

Agri tech a new normal for sustainable farming in the Western Cape

A report by USB for the Western Cape Department of Agriculture (WCDoA) has cited that the 'new normal' for agriculture is a future in which agricultural technology (AgTech) enables more efficient and sustainable farming, providing food security in an inclusive and equitable economy. As such, an 'agri renaissance' of higher yields, reduced costs and improved nutritional value of foods is possible for the Western Cape's R50bn agricultural economy if the farming sector, government and education institutions work together to harvest the benefits of the smart technologies emerging in the Fourth Industrial Revolution (4IR).



The University of Stellenbosch Business School (USB) report on the Impact of 4IR on Agriculture in Western Cape was formally hand-over to Minister Alan Winde, Minister of Economic Opportunities in Western Cape. From left to right: Dr Dirk Troskie, Director: Business Planning and Strategy, Department of Agriculture WC; Mr Shelton Mandondo, Agri Western Cape; Prof Marius Ungerer, USB team leader of research report on 4IR and Mr Alan Winde.

One of these benefits, says University of Stellenbosch Business School (USB) research associate Angus Bowmaker-Falconer, is the potential for smart water technology and intelligent irrigation systems to dramatically reduce agricultural water use in the drought-stricken province, while maintaining and even improving production levels.

The WCDoA commissioned the report to obtain a strategic outlook on the future for agriculture in the province in the context of the 4IR, the emerging technologies and innovations that could change farming methods and production, and the opportunities that these present for a sustainable future for both large and small farmers.

"Agriculture and agri-processing are strategically important sectors for the Western Cape, for their large absorption of unskilled labour and for their economic contribution accounting for more than 10% of the regional economy, more than half of its exports, and 20% of South Africa's agricultural output," says Bowmaker-Falconer.

The 'agri renaissance' scenario developed by the USB researchers sees agriculture embracing technology such as farm management software, precision agriculture and predictive data analytics, enabling producers to use robotics and drones to monitor crop health, soil quality and weather.

"In this best-case scenario, agriculture will benefit from the innovations of the digital economy, such as blockchain technology to provide product traceability, an increasingly important issue for consumers; and concepts such as the sharing economy and crowdfunding to stimulate the development of commercially viable smallholder farmers and agri-entrepreneurs."

"By adopting the smart and interconnected technologies of the new industrial era, agriculture in the Western Cape has the opportunity to reposition its brand: engaging consumers through new digital platforms, attracting new career entrants to high-tech employment opportunities, and becoming an attractive investment proposition for smart technology applications."

Creating and enabling environment for small-scale farmer

However, Bowmaker-Falconer warned against the creation of a digital divide, wherein only certain role players benefited from 4IR opportunities, saying that the sector and government needed to work together to create an enabling environment for small-scale farmers to access technology, training and finance.

On concerns about job losses, particularly in semi and unskilled labour, he said technology would enable the creation of new types of jobs and that education and training – both for new entrants and new job types as well as upskilling and retraining of existing participants – would need to be prioritised in government's response to changes brought about by the 4IR. "Technology is a critical part of the 4IR, but aspects like energy and the environment, economics and policy, the consumer, and social change are also integral drivers of future change," says Bowmaker-Falconer.

The scope of the 4IR goes beyond smart and connected machines: "We are pivoting towards a fusion of the physical and the virtual world. Interoperability, advanced artificial intelligence and autonomy are becoming integral parts of a new industrial era."

What sets the fourth industrial revolution apart from its predecessors, he said, is that change is not only fast, but is expanding exponentially across multiple areas of a deeply interconnected world, leading to 'unparalleled paradigm shifts' in the economy, business and society. "Touching every aspect of human life, technological advances are spread widely via the internet, and available at relatively low cost."

The researchers provide five key recommendations for an integrated and comprehensive response by the agri and public sectors, academia and civil society that will enable agriculture in the Western Cape to "adapt, shape and harness the potential of this disruption".

Aligning vision, strategic initiatives

Firstly, the WCDoA should align its vision and strategic initiatives to accelerate growth in agri-economic outputs with the desired end-state of 'agri renaissance', Bowmaker-Falconer said, and work with educational institutions in the province to develop digital skills and capability for the agriculture sector. "Tertiary institutions will need to strengthen their agriculture

education and training courses with the theory, skills and knowledge related to the 4IR, which will, in turn, attract new students to the sector, and should also ensure that reskilling and retraining opportunities are offered for existing workers in agriculture."

The second is for agriculture to engage with the rising influence of consumers, who are better informed and changing the demand for products due to concerns about food safety, quality and nutrition, fair trade and the traceability of products to origin, and the use of chemicals in production and processing.

"The opportunity is for producers to market their individual brands, as consumers have increasing influence on retailers to stock products that meet specific requirements and also seek out niche products to purchase direct from producers."

The researchers recommend that producers turn to blockchain technology to list their products and provide verifiable information for the tracking of food origins. "Producers and processors should take advantage of innovations in packaging, such as bio-packaging and recycled materials, to provide environmentally-friendly packaging. Automation, providing ready-packed produce with smart indicators for freshness, is a further opportunity."

They found that accelerating technology adoption in agriculture, the third recommendation, will require a widespread programme of communicating and disseminating information about new technologies and their impact, by suppliers, producers, government and scientists. "The WCDoA's role could include setting up technology demonstration farms, developing and sharing the business case for investing in technology, and investigating options to reduce the cost of acquiring technology for smallholder farmers, while financial institutions should develop financing products suitable for smallholder farmers and new entrants."

"Stimulating technology adoption and the development of technology entrepreneurs could take place through research on the integration of technologies into the farming value chain, while private sector technology incubators, academic institutions, business and government collaborate on initiatives such as competitions and ideas fairs to stimulate understanding and application of 4IR technologies."

"The development of commercially viable smallholder farmers is a key element in securing a sustainable future for agriculture in the Western Cape, and the focus of the fourth set of recommendations."

Bowmaker-Falconer said that government should develop the enabling conditions both to support new entrants and existing smallholder farmers. These include incubation and mentoring, education on technology and farming practices, as well as business education, and access to finance.

Supporting new entrants, existing smallholder farmers

He encouraged partnerships between large agri-businesses and smallholder farmers that could support joint access to finance, markets and technology, especially if incentivised for the large producers.

Smallholder farmers should use concepts such as the sharing economy and crowdfunding to explore the pooling of resources and the creation of networks to strengthen their ability to produce at commercially viable scale, he said.

Finally, he said, the 4IR presents the opportunity to 'reposition agriculture as a brand'.

"The agricultural value chain offers a variety of exciting and interesting career opportunities to be explored, due to its complexity and the wide range of knowledge and skills required, from food and animal science through to marketing and management, economics and technology," he said.

Bowmaker-Falconer encouraged the involvement of the youth in generating content to demonstrate the attraction of technology-enabled agriculture as a career.

Fast-tracking learning through skills exchange with countries leading in agricultural technology innovation, agri-accelerator development programmes, as well as harnessing digital marketing, data analytics and social media to create individualised brand experiences for consumers, were further opportunities to position a tech-enabled agriculture brand for the Western Cape, he said.

"The gains of the 4IR in the Western Cape will be realised through leadership. We must shape the future we want to live in," Bowmaker-Falconer concludes.

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