module posits that as phones increase in sophistication, merging with newer devices like tablet computers, they represent a platform for innovation and service delivery whose promise for agriculture and rural development is already being realized. Drawing on a variety of empirical studies, the various mechanisms through which mobile phones can improve agriculture are outlined. These include enhancing market efficiency, lowering the cost of information, increasing income, and substituting for transportation; however, this module emphasizes the challenges and shortcomings of using mobile telephony for rural development, noting specifically the need to improve complementary infrastructure – such as roads – and the need to carefully design interventions. Building on a survey of real-world examples, this module also recommends

principles for designing mobile agricultural programs, such as participatory design, partnerships, and methods for sustainability and accessibility. Next, the module provides case studies of mobile-mediated extension services in Uganda, market information services in India and West Africa, Nokia software that combines agricultural information with sporting news and entertainment, and a business in Kenya offering crop insurance through mobile money. The module closes with a brief note on how the specific promise for gender equality.

ICT AS ENABLERS OF AGRICULTURE INNOVATION SYSTEMS: RESEARCH, EXTENSION, AND ADVISORY SERVICES

Stephen Rudgard, Peter Ballantyne, Riccardo del Castello, Philip Edge, May Hani, Ajit Maru, Estibalitz Morras, Karin Nichterlein, Enrica Porcari, and Sophie Treinen

Research, extension and advisory services are some of the most knowledge-intensive elements of agricultural innovation systems. They are also among the heaviest users of ICTs. The past decade, has seen a massive increase in ICT use: to power internal systems, processes and services; to enable inter-institutional collaboration, communication and engagement; and to catalyze knowledge co-creation, sharing and use across a wide spectrum of interventions. This module introduces developments in the wider innovation and knowledge systems and some drivers of ICT use in research and advisory systems. The research topic note spans the entire research process from engaging partners and stakeholders, through data

Farmers can use nitrogen sensors to improve accuracy in fertilizer applications.



Photo: Ivan Ortiz-Monasterio, CIMMYT.

collection and analysis, collaboration and knowledge access, publishing and dissemination, to feedback and interactions with rural and other end-user communities. In each one of these areas, ICTs are being used to make research more effective. The second topic note looks at ways that ICTs are helping to transform extension organizations—including the emergence of a new ‘sector’ of public and private innovators and startups with business models built around ICT-enabled advisory services. It examines how traditional and new ICTs are being used to ‘traditional’ extension roles: reaching rural communities, enabling the creation and sharing of rural communities’ own knowledge, and supporting connections of rural communities to markets, institutions and other sources of information and advice. Innovative practice summaries dive deeper into different initiatives and projects—radio in Africa, participatory video in Asia, e-extension in the USA and the Philippines, web communications across the CGIAR, mobile phones and SMS services connecting research with farmers, data and knowledge repositories, and Internet-enabled knowledge sharing, learning and collaboration platforms.

ICT APPLICATIONS FOR SMALLHOLDER INCLUSION IN AGRIBUSINESS SUPPLY CHAINS

Soham Sen and Vikas Choudhary

The food industry has recently undergone a number of structural changes which have created new opportunities for smallholders to raise their incomes if they are able to participate in commercial supply chains. However, including smallholders entails significant challenges—both for agribusinesses and for smallholders. For agribusinesses, interacting with a large group of smallholders implies high transaction and monitoring costs to ensure quality, safety, and timely delivery. For smallholders, participation requires access to the necessary inputs and training, and the need to satisfy stringent quality requirements exposes them to substantial risk. The linkages between smallholders and agribusinesses are fragile, and for trust and mutual confidence to develop, effective communication and transparent interactions are indispensable. ICTs have direct application in facilitating the exchanges and flows of information between parties all along the supply chain, and can be used to manage transactions, arrange logistics, and ensure that quality specifications are clearly understood. This is a particularly critical opportunity for women, who can participate and integrate into supply-chains more effectively through the use of ICT. This module presents topic notes along with innovative activity summaries which

discuss examples of current practice and identify noteworthy trends. These yield practical lessons for both private and public sector led initiatives that seek to apply ICTs in bringing smallholder farmers into supply chains. Case study evidence suggests that agribusinesses have the necessary incentives, capacity, and resources to create and apply technologies that support inclusion. Public sector organizations also play an important role in linking smallholders to supply chains, and have facilitated the creation and deployment of a variety of ICT applications in a range of supply chain activities.

