



Ministry of Agriculture and Livestock Development
State Department for Crop Development
P.O. Box 30028, Nairobi



Emergency Locust Response Program
P.O. Box 30028, Nairobi



Kenya Agricultural & Livestock Research Organisation
P.O. Box 57811-00200, Nairobi



The World Bank
P.O. Box 30577-00100, Nairobi

Sustainable Agricultural Livelihood Restoration, Rehabilitation and Resilience in Kenya Training Manual

4.1.1 SUB-MODULE 1: ICT TOOLS FOR AGRICULTURAL PRODUCTION

Information and Communication Technology (ICT) initiatives seek to improve agricultural value chains and agribusinesses. Many ICT solutions entail improving access to reliable and timely information. Inequity in access to information allows those with information to take advantage of those without it (often farmers), even though much of the information is technically within the public domain. Because of the ever-lower costs and growing ubiquity of ICT, such as mobile phones and the networks needed to connect them, new avenues have been opened, offering critical information to farmers, small traders and business people. There are three types of ICT solutions, categorized in terms of the end result for the consumer: ICT for production systems management, ICT for market access services, and ICT for financial inclusion. All these platforms rely on data collection ICT tools such as smartphone-aided digital tools such as ODK and Kobocollect, mobile phones using short messaging service (SMS), personal data assistants (PDAs), radio-frequency identification (RFID) tags, geographic information system (GIS), and remote sensing. Electromagnetic and photographic data can also be recorded and transmitted remotely by satellites, aircraft or unmanned aerial vehicles (UAVs).

ICT tools for agricultural production

The ICT tools that facilitate production systems management are the most prevalent category of ICT service for inclusive agricultural value chains. The information services involve four categories: (i) short-term productivity, such as weather information to help farmers decide when to plant or harvest; (ii) long term productivity, such as training on proper fertilizer usage; (iii) minimizing the negative effects of crisis events, such as information on how to protect crops from migratory pests or drought; and (iv) improving field-based risk management, such as information on the implementation of crop rotation to preserve the soil. The ICT tools for production systems therefore rely on information that is linked to helping farmers improve agricultural productivity, yields and profitability while minimizing risks. This covers ICT applications for production systems that involve short- and long-term productivity enhancement, minimize the negative effects of crisis events, and improve field-based risk management.

ICT tools for market access services

These include services that facilitate farmers' access to information on pricing of agricultural products such as inputs and outputs. In addition, they offer connections to and knowledge of suppliers, buyers and logistics service providers such as storage facilities and transport companies. These services also include ICT solutions that help the typically larger upstream and downstream firms, such as processors or exporters, to better manage their operations and the quality of the produce.

ICT tools for Financial Inclusion

This entails ICT solutions that allow formal and semi formal-financial institutions and direct value chain players (e.g., using trade credit) to provide financial services in a more convenient, secure, flexible and affordable manner.



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Criteria for selecting ICT tools for agricultural production value chains

The ICT tools are widely used to collect data, with the choice of technology depending on the kind of data needed. Another criterion concerns the need for an overall enabling framework for the utilisation of ICT technology in a given country. This macro condition puts in place regulatory framework that enables the establishment of ICT infrastructure. The more effective this framework is the less the effort required to tailor strategies that lead to increased application of ICT in agricultural production value chains. This is because a proper regulatory framework increases the chances of having basic expertise and infrastructure to build on. The following criteria should be considered when planning to use ICT for enhancing agricultural production value chains:

End user needs

There are many potential uses of technology for improving the agricultural value chains, but not all can be applied. Multifaceted technology can complicate adoption and utilisation process, confuse various players and become costprohibitive. The ICT implementing party should therefore first listen to the end users and prioritize the challenges to be addressed. The target ICT users must be empowered to express their requirements and take a leading role in technology development, adoption and utilisation. Without end-user involvement, well-intentioned outsiders will make mistakes, perhaps even fail the process.

Functional stability

There are many areas of improvement in the traditional agricultural value chains. It is therefore often more appropriate to use ICT solutions that have already been proven in other more advanced industries or use cases. There is seldom any need for agricultural value chain to use the most state-of-the-art technology, which often can have many bugs and other problems to be resolved.

Existing infrastructural support

Building communications structures from the ground up is a very complex and expensive endeavour and adoption of existing infrastructure, increase the likelihood of success. Examples of existing infrastructure include weather stations, mobile phone networks and satellite networks. Infrastructure that is in place for one purpose can often be used to serve an additional purpose/industry, such as GPS technology, which was originally only for military purposes. However, the ICT implementing agency must be careful with assumptions regarding the growth or improvement of infrastructure, whether by government providers or private players in the area.

Affordability and simplicity

Many of the new ICT solutions require significant increases in bandwidth and computing power. The rural poor may however not be able to use such services because networks are inadequate or too expensive to use regularly. In addition, agricultural value chains are particularly complex ecosystems with many different players, often fragmented among many small players such as input suppliers, retailers or smallholder farmers. The simpler the ICT solution to implement and use, the lesser the cost and the higher the likelihood of adoption.



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Usability and maintenance capacity

It is necessary to think about not only the implementation phase of an agro-based ICT solution, but also how the solution will be maintained, especially if the promoting agency will not be present in the long term. It will often be necessary to bring on technical expert partners (preferably based locally), hardware and software vendors and, possibly, systems integrators to help ensure that the solution is implemented and maintained well. Those with few resources might do well to partner with larger, private companies, to take advantage of not only their technology infrastructure but also their expertise and general support.

Scalability, replicability and viability

Successful agricultural value chain ICT projects are generally successful when the fixed costs can be spread across wide usage of the technology. For instance, when there are many users, frequent usage and perhaps different types of usage. Ideally, a solution initially tested and used in one type of geographical area should be easily implemented in another, with relatively low incremental costs. The issue of scale feeds directly into viability. Self-sustaining models with a clear revenue generation plan and/or financing model have a greater chance of success than those based solely on donors. If the solution does not generate revenue directly, clear and monitored cost and efficiency gains should be stipulated and tracked. Practitioners may do well to begin their endeavours with a clear for-profit and scaling strategy in mind or even with a for-profit partner that views the endeavour as a true business opportunity and not just a corporate social responsibility exercise.