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SA farmers turning to technology to boost yields and financial resilience

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Amid a challenging economic climate in South Africa, as well as prevailing drought in some provinces, emerging and commercial farmers have become price conscious and focused on optimising operations to remain competitive, says Afgri Equipment branch manager **Riaan Muller**.

Industry body Agri SA's 'Agriculture Drought' report for 2018/19 finds that the agriculture sector has shed 31 000 jobs since January 2018 in provinces severely affected by the drought; this also includes a R7-billion loss in turnover.

The report indicates that 173, or 62%, out of 278 municipalities surveyed by Agri SA say they are affected by the latest drought.

Mpumalanga and Gauteng are the only provinces that have a stable drought status and stable drought outlooks. This could change, however, depending on winter rainfall in the western regions of the country and the severity of the expected 2019 El-Niño phenomenon – the rising of surface water sea temperatures in the eastern tropical Pacific Ocean, which is usually associated with lower rainfall in South Africa and floods in other parts of the world.

These conditions affect not only crop yields and exports but also funding providers, which typically adapt their risk-mitigating strategies..

There are about 32 000 commercial farmers in South Africa, of whom between

5 000 and 7 000 are responsible for producing about 80% of the agricultural output.

"These conditions also impact on original-equipment manufacturers (OEMs), since it has become non-negotiable to offer products that allow for cost savings and optimal yield," notes Muller.

Financial Perspective

John Deere financial MD **Antois van der Westhuizen** says improved farming techniques, access to better seeds and more mechanised equipment could further boost agricultural yields.

"The integration of digital technology into agriculture presents a major opportunity for sub-Saharan Africa. The emergence of the mobile phone as a popular communication tool, coupled with Internet-based solutions, could significantly boost access to financing for agricultural inputs across the value chain."

Van der Westhuizen says the electronic payment and receipt records of electronic banking accounts can be leveraged to harvest valuable client

information, which can then be used to create more accurate risk profiles of smallholder farmers by analysing their cash flow management, repayment histories and spending habits.

"The more accurate a picture you can build of the borrower, the better you can price the risk, which boosts the likelihood of credit providers actually wanting to lend money to them."

Van der Westhuizen notes that the "enormous potential" to boost Africa's agricultural output is underscored by most smallholder farmers having the capacity to farm only about 10% of the land available to them at one time, owing to a reliance on hand-hoeing and rainfall.

"You have to look at the entire supply- chain financing arrangement, from the seed and fertiliser to the tractor," he notes, warning that OEMs cannot sell a tractor and expect that alone to improve yields.

"You need to sell an ecosystem, not just a machine, if you want to succeed in making the farmer a businessperson," he highlights.

Dubbing its approach the S.M.A.R.T Campaign – Solutions for small farmers, Mechanising for yield, Access to finance, Reliability for lower costs, and Technology and education – John Deere is exploring ways of better using technology to enable smallholder farmers to hire tractors on a short-term basis.

Telematics and the Internet of Things will enable owners of, for example, a tractor, to monitor its use through a small tracking device installed in the tractor. This data is uploaded to the cloud for further analysis by financiers, insurance providers and other stakeholders.

"By thinking laterally and using better information through . . . technology, we can build financing models that price risk more competitively, resulting in better repayment terms for the borrower," Van der Westhuizen explains to *Engineering News*.

Improving Visibility

Financial services provider Standard Bank is running a pilot programme on remote sensing to assist emerging or commercial farmers in increasing their yields by providing images that shows the yield and health of a crop.

The bank is partnering with Origin Enterprises, of the UK, which is linked to the European Space Agency, to gain access to radar and satellite imagery suitable for agricultural research that uses algorithms to analyse and interpret specific aspects of the image.

“The platform enables us to monitor crop development in every field – it builds trust and transparency between the bank and its clients,” Standard Bank agribusiness head **Abrie Rautenbach** explains.

He cites a pest, the African Fall Armyworm, for which clients often seek additional finance for crop protection.

