Issue 65 • July/August 2023

HarvestSA

Securing South Africa's Food Resources

Radical reform
Getting transformation right

Strategic advantage
The importance of food safety

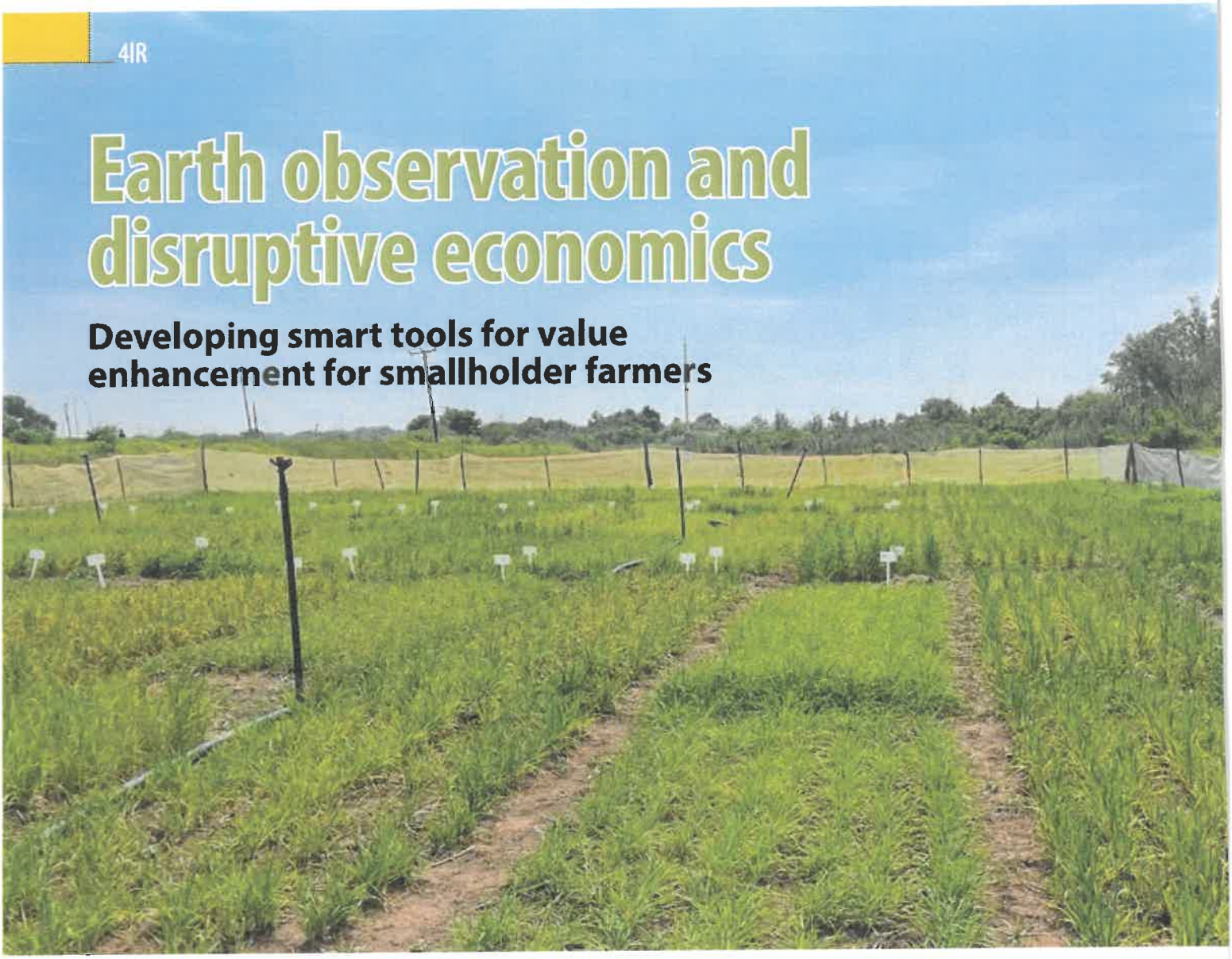
Earth observation and disruptive economics
Developing smart tools for value enhancement for smallholder farmers

RSA R29.95
ISSN 2305-0551
9 772305 055108

South Africa's top international award winning agricultural magazine

Earth observation and disruptive economics

Developing smart tools for value enhancement for smallholder farmers



The world is in the midst of the 4th Industrial Revolution (4IR), which is characterized by a fast and mobile internet, smaller, cheaper and more powerful sensors, and Artificial Intelligence (AI) and Machine Learning algorithms. Digital technologies are not new, but in the 4IR they are becoming more integrated. However, the 4IR is much wider than connected smart machines and systems – it integrates the fusion of these technologies and their interaction across the physical, digital and biological domains. AI is one of the major contributors and enablers of the 4IR.

