Creating Sustainable Businesses in the Knowledge Economy

Information & Communication Technologies (ICT) in Agriculture Sourcebook: Project Concept Note

Contents
1. Introduction .................................................................................................................. 2
2. Context .......................................................................................................................... 2
3. Objectives and Audience ............................................................................................. 4
4. Scope and Structure ...................................................................................................... 5
5. Methodology .................................................................................................................. 9
6. Outputs .......................................................................................................................... 9
7. Dissemination Plan ....................................................................................................... 10
8. Time Frame .................................................................................................................. 11
9. Review Process ............................................................................................................ 11
10. Coordination .............................................................................................................. 12
1. Introduction

There is growing recognition within the Bank and the broader development community of the potential contribution of information and communication technologies (ICT) both in achieving sectoral development objectives and in contributing to broader economic, social and institutional development. In the Agriculture and Rural Development sector, this growing interest in ICT is generating strong demand for evidence, new approaches, business models, good practices and design guidance in using ICT effectively and appropriately in agriculture and rural development projects, and in including ICT in dialogue with country counterparts about agricultural and rural development strategies and programs. Yet in many cases, concrete evidence of ICT’s impact remains incomplete, and guidance on proper design and deployment of ICT interventions in sectoral work is not always easily accessible. At the same time, innovation in ICT devices, applications, services and business models is rapid and unpredictable, and it is becoming increasingly difficult for Bank staff to keep track of these evolving solutions and models, the opportunities they create, and their implications for policy and program design.

The ICT for Agriculture Sourcebook is designed to provide, in easy-to-use, modular and updatable form, guidance for Task Managers and other Bank staff (as well as others) in understanding current trends in ICT as they pertain to agriculture and rural development, and the contributions that ICT can make to enhance ARD strategies and projects; designing and implementing appropriate and sustainable ICT components of ARD 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. It will incorporate good practice examples, the latest analytical approaches, and evidence from recent global experience.

Given the rapidly-changing nature of these tools, approaches and business models, the Sourcebook will be designed as a "living" resource with a facility for ongoing stakeholder and expert input of new evidence, examples and cases, and resources for regular updating of the Sourcebook modules. Each of the modules will also be available independently in both print and electronic formats to facilitate their broad dissemination to interested stakeholders.

2. Context

It has long been understood that information and communication play a vital role in agricultural development and in rural development more broadly. Yet the contribution of information and communication technologies (ICT) to agriculture is less well-understood, and rapidly changing. New technologies, new applications and new business models -- and their wider availability and affordability -- are enabling widespread innovation in addressing the needs of poor farmers. Yet evidence of impact, and rigorous analysis of what works under what conditions, still
lags behind these rapid changes. At the same time, these technologies are driving changes in agriculture that make it even more urgent to understand their potential and pitfalls. The dramatic and rapid expansion in global information and communication networks in the past decade, and the concomitant proliferation of new information and communication devices, applications, services and business models pose significant new opportunities -- and new challenges -- for developing country agriculture and for rural poor populations. Globalized food markets have both opened new market opportunities for developing country agriculture and created new risks and volatility, including new challenges to food security, and risks of marginalization from agricultural value chains that increasingly depend on technical sophistication for speed, scale, customization and food safety.

The information and communication intensity of global agriculture has increased dramatically, as globally-traded commodities and the demand of a growing global middle class for higher value-added, more diversified food products necessitate more time-urgent and contextualized information about crop varieties, supporting technologies, market trends, trading partners and the competition. At the same time, poor smallholders face an increased risk of being left at the "bottom of the value chain", seeking to earn income from commodity crops that are increasingly volatile in price while being faced with substantial information disadvantages (impediments and costs imposed in part by physical isolation, weak infrastructure and asymmetric access) that continue to limit their leverage at market and their ability to innovate in response to changing demand. In terms of inclusive, sustainable agricultural and agro-enterprise development, these represent important market failures.

The twin challenge for developing country agriculture, then, is to harness the power of ICT to compete in complex and rapidly-changing regional and global markets while empowering poor smallholders with information and communication assets and services that can increase their productivity and income and protect their food security and livelihoods. This requires developing countries to undertake a complex set of policy, investment, innovation and capacity-building measures, in close coordination with international donors, the private sector and other partners, to encourage the growth of locally appropriate, affordable and sustainable ICT infrastructure, tools, applications and services for the agriculture sector and the rural economy.

