



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA



## Policy Brief

### ICT4AGRICULTURE: EXPLORING INFORMATION AND COMMUNICATION TECHNOLOGIES FOR AGRICULTURAL DEVELOPMENT Key lessons, challenges and recommendations

#### BACKGROUND

The South African government is committed to the provision of cost-free public extension<sup>1</sup> and advisory services to support the development of the agricultural sector, especially emerging smallholders.

Sharing of relevant technical and market-related information, and facilitating appropriate skills development to enhance farm productivity has the potential to play a major role in the sustainable development of smallholder agriculture in South Africa.

The Department of Agriculture, Forestry and Fisheries provides free extension and advisory services to smallholders. Private companies also provide such services, and agricultural commodity organisations like Grain SA, Potato SA and the Red Meat Producers' Association<sup>2</sup> provide commodity-specific services.

However, the efficiency and effectiveness of efforts and investments in such services (especially to smallholders), are currently hampered by challenges such as

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<sup>1</sup> Agricultural extension involves providing information to farmers to improve agricultural practice and output.

<sup>2</sup> <http://www.agrisa.co.za/about-us/>

the low extension practitioner-to-producer ratio; uncoordinated efforts from various extension support agencies; limitations in the extension education system and the narrow service focus; the lack of a national policy and regulatory framework for extension, and poor linkage between researchers, extension practitioners and producers.

To support the development of efficient and effective extension and advisory services, the Department of Science and Technology (DST) commissioned the Agricultural Research Council (ARC) to carry out a pilot project on the ICT-enabled delivery of these services.

## **PROJECT DESCRIPTION**

The ICT-Enabled Extension and Advisory Services Delivery pilot project explored the potential of ICT-based information-sharing and communication platforms to improve access to high-quality agricultural development information, mainly by agricultural advisors. It also looked at supporting young agricultural graduates to explore the commercialisation potential of extension services, in this way contributing to economic development as well as sustainable agriculture.

The project included entrepreneur development, and employment opportunities for unemployed agricultural graduates in the area of information brokering for agricultural development. The project focused on giving graduates agricultural extension and entrepreneurship skills and helping them to start advisory-service-based businesses, complementary to public extension efforts, aimed at strengthening the link between research information outputs and farmers. The project began in March 2014 and over the years 28 graduates from diverse agricultural <sup>3</sup> training backgrounds have been contracted to the project in Mpumalanga, Limpopo, KwaZulu-Natal and the Eastern Cape for 18-month periods. The graduates were trained and mentored in the areas of extension and entrepreneurship with support from the ARC and local extension service offices.

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<sup>3</sup> BSc/BCom/BAgric Agricultural Economics, Agronomy, Agribusiness, Animal Science and Extension

## WHY USE ICT?

The knowledge generated by research allows for continuous improvements to and innovations in agriculture, and is crucial in ensuring a diverse, resilient, productive and sustainable agricultural sector. However, the flow of information between researchers and producers is often not as good as it could be. Researcher-extension practitioner-producer interactions should see information transferred to and from all parties. ICT can facilitate substantial improvement in this regard. ICT4Agriculture, or e-Agriculture, refers to the conceptualisation, design, development, evaluation and application of innovative ways to use ICT for agriculture in the rural domain, with a primary focus on enhancing sustainable agricultural development, food security, livestock production and rural development.

