AGRIPROBE

Vol 17 | No 1 | 2020
ISSN: 1810-9799

E-commerce: opportunities and challenges for the fresh produce sector

Agricultural land values under pressure

Fare-well rabies – hello well-fare!

Game on! or Game over!

Research and news magazine of the Western Cape Department of Agriculture

SAT 25 - MON 27 APRIL 2020

south african cheese® festival

AGRI EXPO®

SANDRINGHAM STELLENBOSCH

ESCAPE TO THE #SACHEESEFEST
OVER THE #FREEDOMDAY LONG WEEKEND

#CHEESE#WINE#BEER#FOOD#FEST #GINOCLOCK

MUSIC#CONCERTS #CAPEMADE #TASTETHEALTERNATIVES

TICKETS ARE AVAILABLE FROM COMPUTICKET NO TICKETS ARE AVAILABLE AT THE GATES. | AGRI-EXPO PROMOTES THE RESPONSIBLE USE OF ALCOHOL. NO ALCOHOL WILL BE SERVED TO PERSONS UNDER THE AGE OF 18.

R240 per person per day
R200 early bird until 31 Jan
R860 #FestivalFriends for 4
R200 senior citizens (60+)
R20 children 2-13 years

www.cheesefestival.co.za

021 975 4440

Setting the SCENE

by Joyene Isaacs

In April 2006, the position of Head of Department was filled by a relatively unknown agriculturist, starting a journey that eventually would span 14 years. It was a blessing and a challenge all in one, but the most important factor of this journey was the pure enjoyment of being part of changing the trajectory of the Western Cape Department of Agriculture.

Let me share part of what has happened during this journey:

The management team of the department changed to reflect the diversity of the province, and the transformation of the department started in all earnest. A tough road with no compromise, but with a management team committed to changing the profile of the department. Amazing and wonderful initiatives were put into place to demystify the agricultural sector, to make it attractive to the young people of this province and beyond. Many individuals in key positions in agricultural institutions started their agricultural journey at this department. It takes dedication and hard work, but everybody's help is still required to make agriculture "sexy" and a place where the young want to make a living and contribution to this country.

In 2006, the budget of this department was about R252 million, and the budget for 2020/21 is close to R1 billion, which shows impressive growth for any institution. Again, it could only be realised as a team, with hard work and a clear vision. This translated into more personnel (especially technical), improved processes and systems, the use of technology across the programmes and hopefully a government department that delivers services across a spectrum of clients. This department remains a bureaucracy but with a difference. Service delivery remains at the pinnacle throughout the organisation. Clients are and should remain the most critical focus of any government organisation.

The department has made considerable strides in enhancing the research capacity within, and the number of scientific and popular articles are impressive. The increased outputs are linked to increased budgets (not as much as we wanted, though) and the appointment of technical staff across programmes and disciplines. We invested time and funds to enhance the skill sets of our staff and partnership arrangements within the province, South Africa and internationally. I believe that our technical staff across the disciplines have the right skill levels, capacity and attitude. The outputs captured in 14 annual reports show the evidence. However, doing research and writing reports are insufficient as technology transfer must be done continuously, and

»

the staff members understand that the client is key. Thank you to all the officials at the department for making sure that the information generated is shared with our clients to improve their agricultural businesses, large or small.

It would be remiss of me not to speak about the disasters that hit the province in the past 14 years. Let me share with you the different disasters where we have lent support for clients of the province:

1. Floods in 2011/1
2. Floods in 2013/14
3. Drought in 2015
4. Drought in 2016
5. Drought in 2017
6. Drought in 2018
7. Drought in 2019 (and ongoing)
8. Fires in 2016
9. Fires in 2017
10. Fires in 2018
11. Fires in 2019
12. Avian influenza in 2011
13. Avian influenza in 2012
14. Pests and hail in 2015
15. Pests and hail in 2016
16. Pests and hail in 2018
17. Pests and hail in 2019

The funds spent on these disasters amounted to R757 235 million, and most of the financial support was to farmers who were directly and indirectly affected. This raises questions about climate change. I want to urge the agricultural sector to make a concerted effort with the department to work together, protect our future, and make the necessary changes, starting today.

Agriculture is first and foremost a science, and to thrive we have realised that we should invest in technology development, and embrace and harness technological innovation. We have done so – Fruitlook, CapeFarmMapper, wireless network, the fly-over initiative, and many more attest to this. All these technologies were developed, sometimes in the department, sometimes using expertise internationally, and sometimes with our partners. All the information was made available free of charge to our clients and we understand and appreciate the role of this department in creating an enabling environment for the agricultural sector to flourish in!