The increasing diversity and complexity of global agriculture, and the speed of global innovation in ICT tools, services and business models, require in turn a flexible approach to these policy and investment choices that focuses not on "choosing winners" among ICT options but on maximizing conditions for local innovation and creative public-private partnerships to expand ICT access and services. Certain lessons about policy, regulation and investment in the ICT sector remain relatively stable over time -- the key one being the importance of competition and private sector innovation as the driver of affordable and locally appropriate ICT services. Yet the rapid evolution both of the technologies
themselves and of the way people and businesses deploy and use them (including entirely new business models and types of service) increases the importance and urgency of good guidance to Bank staff and their developing country partners on how best to harness these opportunities.

3. Objectives and Audience
The objective of the ICT for Agriculture Sourcebook is to provide Bank Task Managers, their counterparts in client countries, and other key policy makers and practitioners with:

1. a framework for understanding the contribution of ICT to agricultural development and for incorporating ICT in agricultural development strategies, investments and programs;

2. concrete guidance on, and successful examples of, effective ICT implementations in a range of key sub-sectors;

3. frameworks and models for the complex investments and partnerships that are required to extend affordable ICT access and services to agricultural stakeholders and key institutions of the rural economy and promote locally-appropriate ICT innovation;

4. strategies and tools for assessing the effectiveness and impact of ICT components of ARD projects;

5. Additional, regularly-updated resources for further research and analysis;

6. Tools for stakeholder feedback and inputs on new models, evidence and good practices to enhance and update the modules.

The Sourcebook will focus on providing practical, hands-on advice for operational staff and policy makers in designing effective ICT-for-agriculture initiatives. At the same time, it will seek to provide a broader analytical framework that helps readers to understand the rapid changes in the field, the opportunities and constraints they create, and how to design programs and partnerships that promote ongoing innovation and flexibility to adapt to these changes. This is especially important since there are no immutable, global "best bets" in this rapidly-changing field, and yesterday's "success story" might quickly be replaced by innovations in technology, applications and business models that spring up in response to the constantly-changing challenges and demands on the ground.
4. Scope and Structure

The Sourcebook content will have a structure somewhat similar to that of the Agriculture Investment Sourcebook. After an introductory chapter that provides the analytical framework and an overview of current trends and issues at a "macro" level, the Sourcebook will be divided into several Modules on key subjects. Each Module will have a short introductory section (6-8 pages) followed by a series of Topic sections, each of which will have two components:

1. a 4-to-6 page Topic Note that frames the issue, summarizes current knowledge, outlines key policy and implementation issues, reviews lessons learned, offers recommendations for practitioners, and provides references for further reading. This Topic Note will also have a short section on "designing effective and sustainable projects" that explains the key assessment and design criteria for developing projects, and the major enablers (such as policy, regulation, infrastructure, financing and human capital) that will affect the success of projects in that subject area.

2. a 4-to-6 page Innovative Practices Summary that highlights effective examples of ICT interventions that have addressed the challenges posed in the Policy and Investment note.

The full details of the structure and content of the Toolkit will be determined in consultation with a range of Bank Group stakeholders, but a proposed indicative structure and timeline follows.