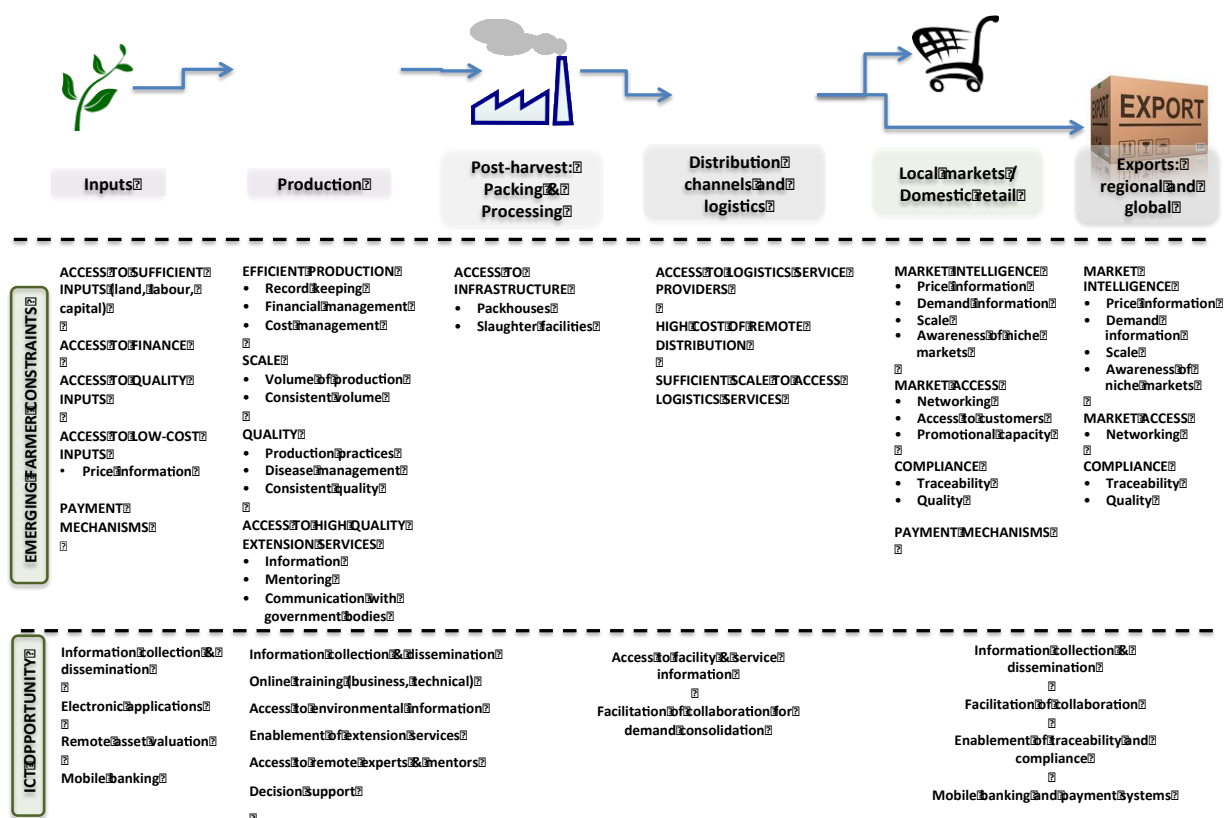
A major challenge for extension is the lack of capacity. The demand for extension and advisory services varies according to the size of the farm and nature of the farming being done (i.e. crop farming, livestock farming or mixed farming systems, involving both crops and livestock). While market-oriented, large-scale producers have a high extension practitioner-producer ratio, communities with a large number of subsistence-level farmers currently have a low extension practitioner-producer ratio. The increasing number of smallholders resulting from land redistribution and agricultural development policies, and the often poorly defined target group among farming communities (it is commonly assumed that everyone living in a rural area is a producer), lowers the ratio further. This puts extension services under growing pressure and may lead to a perception that public extension services are ineffective. The use of ICT to provide information and advice to farmers, especially smallholders, remains limited, in spite of the many potential opportunities in this space.

Accurate and timely information is required at each stage of the agricultural value chain, and for each of the various aspects of agribusiness management – land preparation, planting, animal management, water management, fertilizer application, pest management, harvesting, post-harvest handling, packaging, transportation, processing/value addition, quality management, food safety, storage and marketing.

Many different stakeholders are involved at every stage, and they need specific information and knowledge to manage their part of the value chain.

ICT greatly improves the delivery of concise information, knowledge and advice to support decisions. It allows for user friendly and cost-effective delivery (compared to the delivery of information in person by extension practitioners).

Here is a schematic representation of the agricultural value chain and its information needs, which could be provided through ICT<sup>4</sup>.



<sup>4</sup> [http://www.hsrc.ac.za/uploads/pageContent/6277/Concept%20Note\\_ICT%20in%20Agric%2022%20July%202015.pdf](http://www.hsrc.ac.za/uploads/pageContent/6277/Concept%20Note_ICT%20in%20Agric%2022%20July%202015.pdf)

## ICT-ENABLED EXTENSION AND ADVISORY SERVICES PILOT PROJECT

Specifically, within the ICT-Enabled Extension and Advisory Services pilot project, the ARC Information Hub provides information for production and training, information on economics, marketing support and the weather, and early warnings of fire hazards and disease outbreaks, among other things.

The ARC Information Hub packages are as follows:

<b><i>Technical production information</i></b>	<b><i>Marketing and economic information</i></b>	<b><i>Early warning information (as required)</i></b>	<b><i>Training information</i></b>
<ul style="list-style-type: none"> <li>• Production manuals</li> <li>• Plant health</li> <li>• Animal health</li> <li>• Natural resource management</li> </ul>	<ul style="list-style-type: none"> <li>• National markets information</li> <li>• Production economics</li> </ul>	<ul style="list-style-type: none"> <li>• Fires</li> <li>• Animal health</li> <li>• Plant health</li> <li>• Weather/climate</li> </ul>	<ul style="list-style-type: none"> <li>• Courses</li> <li>• Books</li> </ul>

The information has been arranged into the ARC Information Hub mobile application. A screen shot illustrating application is attached (Appendix 1). Users, including farmers, extension practitioners and agricultural development experts, can register to access information and interact with other users. The application is supported by ARC experts, based at ARC research centres across the country, who provide the Hub with updated information, as well as addressing specific technical questions from farmers and extension officials on the ground in respect of agricultural economy, weather conditions, soils, crops and livestock.