In the journey of the department (and mine), the management team embraced evaluations as a means to assess our outputs and outcomes independently, but also learnt of the improvements required within our processes and systems. All of this to deliver an even better service to our clients. These evaluations allowed the department to make better decisions, but also allowed "outsiders" to look in to either confirm that we are doing well or not. Some of the "headlines" of the 22 evaluations (available on the website) are:

- Eighty-nine per cent of our college graduates are employed in the agricultural sector.
- Continue with the Farm Worker of the Year competition but change the name to "Agri worker".
- Seventy-two per cent of land reform projects supported by the department are successful.
- The implementation of the food garden strategy is successful.
- Ninety-nine per cent of farmers are implementing the results of the long-term crop rotational trials at Langgewens.
- A diagnostic report on the fourth industrial revolution (4IR) is shaping the future plans of the department.

The outputs of the department are impressive and it could only be done with Team Agriculture (department and industry). Build on this foundation as I sign off and hand over to the new HOD, Dr Mogale Sebopesta.

Go well, agriculture!

Farewell messages from the agricultural sector to an exceptional Head of Department

I could easily write a couple of pages on personal and professional experiences shared with Joyene during her time as the HOD, especially given the fact that she loves reading so much and never misses anything. This time around I will keep it short and sweet, although her contribution, influence and impact are anything but short and sweet. The way that I will always remember Joyene is:

J – Jubilant – always being proud of and delighted with achievements, and keen to share to make a difference.
O – Open-minded optimist – always seeing the opportunities and capitalising on them first.
Y – Young at heart – always being a lively, eager, agile person that is prepared for whatever life throws at her, fuelling the workaholic within.
E – Enabler – always accessible and willing to help in the interest of the sector and the country.
N – Natural – Joyene is certainly not pretentious; however, very unpredictable and naughty at times, catching most off-guard and then thoroughly enjoying the moment.
E – Endurance – Joyene certainly is a strong and dedicated woman (in a man's world); an inspiration to many aspiring young people.

The above is a testament to the great person and leader she was (and still is) and the legacy that has been laid in the past 14 years!

From us at HORTGRO it is not "goodbye" but "until we meet again".

Mariette Kotze
Group Operations Manager
Hortgro

Ms Isaacs has inspired me to stand up and be courageous in a difficult industry – agriculture. Her open and to-the-point approach to topics has helped me not to beat about the bush when it comes to uncomfortable or difficult discussions. Her calm yet assertive personality has shown that one can lead without being aggressive.

Thanks, Joyene, for taking the lead for us females. Thanks for being you!

Jacky Goliath
Managing Director
De Fynne Nursery

»

Joyene is often referred to as a powerhouse – you always had to be prepared and ready for that unexpected answer of hers!

When you take her calls at 6:00 or 20:00, when you forget her birthday and when you have an early morning coffee with her at Doppio Zero in town, it's only then that you'll get to know the soul of Joyene.

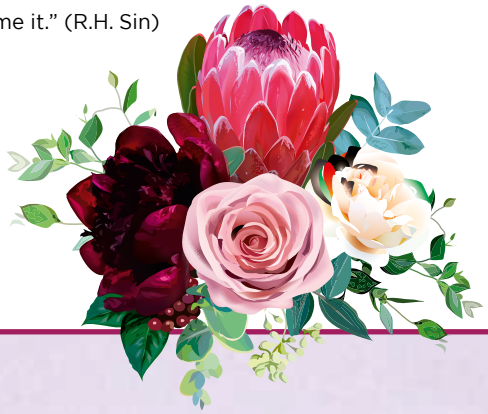
Once you sat down (on the floor!) in the small glass cage in her office, you get to see the sincerity, honesty and genuine passion of an individual that is willing to sacrifice everything for agriculture and its people. Mention a topic or challenge and you are immediately connected to someone within her impressive worldwide network. Send her a report and months later she will quote page 3, paragraph 2 and you will know she reads and remembers everything.

I was fortunate to travel with her to China. It was there that I experienced her passion for what she does first-hand and how she is prepared to take on the world! Gūnbāi Joyene!

You will be missed by everyone that you have ever engaged with, from the cleaner to the CEO. You have made a difference in many people's lives and we will reap the benefits of your legacy for many years to come. Thanks, Joyene!