Proposed Module Structure

<table>
<thead>
<tr>
<th>Name of Module (responsibility)</th>
<th>Primary Focus/Targets of Interventions</th>
<th>Indicative Topics for Inclusion in the Module</th>
<th>Year of Completion</th>
</tr>
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<tbody>
<tr>
<td><strong>1</strong> Introduction: The contribution of ICT to developing-country agriculture: A conceptual framework for analysis, policy and investment (K. McNamara)</td>
<td></td>
<td>Addressing Gender Differentials in Access, Appropriation and Use of ICT</td>
<td>FY10</td>
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<td><strong>2</strong> Design and Implementation of Effective ICT-for-agriculture projects: Principles and Tools (Core team)</td>
<td>(Task teams and their implementation partners: policy makers)</td>
<td>Designing sustainable business models for ICT-for-agriculture services: demand stimulation, affordability, cost recovery and scalability Assessing impact of ICT interventions: randomization, natural experiments and other</td>
<td>FY10</td>
</tr>
</tbody>
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|   | **3. Improving smallholder productivity with ICT**  
(Eija Pehu) | Smallholders and poor rural agricultural laborers | **tools and approaches**  
Effective and appropriate partnerships: who does what best, with whom? | FY10 |
|---|---|---|---|---|
|   | **4. Strengthening agricultural markets with ICT**  
(Grahame Dixie & colleagues?) | Smallholders, producer organizations, cooperatives, traders and other key participants in local agricultural output markets | **Connecting smallholders to markets:** strengthening market information and transaction services and systems  
**Making agricultural markets more transparent and efficient with less price volatility** | FY10 |
|   | **5. ICT and Rural Finance**  
(R. Kloepinger-Todd and Ajai Nair) | Financial institutions and other providers of finance and related services to the rural poor | **Extending rural access to financial and insurance services through ICT** | FY10 |
|   | **6. Strengthening rural governance, institutions, and collective action with ICT**  
(Pekka Jamsen, Regina Birner, Advansis, Lemola) | Local government institutions and services, farmer cooperatives, NGOs | **Delivering effective and accountable government-funded services in rural areas**  
**Empowering intermediary institutions with ICT:** cooperatives, extension institutions, community organizations, farmer networks, etc. | FY11 |
|   | **7. Making ICT infrastructure, appliances and services more accessible and affordable in rural areas**  
(Mira Slavova, IFPRI and Michael Barrett, Univ of Cambridge) | Providers of ICT infrastructure, applications and services; local businesses; government regulators and policy-makers | **Extending rural ICT infrastructure:** regulation, policy, partnerships and technical innovation  
**Cheap laptops, multi-function mobiles, and other technical innovations to watch**  
**Stimulating demand, expanding supply:** building sustainable business models for ICT services in rural areas  
Grameen Phone, e-Choupal and beyond: the | FY10 |
<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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<tr>
<td>8.</td>
<td><strong>Anytime, Anywhere: Mobile Devices and Services and their impact on agriculture and rural development</strong> &lt;br&gt;Kevin Donovan, InfoDev team&lt;br&gt;&lt;br&gt;Task Teams and their implementation partners considering mobile solutions for a range of ARD interventions</td>
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<td>9.</td>
<td><strong>Strengthening and diversifying agricultural research, extension, advisory services and innovation through ICT</strong> &lt;br&gt;Stephen Rudgard, FAO&lt;br&gt;&lt;br&gt;Agricultural research and extension institutions and agents; other providers (public, private and non-profit) of agricultural research, training and advisory services</td>
</tr>
<tr>
<td>10.</td>
<td><strong>Building stronger and more inclusive agricultural value chains</strong> &lt;br&gt;John Lamb, tbc&lt;br&gt;&lt;br&gt;Firms and intermediaries involved in agricultural supply chain integration; commercial farms; producer organizations and farmer cooperatives</td>
</tr>
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<td>11.</td>
<td><strong>Global Markets, Global Challenges: Improving food safety and traceability while empowering small producers</strong> &lt;br&gt;Tina George, Lara Srivastava InfoDev&lt;br&gt;&lt;br&gt;Agro-processors and supply chain integrators and the farmers and farmer networks they interact with; food safety agencies</td>
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<tr>
<td>12.</td>
<td><strong>ICT for Land Administration and</strong> designers and implementers of</td>
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| **Natural Resource Management**  
(Klaus Deininger & Marjorie-Anne Bromhead, Jon Padgham, tbc) | projects in land administration, natural resource management, biodiversity, | **Using Water well: Sensor technology and smart irrigation**  
The role of Geographic Information Systems in land administration and natural resource management  
The role of ICT in monitoring and adapting to the impacts of climate change on land and water resources |
|---|---|---|
| **13. Managing environmental risk in agriculture: ICT for monitoring and early warning**  
Marc Sadler | Weather monitoring agencies; cooperatives and producer organizations; government disease and pest monitors; | **Localizing weather monitoring, forecasting and reporting to benefit smallholders**  
*Saving Crops, Saving Lives: ICT and early warning of natural events*  
*Improving disease and pest monitoring with ICT* |
| | | **FY11** |

This content will be produced and delivered in a flexible and readily-updatable format based on the goal of making each Module, and the entire Sourcebook, a "living document" that reflects the rapid changes and innovations taking place both in access and affordability of ICT tools and services and in the application of ICT to the challenges of developing country agriculture.