The exponential increase in computing capabilities has led to significant progress in AI. Data has become a valuable global commodity, but it is much more than simply information – in expert hands it is intelligence. AI is already helping to accelerate the development of robust responses to some of the most pressing challenges of our time: climate change/variability, food insecurity and malnutrition, and environmental degradation. It is transforming the world of genomics and crop breeding and revolutionizing disciplines from climate modelling to agronomy.

South Africa's smallholder farmers practise agriculture mostly in the former homelands. These farmers have very little participation in the mainstream agrarian economy and lag behind regarding access to mechanization, but their production plays a significant role in rural economies and poverty alleviation. Consequently, the government acknowledges them as a crucial niche for development and food security due to their number and their potential to be more productive. Smallholder production is linked to several key constraining factors including, but not limited to, access to markets, financial data, advice on water and crop management, and agrometeorological data. Thus, small-scale farmers should be provided with appropriate decision-support tools across the value chain (production to market) to enable them to increase production and access larger-scale supply chains. This would contribute to ensuring food security and promoting rural economic growth.

In a project funded by the National Research Foundation (NRF), the Agricultural Research Council (ARC) is collaborating with Agrikool Seed to Market with the aim of providing smallholder farmers with user co-designed

mobile smart solutions weaponized with Earth Observation (EO) derived predictive information, market and financial data presented in appropriate forms, which would result in increased and more consistent production, reduced exposure to risk, and an enhanced ability to enter larger-scale supply chains and exploit financial support.

The integration between big data analytics, AI and EO enables the acceleration of development and provides smallholder farmers with mobile smart solutions such as management of crop production and marketing. The smart/wise/effective use of data will be one of the most important tools for achieving the overall aim of the project, which is to determine, through small-scale farmer engagement, the preferred (1) EO-driven data content, (2) data format, and (3) user co-designed platform for data communication (web or mobile).

The ARC-Agrikool Seed to Market project aims to create an app that will provide recommendations for data products and data visualization methods through interactive participatory workshops and household interviews. Participating farmers were selected by the respective gatekeepers in their capacity as agricultural practitioners in the selected provinces and the researchers operate under the guardianship of the appointed gatekeepers to monitor the workshop proceedings. The ARC is working closely with the Department of Agriculture, Land Reform and Rural Development (DALRRD) at municipal level and DALRRD officials in the selected provinces are providing support to the project objectives.

Focus group discussions were held in the Lejweleputswa, uMzinyathi and Mthatha districts in the Free State, KwaZulu-Natal and Eastern Cape provinces respectively.

These discussions covered the background to communication selection, agricultural enterprises engaged in by farmers, farming techniques, soil and rangeland conditions, weather and climate, finance and markets, as well as information dissemination methods used and preferred by the farmers in each district.

The project is still in its early stages but preliminary results revealed that the majority of the participating farmers are full-time and engage in a combination of crop and livestock (mixed) farming. Very few farmers solely keep livestock which implies that the various open data products to be developed should cater to both crop and livestock farming. Very few of the farmers are involved in agro-processing. Many farmers use auctions to sell their produce although there are concerns about the pricing of cattle, which at times do not meet the weight requirements. Other formal markets include feedlots and abattoirs. Beefmaster was indicated as a retail outlet. Other farmers are selling livestock informally to their community or consuming it at a household level. Grains are sold to large aggregators such as Senwes, SAB and Harkos Farms, while vegetables are sold to local retailers such as Spar or informally to hawkers and neighbours. Other emerging retail outlets include school feeding schemes and the hospitality industry (e.g. caterers and guesthouses). Very few farmers use the local municipal markets to sell their goods.

In the main, these farmers have an education level between Grade 11 and 12 and on average are between 47 and 52 years of age. Their households range between 6 and 8 members.

Dr Khaled Abutaleb

ARC-Natural Resources and Engineering

E-mail: AbutalebK@arc.agric.za

Focus group discussion and individual interviews with the farmers