"Some women fear the fire. Some simply become it." (R.H. Sin)

Johan Ehlers
Chief Executive Officer
Agri-Expo



Joyene Isaacs is the doyenne of provincial top management (PTM) and a wise mentor to her colleagues. Drawing on a wealth of experience of 14 years as Head of Department and her expertise in intergovernmental relations, Joyene has provided leadership and guidance to her department and to PTM. Thanks to Joyene, the Department of Agriculture has an exceptional governance and service delivery record.

I would also like to thank Joyene for her kind hosting of PTM at Elsenburg on many occasions. We will sorely miss our colleague and wish her well in her future career.

Harry Malila
Director-General
Western Cape Government

Joyene is always well prepared and extremely knowledgeable about the agricultural sector. A powerful leader who cares for those she serves. She is never apologetic, simply because her leadership and management qualities are second to none.

Ismail C Motala
Farm Waveren
Wolseley

'n Groeteboodskap aan 'n merkwaardige leier is op sigself geen maklike taak nie. Om in 'n beperkte aantal woorde op te som wat die bydrae en nalatenskap is van 'n vrou wat toegesien het dat die Wes-Kaapse Departement van Landbou ligjare vooruit is teenoor die res van die provinsies, is nog moeiliker.

In nasionale landboukringe is die naam Joyene Isaacs gróót. Dit het ewe veel te doen met haar insig dat 'n toekomsvisie vir die landbou op tegnologiese voor-uitstrewendheid gebou moet word, as met haar energie, onstuitbare geaardheid, nugtere ingesteldheid en haar vermoë om mense na haar te laat lúister.

Binne die georganiseerde landbou het ek haar leer ken as iemand wat vanuit haar landbou-opleiding en jarelange loopbaanervaring 'n intense liefde vir die bedryf koester. Dit het veral duidelik gestalte gekry in die talle kere wanneer sy moue opgerol en saam met ons in die kryt geklim het om die Wes-Kaapse landbouers tot op die hoogste vlak te dien.

Joyene verdien haar reputasie as die persoon wat meedoënloos gewerk het om die sektor op só 'n hoë voetstuk te plaas dat die res van die land net kan smag om daarby uit te kom. Daarom verdien sy ook die tyd om rustig en onbelemmerd te besin oor haar pad vorentoe.

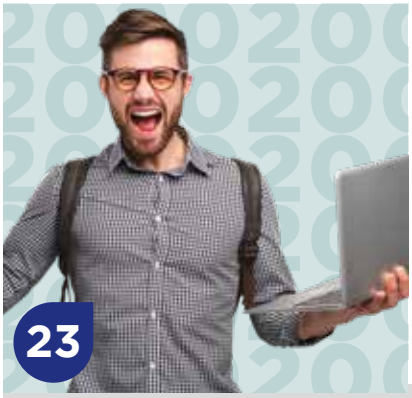
Onkonvensioneel soos wat sy is, het Joyene altyd gesê sy wil die landbou "sexy" maak. Ek hoop dat haar kundigheid in die toekoms, in watter kapasitiet ook al, nog lank tot die landbou se beskikking gaan wees om die sektor dié aanloklikste een in die ekonomie te maak.

Carl Opperman
Previous CEO
Agri Wes-Cape

You managed to get people to experience the single most exciting and rare thing in government – "service". You are making a mark in government, my sister.

"B" – this is what you affectionately call me.

Bafedile Bopape
Chief Director: Policy Development Plannning
Department of Agriculture, Land Reform and Rural Development



EDITOR
Mary James (021 808 5008)
maryj@elsenburg.com

CHAIRPERSON
Dr Ilse Trautmann (021 808 5012)
ilset@elsenburg.com

SECRETARIAT
Gizelle van Wyk (021 808 5022)
gizellevw@elsenburg.com

EDITORIAL COMMITTEE
Ashia Petersen
ashiap@elsenburg.com

Douglas Chitepo (021 808 5100)
douglasc@elsenburg.com

Riaan Nowers (021 808 5194)
riaann@elsenburg.com

Maritjie Cornelissen (021 808 5497)
maritjiec@elsenburg.com

Brighton Shumba (021 808 5384)
brightons@elsenburg.com

Dr Lesley van Helden (021 808 5107)
lesleyvh@elsenburg.com

John Constable (021 808 7763)
johnconstable@elsenburg.com

Arie van Ravenswaay (021 808 5085)
arievr@elsenburg.com

Daniel Johnson (021 483 3261)
Daniel.Johnson@westerncape.gov.za

EDITORIAL

MINISTERIAL

DIARY AND EVENTS

NEWS SNIPPETS

PEOPLE ON THE MOVE

ON OUR COVER

The agricultural sector in South Africa leans towards a second year of recession and there is growing concerns, with agricultural land value under pressure. However, there are rays of hope for the economy with industrious and innovative trends in trade. E-Commerce is changing the fresh produce sector, making for many opportunities as well as challenges, but it is certainly exciting and en route to good outcomes.