GLOBAL MARKETS, GLOBAL CHALLENGES: IMPROVING FOOD SAFETY AND TRACEABILITY WHILE EMPOWERING SMALLHOLDERS THROUGH ICT

Tina George, Luz Berania Diaz Rio, and Lara Srivastava

Food supply chains today are increasingly globalized. Modern production, processing and distribution systems are interdependent, commingling food from multiple farms, regions, and countries. The need to provide food safety assurance and security across global supply chains is driving technological innovations in make food ingredients traceable. Traceability is becoming an increasingly common element of public (both regulatory and voluntary) interventions and of private systems for monitoring compliance with quality, environmental, and other standards. Traceability allows supply chain actors and regulatory authorities to identify the source of a safety or quality problem and initiate procedures to remedy the situation. In spite of the benefits of traceability in terms of public health, consumer safety, and corporate protection against reputational risks and liability – there are also concerns that requirements may represent barriers to trade for small-scale farmers in developing countries. Smallholders have faced serious challenges in complying with standards, particularly with tracking requirements that use paper-based data collection of sophisticated ICTs. The mobile wireless and nanotechnology revolution offers the potential to change all that as remote producers and smallholders gain access to ICTs. Mobile phones, radio frequency identification (RFID) systems, wireless sensor networks, and global positioning systems (GPS) are some technologies that together form the so-called “internet of things.” These technologies enable compliance with food safety and traceability standards and make it possible to monitor environmental and location-based variables and communicate them to databases for analysis. This module examines the effects of food traceability, and identifies specific implementation systems in the developing world.

A Maasai woman from northern Tanzania with her calf tagged to show that it has just been immunized against East Coast fever. Digital tags are now being used to ease remote tracing and increase reliability.

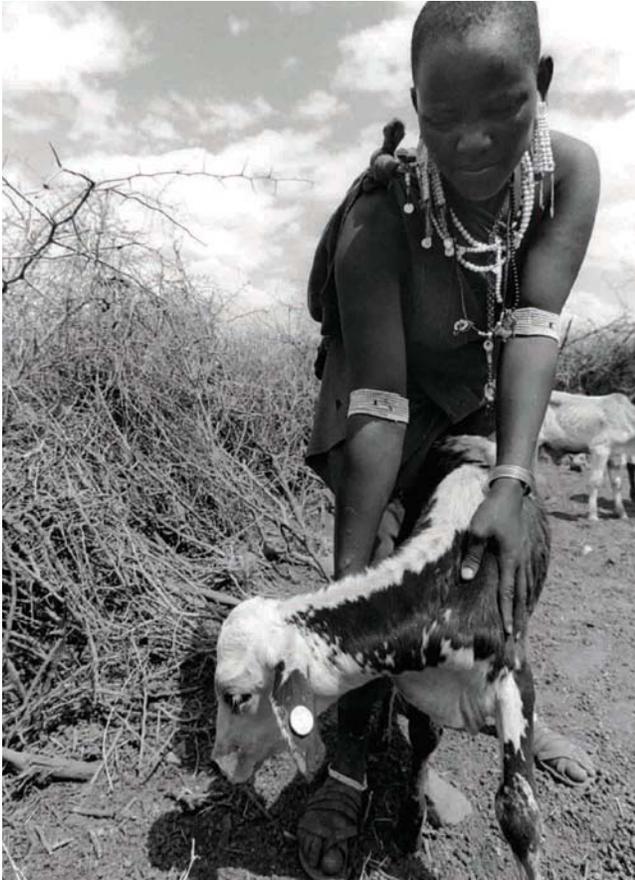


Photo: Mann, International Livestock Research Institute. (CC BY-NC-ND 2.0.)

Examples include seafood safety implementations in Vietnam, Thailand, Chile; livestock traceability in Botswana, Namibia, South Africa, India, Malaysia, China, and Korea; bulk food tracing in Morocco, Palestine, Colombia; fresh produce traceability in Mali, Chile.

ICT FOR LAND ADMINISTRATION

Robin McLaren and Victoria Stanley

Good governance and effective public administration recognize land as the principal source of wealth and indeed wealth generation in a society. No country can develop or sustain a civil society or promote economic development within its boundaries without internal confidence and public acceptance in its land rights and its system of land administration. This module identifies how ICT is more effectively supporting land markets and land reform activities, explores how

more open approaches to Public Sector Information policy and innovative business models are making investments in ICT more sustainable, recognizes how ICT is an essential component of good governance, and details how interoperable ICT approaches to Land Information Infrastructure extend and integrate land administration services into the wider e-government arena. The establishment of land administration systems is complex and lengthy, but ICT solutions using Global Navigation Satellite Systems (GNSS), Continuously Operating Reference Stations (CORS), high resolution satellite imagery are accelerating data capture and maintenance. Adoption of “crowdsourcing” has the potential to further improve coverage. ICT is also having a profound impact on the outreach of land administration services and the accessibility and transparency of land information. Support of customary tenure, access via mobile phones and the use of mobile land offices are eroding previous barrier for the poor and vulnerable, and building trust with civil society. ICT trends in open standards, service oriented architectures, and cloud computing are not only allowing Land Information Infrastructures to be built incrementally with a wider range of solutions, but the inherent interoperability is also allowing the integration of land administration services and wider e-government services. Open Source land administration solutions are now emerging, encouraging local capacity building that leads to increased sustainability through home-grown solutions.

