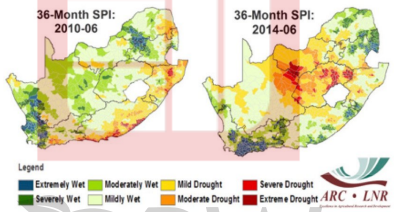
Scientists use high-tech methods to deliver accurate agricultural information



STANDARDISED PRECIPITATION INDEX 2010 – 2014 The gradual shift in dry areas can be observed on the 36-month time scale from June 2010 to June 2014

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CREAMER MEDIA
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Scientists at the Agricultural Research Council (ARC) are using high-technology methods to provide accurate information and research for the agriculture sector, such as the use of genomics to significantly and rapidly improve breeding of animals and plants, and using high precision mapping to map out areas of land degradation, erosion and drought-affected lands.

report launch last month.

Tswai and a team of researchers at the ARC Institute for Soil, Climate and Water, studied land degradation, desertification, drought and land cover in South Africa for the United Nations Convention to Combat Desertification between 2009 to 2013 as part of the international efforts to understand desertification, land degradation, drought and land cover in the context of a changing global climate.

“Desertification, land degradation and drought are complex processes and are also economic and environmental problems, from a land productivity perspective. The project delivered detailed information on the rates of changes of desertification, land degradation, drought and land cover over the period, which enables better understanding of the changes and impacts of these effects, as well as informing responses to these changes.”

The study produced a land degradation map, a desertification map, and a drought-affected land map of South Africa.

Makgahlela and Tsilo, as well as Malatji, were using high-throughput genomic technologies, such as polymerase chain reaction methods and automated, robotic equipment, which enabled them to genotype thousands of genetic markers within hours, which were used to study populations’ genetic diversity, susceptibility and resistance of local plants and animals to diseases and parasites.

“We need to identify and select desirable genes from animals within a population and propagate them. High-throughput genomic technologies, which also led to the discovery of high-density single nucleotide polymorphisms (SNP or genetic markers), resulted in massive reduction in their genotyping costs.”

parasites, and natural genetic resistance to them.

Genomic selection will fast-track selection decisions because genetic information is available as soon as an animal is born. This technology will facilitate genetic improvement for traits that were difficult to identify through traditional methods, including susceptibility to diseases and parasites, and fertility, said Makgahlela.

Makgahlela cited the economically important bovine genomic and dairy genomic programmes, which are aimed at developing a database and tool set to enable farmers to identify the economically desirable genes of animals and breed those that would propagate the genes, specifically regarding dairy production, resistance to diseases and pests, and growth rate.

"We aim to provide tools for livestock genetic improvement, and generate a reliable genotype and phenotype database. These tools will help to improve the success of breeders and even of smallholder farmers."

Malatji used genomics to study the gastrointestinal parasites of chickens in rural areas of South Africa, as well as the natural resistances or susceptibilities, to develop a genomic control strategy for gastrointestinal parasites of such chickens.

"The control strategies mainly involve antiparasitic anthelmintics, or even traditional medicines, but treatment is not based on genetic evidence and some could be dangerous to the health of those consuming the meat.

"The data from our project demonstrated that the gastrointestinal parasite, known as Ascaridia galli, share genetic properties between regions, meaning that they are a

While producing a large and accurate genetic map of village chickens, and the impacts that parasites, predators and diseases have on their health, a key aspect of the project was how it improved engagement with rural farmers to enable good communication between them and the ARC.

Subsequently, this enabled the scientists to report the findings to the farmers, explain the effects on their chickens' health and how farmers could effectively combat parasitic infections, based on accurate genetic evidence, noted Malatji.

"The presentations were aimed at providing insight into the work that the ARC does to support the growth and sustainability of the agriculture sector and the economy, job creation and food security at national and regional level," concluded ARC president and CEO Dr **Shadrack Moephuli**.

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NEXT ARTICLE

South African maize planting area seen a third larger as rains return

BY: REUTERS

South African farmers have planted a third more hectares

showed on Wednesday. South Africa's Crop Estimates Committee (CEC) is expected to forecast the planted area at 2.6-million hectares, up 33.5% from the 1.947-million hectares planted last year, according to an average estimate of five traders and analysts polled by Reuters. →