The Western Cape Government values the lives of its citizens and their pawed companions. Read more about how the Department celebrated World Rabies Day as well as World Animal Welfare Day and see how you can make a difference in animal welfare. The conceptualised artwork on the cover by Arie Van Ravenswaay, gives an overview of what's to expect inside this edition of the *AgriProbe*. Enjoy as you page through this edition and explore the many opportunities for an economically prosperous Western Cape.

CONTENTS

AgriConnect
Your communications partner in the agricultural industry

PUBLISHING TEAM

Project leader: Henk Odendaal
Manager: Leza Putter
Lead designer: Michélle van der Walt
Copy editor: Michele van Loggerenberg

Youth in agriculture remains a key priority

Minister Meyer explains why he wants to invest in agricultural schools

by Daniel Johnson, Daniel.Johnson@westerncape.gov.za

The agricultural economy in the Western Cape continues to have a significant impact on the province and we would do well to make it a critical aspect of our strategy for sustainable economic growth and job creation.

The Western Cape contributes 46% to South Africa's agricultural exports and generates a total income of R43,8 billion from agriculture, with R23 billion gross value added yearly.

The sector creates over 400 000 direct and indirect jobs (including agri-processing). A mere 5% growth in key competitive industries could create an additional 23 000 jobs in the Western Cape. Agriculture accounts for 16,4% of our total workforce in the province and 24% of agri-workers in South Africa.

In response to the potential of the agricultural sector to grow rural economies and create jobs, I have set structured training and education as one of my key priorities. We must create more training opportunities for the youth in the agricultural sector.

To make this sector more accessible and attractive to the youth, more interventions are needed to include agriculture as a subject in schools, expose youth to the agricultural sector and the career opportunities therein.

More agricultural schools should be established in the Western Cape. My aim is to establish at least one agriculturally focussed school per district and to introduce agricultural subjects in other schools.

However, the promotion of agricultural education must not be viewed as an attempt to lower the standard and the intellectual content of the National Senior Certificate (NSC). It should be seen as an initiative that exposes the youth to subjects such as agricultural technology, agricultural management practices, agricultural sciences and pure mathematics. These subjects could encourage learners to study for careers in agricultural economics, agricultural engineering and veterinary sciences. It must also be accompanied by a renewed effort to promote mathematics and life sciences.

We not only want to make our Grade 12 school leavers more employable with an NSC that offers a number of certified competencies; we also want to ensure that their skill sets are responsive to the skills requirements of the sector. At the same time, learners who wish to attain a tertiary qualification must be adequately enabled to do so.

The Western Cape Department of Education and the Western Cape Department of Agriculture are on a mission to establish more agricultural schools in the Western Cape. We believe this will offer hope to our youth and create a more food-secure province.

Recent meetings with the Western Cape Department of Education's agricultural subject advisor show that at the beginning of 2020 only 39 schools offer between one and three agricultural subjects. A further 14 schools have indicated that they want to introduce agricultural subjects in 2020, while four new agriculturally focussed schools are planned for the period 2021–2025.

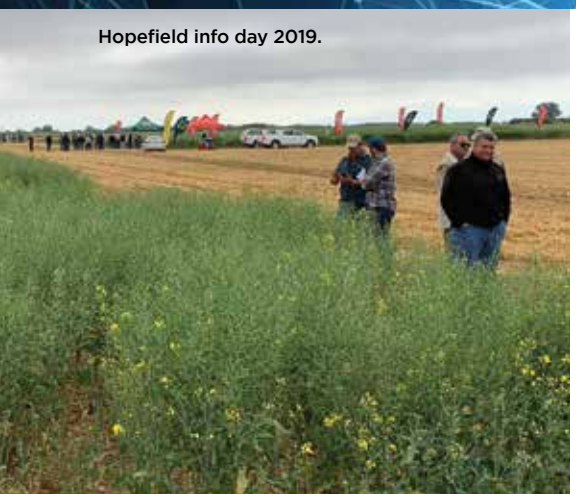
I am also encouraged by the goodwill shown by the agricultural sector and private individuals who have committed land and funds for the establishment of more agriculturally focussed schools.

We are planning exciting projects. Planning and budget are at an advanced stage. Watch this space!

#ForTheLoveOfAgriculture AP

by Dr Ilse Trautmann, ilset@elsenburg.com

Taking results from an array of research projects through the farm gate to optimise agricultural production in a better, faster and more resource-smart way, remains the focus of the research team of the Research and Technology Development Programme.