The "core" ESW project proposed in this Concept Note is the preparation and dissemination of the first edition, in print and electronic form, of the Sourcebook containing the Modules listed above. The print version of the Sourcebook will be produced in modular form, with each Module printed as a separate bound document all enclosed in a custom-designed Sourcebook folder or binder. The electronic version (web and DVD) will contain all Modules as separate downloadable documents, with each sub-module element being a separate PDF file that can be printed independently. The "core" ESW project will also include the creation of a Web facility (either in WIKI form or in another format that permits outside contributions) that enables and welcomes stakeholders and practitioners to submit evidence, examples, data and innovative practices for each module, as the basis for a subsequent updating of each Module. Input will also be welcomed on the conceptual model/framework module and on suggestions for future modules to add to the Sourcebook. A modest amount of staff resources from Bank units and partner organizations will be sought to moderate the emerging "communities of practice" around each Module and to screen suggested inputs and changes for relevance and quality control.

During the course of this first phase represented by this ESW, the core team led by Eija Pehu (ARD) and Tim Kelly (Infodev) will develop partnerships, and seek additional funding, to support a multi-year process of yearly updating of the
Modules based on the inputs from these "communities of practice" around each Module that will be enabled by the Web facility. The updated Modules will be available in electronic format (and downloadable for printing) but will not be re-issued as bound printed documents unless funding permits.

5. Methodology
Each Module of the Sourcebook will be the responsibility of a team of Bank staff, partner institution staff, and consultants as appropriate. ARD will cooperate closely with Infodev, but since this is an ARD ESW product, will retain overall responsibility for the coordination, coherence and quality of the Sourcebook. ARD team will engage authors for most of the modules, while Infodev takes the lead on three modules, which are within their specific technical area (modules 7, 8 and 11).

Each Module team, in coordination with ARD and Infodev (and using common tools for online communication provided by the Sourcebook core team) will reach out to partner organizations, experts and practitioners during the entire process of planning, researching and drafting their Module, both to access the most timely and relevant information, analysis and examples and to begin to build an online community of practice around the Module that will continue to contribute even after the first version of each Module is completed and published. In addition to this online consultation, each Module team will also draw its evidence, examples, analysis and lessons from two major sources:

1. extensive reviews of existing theoretical literature, project evaluations, economic and sectoral analyses, and related literature and evidence (including data sets) from the Bank and other partners;

2. interviews with Bank operational staff, other donor staff and developing country partners engaged in current projects related to ICT and agriculture, or projects that have a significant information/communication component;

The Sourcebook core team will provide technical and design support to each Module team on how to organize effective, ongoing communities of practice in support of each Module.

6. Outputs
The core ESW output will be a World Bank-published Sourcebook (available in print, on DVD and on the Web) that provides analytical tools, operational guidance and good practice examples for the development of effective policies, programs, investments and capacity building initiatives designed to enhance the contribution of ICT to agricultural development. This core Sourcebook will consist of the
introductory chapter and several of the key modules described above. Data sets, case studies, and related information and evidence developed or compiled during the preparation of the Sourcebook will also be made publicly available.

Each Module of the Sourcebook will also be available as a free-standing electronic file, and each Topic Note and Innovative Practices Summary will be formatted so that it can be separately downloaded and printed.

However, as discussed above, given the breadth and rapidity of ongoing innovation in ICT tools, services and business models as they apply to agriculture and rural development, the Sourcebook will be designed as a dynamic and "living" resource. A suite of online participatory tools (including discussion lists and WIKI editable versions of each module) will permit a broader range of stakeholders to propose revisions, additions, new examples and data for inclusion in the modules and in the introductory chapter. These will be reflected in the online version of each Module as received (subject to screening by a Moderator) and incorporated on a regular basis (yearly or every six months, depending on resources and the rapidity of changes in the individual topic) into updated, formatted, downloadable versions of each module. Partnerships with other key stakeholder and expert organizations will be sought to sponsor and organize this ongoing dialogue and updating of the Sourcebook.