ICT APPLICATIONS FOR AGRICULTURE RISK MANAGEMENT

Soham Sen and Vikas Choudhary

Risk and uncertainty are ubiquitous and varied characteristics of the agriculture sector. They stem from uncertain weather, pests and diseases, volatile market conditions and commodity prices. Managing agricultural risk is particularly important for small holder farmers because they lack resources to absorb shocks. Risk also inhibits external parties from investing in agriculture. Timely information is essential to managing risk. ICTs have proven to be highly cost effective instruments for collecting, storing, processing, and disseminating information about risk. In this module a series of topic notes and innovative practice summaries describe a variety of strategies for managing agricultural risk. They also identify important trends in current practice and a number of practical lessons which have been drawn from recent experience. The module focuses in particular on the role of ICTs in disseminating information for better decision-making by the farmers, for instance the Reuters Market Light in India which

uses mobile phones to send information to farmers. Next, while acknowledging the role of ICTs in making possible the provision of Index Based Livestock Insurance in Kenya, the module concludes that overall there are still limited applications to transfer weather and price risk to third parties. Finally, in describing cases such as Mobile Transfers in Zambia, which allows funds transfers through mobile telephones to farmers suffering from drought, the module points out that while there have been few applications of ICTs to cope with agricultural shocks. However, those that exist are proving important and potentially transformative.

FARMERS' ORGANIZATIONS WORK BETTER WITH ICT

Julie Harrod and Pekka Jamsen

Farmer organizations have important roles in overcoming rural poverty through their services to members. This module examines ways in which such organizations can serve their members more effectively by using ICTs. Documented benefits of ICTs are grouped into three categories – improved connections to members, better accounting and administration, and stronger collective voice. These form the basis for three topic notes. A recurring theme is the lack of basic infrastructure in much of the developing world, so the most successful technologies at present are robust and relatively simple. Millions of farmers that live in isolated rural areas are now connected through mobile phones. Improved connections to members include sharing market and technical information. Cell phone messaging systems of varying sizes and with different funding mechanisms are described and compared. Examples are also given of digital photography and video clips used to share information within and between farmer organizations. Governance is improved in large farmers' cooperatives with computers that produce management and member information quickly and accurately. Better accounting and administration is illustrated by dairy cooperatives where computerized record-keeping has transformed efficiency. Comparisons are made between a largely private-sector approach in India and open-source software developed specially for Kenyan dairy and coffee coops. Farmers' collective voice is stronger and reaches wider audiences with the help of radio and television. Interactivity is possible through phone-in programs and by sending SMS messages. Radio and television are also effective tools for agricultural extension. Interactivity through websites is becoming more important for farmer organizations, but less so for individual smallholder farmers.

Training and public services are made more accessible through the use of ICT.



Photo: Nadia Manning, ICT-KM

USING ICT TO IMPROVE FOREST GOVERNANCE

Tuukka Castern and Madhavi Pallai

Good governance in the forest sector is essential to ensuring a balance between economic benefits, livelihoods and environmental sustainability. The recent focus on reducing emissions from deforestation and forest degradation (REDD+) to reduce the impacts of climate change, has given the issue even greater prominence. This module focuses on how ICT applications can be harnessed to improve governance in the forest sector. This can be achieved through enhancing public participation and transparency, making enforcement more efficient, as well as improving forest management. The module uses the World Bank Framework for Forest Governance to assess the potential of ICT applications to address different aspects of governance. The Framework comprises of five main pillars of governance: i) transparency, accountability and public participation, ii) stability of forest institutions and conflict management, iii) quality of forest administration, iv) coherence of forest legislation and rule of law, and v) economic efficiency, equity and incentives. Several examples of ICT applications that address the key elements in each pillar of governance are discussed. The module focuses on access to the technologies by key users. It examines issues of cost, and the question of what works under 'real world' conditions, including the potential for replication and scaling up. Some of the applications discussed are from other sectors, but can readily be adapted to the forest sector. The examples discussed include a wide range of technologies – from internet social media and mobile phones to remote sensing and GIS.



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