“We would normally have no verification on the existence or extent of the pest. Now we have a visual image that can show whether a field is experiencing a problem that is impacting on yield or ground conditions and the farmer can take corrective action,” Rautenbach tells Engineering News.

Using Contour, a farmer-facing programme developed to monitor farms and fields, clients can use the information to understand crop health, do water and spray planning, determine flood areas, understand ground conditions – such as soil health and moisture levels – and monitor weather.

Rautenbach says the data, presented to clients through the Contour tool and the Contour Mobile application (app), enables them to make better decisions, while mitigating risks and improving yield through optimised operations.

Contour Mobile guides farmers to an exact location of, for example, a soil or pest issue, and enables them to take a picture of it. The app will link the issue to a relevant expert, such as an agronomist or pesticide expert, who can then help to diagnose the problem, which ultimately saves farmers, and Standard Bank, time and money.

"It is important that we add value for the farmer. We are not using data as a monitoring tool, but rather . . . to improve on yield through aggregated information that can, for example, predict issues with a specific crop and dry spells (around planting time), which is currently prevalent in South Africa, while ensuring the crop is protected and thus the surplus used for our repayment," avers Rautenbach.

Part of the value-add that Standard Bank is providing through Contour includes insight around the Africa Crop Growth Index, growth stage predictions and yield estimates. "Our service provider is doing this by working on protocols describing crop growth cycles and then developing yield estimates. Algorithms are then designed and, by using optical and radar satellite images and overlaying this with hyper local weather data, a yield estimate is developed. Calibration is done for various commodities on pilot farms to fine-tune the yield predictions. The bank will continuously add yield estimate capabilities for different commodities."

The bank is conducting the pilot project across about 100 000 ha of farmland in South Africa, Zambia, Zimbabwe, Mozambique, Kenya, Uganda, Nigeria, Ghana, eSwatini, Lesotho and Namibia. It aims to finalise the pilot of its remote sensing by the end of the first quarter of 2019, with a commercialisation and pricing strategy design to follow.

Rautenbach believes digitalisation, as well as the effective use of fertiliser and seeds, will become increasingly important in unlocking agriculture prospects in Africa. Sixty per cent of the world's nonused, arable land is on the continent, but low levels of productivity undermine food security – a problem that could become more acute in light of the prospect of a doubling of Africa's population by 2050 and accelerating urbanisation.

Private-sector agricultural association Global Harvest Initiative forecasts that, over the next 50 years, farmers will have to produce as much food as they produced in the last 10 000 years.

Technical Perspective

In South Africa, farmers are already responding by adopting some of the most progressive business techniques available.

John Deere precision agriculture technology specialist Wayne Spaumer believes that, to keep up with global competitiveness and remain profitable, especially with many other countries benefiting from government subsidies, local farmers will continue to require optimal, efficient practices, subsequently driving them towards a higher adoption rate of technology.

"Farmers are open to learning about new technologies that offer more profitable, easier and faster ways of farming, while assisting in better decision-making."

Meanwhile, John Deere sub-Saharan Africa MD Jacques Taylor points out that farmers no longer just operate tractors and harvesters, but now also have to manage cash flow, supplier bases, employees, and environmental and social sustainability.

Taylor believes that John Deere's Precision Ag Technology and its platform, called Operations Centre, can assist in this growing list of responsibilities. The Operations Centre can link farmers to agronomists to identify improvements in specific fields that could deliver higher yields using farmers' data from equipment, such as harvesters, and their own input.

John Deere's precision agriculture equipment transmits information to the Operations Centre, which the farmer can opt to share with other

preferred stakeholders.

Trending technologies in agriculture include data management, machine learning, artificial intelligence and automation. “Fifteen years ago, a farmer would have a desk full of papers and critical notes. This has now evolved into having a platform that incorporates and consolidates all the necessary information, which is accessible on their smartphones, to manage, monitor and instruct their fleet of equipment and inform operations.

“Ultimately, the farmer that is the most efficient is the farmer that is more profitable,” concludes Taylor.