The goal of this approach is for the Sourcebook to "practice what it preaches" about the potential of ICT, by serving as a model of how such ESW projects can be designed and implemented in a more dynamic and participatory fashion, particularly when they focus on subjects that are continually and rapidly changing.

7. Dissemination Plan
The "core" Sourcebook will be published and printed as an official World Bank publication and distributed through the Bank's official publication distribution system. It will not, however, be bound as a single large document, but rather as a series of separately-bound modules contained in a custom folder or binder. (The Port Reform Toolkit of several years ago offers a model). It will also be made available on the ARD, SASKI and Infodev websites and linked to the websites of all key collaborating World Bank units and external partners. A workshop will be held in Washington to launch the Sourcebook, with videoconference participation of key partners from developing countries. Thematic groups both within ARD and throughout the Bank will be encouraged to distribute electronic copies of relevant Topic Notes to their constituencies and to raise broader awareness of the Sourcebook, particularly to encourage participation in the ongoing community of practice around each module.

In a larger sense, the "Dissemination" plan will really begin with the participatory process of engaging a range of partners and stakeholders in contributing to,
commenting on, improving and updating the various modules both during the formal ESW phase of this activity and afterwards.

8. Time Frame

March-April 2009  Task Force of World Bank stakeholders meets to finalize format, analytical framework and scope of Sourcebook and to agree on distribution of lead responsibility for Modules

May-June 2009  Internal World Bank ESW review process finalized; Sourcebook approved as ESW; funding secured May 2010

June 24, 2010  Planning meeting of full Sourcebook team including lead coordinators of the modules

October 2010  First review session for drafts of each module

Oct-Dec 2010  Peer reviews of modules

Feb 2011  Peer review of the entire Sourcebook

April 2011  Editing, layout and other production details completed

May 2011  Full Sourcebook goes ‘live’ on the web.

9. Review Process

There will be eight (8) overall Reviewers of the Sourcebook (listed below), including experts in the operational and policy dimensions of agriculture and experts in ICT policy, infrastructure, applications and project design. In addition, each Module team will select 2-3 Reviewers with specific expertise on the module topic.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Name of reviewers</th>
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<tbody>
<tr>
<td>Internal</td>
<td></td>
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<tr>
<td>WB</td>
<td>Shobha Shetty, EASRE</td>
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<tr>
<td>WB</td>
<td>Deepak Bhatia, CITPO</td>
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<tr>
<td>WB</td>
<td>Samia Melhem, CITPO</td>
</tr>
<tr>
<td>WB</td>
<td>Fionna Douglas, ARD</td>
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</tbody>
</table>
10. Coordination
Core responsibility for project coordination and overall quality and coherence will rest with a core ARD/infoDev Task Team consisting of:

- Task Team Leader: Eija Pehu, Adviser, ARD (202-458-2422) ; Co-TTL Tim Kelly, infoDev (202-458-9839)

The TTLs are supported by assistant staff in ARD and infoDev.

A broader World Bank Task Force will be responsible for guiding the overall design and implementation of the ESW; assuring its relevance to operational needs of Bank staff; and mobilizing evidence, networks and experiences to support the content of the various modules. Members will include:

- At least one ARD regional colleague from each Region (e.g. Grahame Dixie, SAR; Iain Shuker, EAP; Matthias Grueninger, ECA; Pierre Rondot, MNA; Indira Ekanayake, AFTAR; Willem Janssen, LCR)
- Other Bank Group colleagues with relevant expertise, including colleagues from GICT/infoDev; and WBI will also be invited to support the Sourcebook development.

The core Task Team will provide guidelines and templates for the format of the Modules, including models and templates for the Module Overviews, Topic Notes and Innovative Practice Summaries. Day-to-day coordination of contracting contributors, Task Force correspondence, and production/publication will be the responsibility of the ARD team. The Task Force will select Module Coordinators, who will be responsible for the overall design and content of each Module (in consultation with the Task Force), selection of module component contributors; and Module quality control.