## LESSONS LEARNT

The project is ongoing, but much has been learnt. There is definitely a need for more extension services for smallholders, and ICT has been shown to be a useful

tool. The following are some of the lessons learnt in the facilitation of extension and advisory services using ICT:

- ***Access to Internet coverage is limited***

Much of South Africa is well resourced, with almost 100% Internet coverage. According to Statistics South Africa's 2013 General Household Survey (GHS) more than a third of South African households (40,9%) had at least one member who used the Internet at home, in the workplace, at a place of study, or at Internet cafés. However, while more than half of households in the most affluent provinces, Gauteng and the Western Cape, had good access to the Internet, the provinces involved in the survey had lower Internet access. The GHS gave the percentage access as follows: Limpopo (21,9%), the Eastern Cape (30,2%), Mpumalanga (37,8%) and KwaZulu-Natal (32,3%). Households with more economic power generally have greater access. This means that women and poorly resourced farmers are still the least likely to have access.

- ***Theory versus practical farming-based advice***

Although all the extension practitioners were graduates with access to ARC expertise and technical support, as well as to the ARC capacity development programme (aimed at strengthening the extension delivery mode of advice provided to farmers), and although many farmers have been supported through the project, it has been noted that farmers tend to trust advice from other farmers more than from the new young extension practitioners, who are seen to offer theoretical advice. This has made it difficult for the extension practitioners to pursue extension work as a business. The pilot project is therefore exploring the development of extension practitioner-led farming enterprises in order to provide practical demonstrations of good agricultural practices through successfully run agribusinesses. However, the establishment of such farming enterprises has been difficult for young graduates, who have limited access to land, water or finance.

- ***Lack of commercialisation of agricultural information markets***

The provision of information at a cost remains a highly contested space, especially among smallholders, as public extension services currently dominate

the agricultural information market, and sometimes come with free financial capital support packages for farmers. Only a few farmers are prepared to pay for information.

- **ICT4Agriculture does not eliminate the need for extension service practitioners on the ground**

The use of ICT for agricultural extension services does not eliminate the need for knowledge brokering that is provided by extension practitioners in person. Practitioners are needed on the ground to ensure that knowledge is understood and applied appropriately by farmers. This is particularly true in a developing country like South Africa, where the literacy levels of smallholders are generally low, limiting their ability to interpret agricultural development information and advice independently. Limited access to the Internet and smartphones (see above) also limits the accessibility of ICT-based information.

## **CONCLUSION AND RECOMMENDATIONS**

Considering the unemployment situation in South Africa, especially unemployment among agricultural graduates, the exploitation of e-agriculture as a support tool for farmers is justified for potential entrepreneurial spinoffs. The South African market can look at international best practices, such as incorporating a combination of different technologies to strengthen the delivery of information. With a few improvements taking specific South African challenges and opportunities into account, ICT4Agriculture can yield great benefits for the sector and its young stakeholders.

Within the limited scope of the ICT-Enabled Extension and Advisory Services Pilot Project, the emphasis has been on the development of the ARC Information Hub mobile application as an ICT-based extension platform, and on training the knowledge brokers in agricultural science, agricultural extension, entrepreneurship and business management, as well as on the use of the mobile application.

However, the success of ICT4Agriculture initiatives in South Africa will require more than just the provision of ICT-based information. Affordable Internet access will have to be improved in rural areas, and ICT platforms will have to –

- combine mobile technology and expert networks to help smallholders get accurate and timely information to improve their businesses and livelihoods;
- use the most basic mobile phones, where for example expert agriculture advice is received via SMS;
- use local languages to communicate with farmers;
- provide information relevant to the location of farmers;
- provide a comprehensive set of information across the agriculture value chain, from production to marketing;
- link to social media as way of reaching more people, especially young people;
- take gender, cultural and regional considerations into account in both design and implementation phases.

With regard to the commercialisation of the agricultural information market among smallholders, it is recommended that a survey be carried out to determine farmers' willingness to pay for extension services, and to get input from farmers to inform the appropriate design of information packages and ensure that farmers' needs are met.



# Appendix 1: Screen shot illustrating the ARC Information Hub application

