

REALIZING THE POTENTIAL OF DIGITAL TECHNOLOGIES FOR AGRICULTURAL DEVELOPMENT IN AFRICA

Towards affordable, usable and integrated ICT solutions

Information and Communication Technologies (ICTs) are increasingly accessible and affordable worldwide. This trend has raised high expectations regarding their potential to revolutionize smallholder agriculture by providing farmers with access to information, markets and financial services. Despite the increasing rates of mobile usage and investments in the development of these technologies, uptake of agriculture-specific ICT solutions has been low and few have scaled up to achieve profitability and significant quantifiable impacts. But the technological dream is still possible. ICTs can conceivably lead to large productivity improvements. Achieving their widespread use among smallholder farmers will require affordable solutions that are adjusted to the capacities of the users and their devices. At the same time, investments in more sophisticated ICT solutions higher up in the value chain can also benefit smallholder farmers.

ICTs in Agriculture: Promises and Challenges

Mobile phone use has expanded at an astonishing speed across the developing world. While penetration rates in Sub-Saharan Africa are still low compared to the global average (43% in 2016 according to the GSMA), the region is the fastest growing market. Nowhere is the promise of ICTs more evident than in Kenya where the mobile financial service M-Pesa has proved wildly successful. M-Pesa, which is run by the Kenyan mobile network operator Safaricom, allows users to transfer money using a simple mobile phone interface and offers microfinancing services.

Because of its obvious potential, there is much enthusiasm among businesses, international institutions, governments and researchers for ICTs in agriculture, or “e-agriculture”. Governments and development agencies have jumped on the bandwagon and began initiatives to spur the development of ICTs directed at agriculture. The ICTs highlighted as having the most potential for

smallholder agricultural systems include:

Informational ICTs provide farmers with real-time information about environmental conditions, farming best practices or nearby market prices, allowing them to make better management and marketing decisions.

Precision agriculture and technology improve production processes and provide plot-specific data through the use of increasingly affordable advanced technology, such as GPS, sensor networks, drones and smart technology.

Marketing ICTs connect actors at different levels of the value chain, facilitate payments between buyers and sellers, increase traceability of products, and enable farmers to enter new markets.

Financial services delivered via mobile phone facilitate business transactions, record keeping of financial transactions, savings, group lending, credit provision and agricultural insurance.

However, to date, ICT applications in agriculture have yet to live up to their promise in Africa. Challenges include the underdeveloped technological infrastructure, unreliable electricity, low digital literacy and the widespread use of low-tech devices in rural areas. These impede the development of more ambitious ICT projects. The demographics of the potential beneficiaries also pose a challenge. Agricultural producers in developing countries are predominantly low income smallholder farmers. Many of them are older and often less technologically literate than the younger generation. Willingness to invest in these technologies is hampered by the fact that they are still in their infancy stages and profitability is far from guaranteed.

The setup of existing ICT solutions also hinders their widespread adoption. There are currently a myriad of small, disjointed initiatives and their user-friendliness varies widely. As a result, farmers cannot easily access different services that are potentially complementary through their mobile device. In addition, mobile solutions are often developed with insufficient regard for



user capacities and the context in which they are provided. Too often, the services are technology-driven rather than developed with a problem in mind that determines the choice of solution and delivery channel.

Strategies for scaling ICT solutions in agriculture

To stimulate uptake of ICT solutions among smallholder farmers, such solutions need be compatible with technologies that are already widespread, and be affordable and very easy to use. Good candidates that fit these criteria include informational ICTs that can be automated and disseminated via SMS, such as localized weather information or subscription services to receive standardized instructions. In the longer term, the widespread use of simple technologies can lead to more technologically advanced innovations, as farmers learn to navigate the technology, and as providers gather data about how ICTs are used and tweak them to ensure they better meet end-user needs.

To expand the range of applications, ICT solutions

Policy Recommendation:

- **Leveraging extension services:** engage extension service agents to facilitate use of and offer complimentary training on ICT-enabled services to smallholders
- **Skill development:** invest in digital literacy training as part of school curricula
- **Evidence-based scaling:** gather data on users, usage and impacts to inform the design and dissemination of ICT solutions
- **Complementarity of services:** improve the integration of multiple services through online platforms to host, connect and scale the dispersed individual applications

should combine technologies with different complexities, thereby taking advantage of advanced ICTs while also catering to low-income, low-tech farmers. More sophisticated technologies can be employed to run the system, such as sensors or tracking devices in supply chain management, weather stations in insurance, or cloud-based systems to manage registrations or payments. Engaging different players in the value chain, such as collection points, processors, financial institutions, extension agents, agro-dealers or dedicated m-service agents, will be crucial. They can use the more complex aspects of the digital services while simple delivery technologies, such as SMS and voice, or human intermediaries can then be used to reach farmer.

Policy Recommendation:

- **Broader scope:** expand the diversity of ICT solutions by harnessing a wider range of ICTs and targeting users along the entire value chain
- **Local innovation:** create an enabling environment for local ICT entrepreneurs, including regulatory frameworks, an attractive investment environment, improved network infrastructure and incubation spaces
- **Skill development:** increase training opportunities for e-agriculture entrepreneurs by integrating relevant topics in university curricula and developing specific courses and training centres

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