Hopefield info day 2019.


Outeniqua info day 2019.

Below are the highlights on the 2020 calendar that should not be missed – please diarise.

Event	Date	Where	Focus
Conservation Agriculture Western Cape (CAWC) annual conference	4–5 August 2020	4 August: Conference day outside Stellenbosch 5 August: Field day at Tygerhoek research farm (Riviersonderend)	Conservation agriculture practices – theory and walk-and-talks in trials
Riversdale information day	19 August 2020	Uitkyk farm	Conservation agriculture practices – theory and walk-and-talks in trials
SKOG information day	25 August 2020	Langgewens research farm outside Moorreesburg	Small grain research – theory and walk-and-talks in trials
Hopefield information day	4 September 2020	Waterboerskraal	Conservation agriculture practices – theory and walk-and-talks in trials
Outeniqua information day	16 September 2020	Outeniqua research farm, George	Pasture and dairy research – theory and walk-and-talks in trials and animal viewing

SKOG 2019.

For more information, contact Dr Ilse Trautmann at 021 808 5012 or ilset@elsenburg.com, or watch the local and agricultural press for more details. AP

Healthy diets for a #zerohunger world

by Adéle Isaacs-Cloete, adelei@elsenburg.com and Mary James, maryj@elsenburg.com

World Food Day (WFD) is commemorated globally on 16 October in remembrance of the founding of the Food and Agriculture Organisation (FAO) of the United Nations in 1945 as an organisation that deals with global food and agricultural issues. The theme of the 2019 World Food Day was "Healthy diets for a #zerohunger world". This theme called for action across sectors to make healthy and sustainable diets affordable and accessible to all. The FAO envisages a zero hunger world by 2030 and is urging action to promote the availability of healthy diets to every person in the world. Today, an estimated 820 million people are undernourished, with even more people overweight or obese. In South Africa, we have high numbers of both.

The Western Cape Department of Agriculture (WCDoA) commemorated World Food Day 2019 at Murraysburg in the Central Karoo. The Murraysburg rural community, one of the poorest communities in the Western Cape, is one of 15 rural development nodes identified as part of the Comprehensive Rural Development Programme (CRDP).

The WCDoA staff joined forces with the local municipality to help the community and schools to boost food production by establishing household food gardens, school/community food gardens, and chicken coops to empower the people of Murraysburg. The projects are a starting point to what could be sustainable outreach initiatives with lasting impact in the long run. The event

kicked off with a march against hunger led by the Head of Department, Joyene Isaacs, where the community of Murraysburg came together to declare their commitment to eradicate hunger. Ms Isaacs handed over a "food mountain" to the value of R100 000 to various beneficiaries in the community to address the environmental impact of food production. Ms Isaacs emphasised that food security and access to food is a real struggle for a considerable number of people in the Western Cape. "World Food Day creates the opportunity to give to those people struggling daily and deserve a break." The 2019 event was successful due to the contribution of various public and private sector organisations. These included ABInBev, Oceana, Fruitways, Hortgro, Shoprite, African Biomass Company Chippers, Kaap Agri and the Western Cape Department of Agriculture staff and Elsenburg College students.

"Together we can fight hunger and make a difference in the lives of the people of the impoverished rural communities of the Western Cape", said Isaacs. AP

by Dr Ilse Trautmann, ilset@elsenburg.com

Droning in agriculture and conservation – **a buzz of opportunities**

The Western Cape Department of Agriculture (WCDoA), in collaboration with the United Nations Development Programme (UNDP) GEF5 Sustainable Land Management project, the Endangered Wildlife Trust (EWT) and the Department of Environment, Fisheries and Forestry (DEFF) hosted a two-day interactive drone users conference during November 2019 on the use and application of drones as a monitoring and assessment tool in the agriculture and conservation sector.

This event was one of the many actions of the department to give effect to the 4th Industrial Revolution (4IR) and its exciting opportunities for the agricultural sector (read the department's 4IR report at or scan the QR code: **elsenburg.com/content/4th-industrial-revolution-evaluation-report**).

The conference provided an opportunity for users, practitioners, service providers, and policy- and decision makers in the natural resource management field to interact, share lessons and build networks to use drone and related technologies to achieve sustainable land management and conservation objectives.

"The power of partnerships was once again showcased as this marks the first ever drone users conference in conservation and agriculture in the Western Cape. In our

> Unmanned aerial vehicles or drones are a rapidly evolving technology."

From left to right: Cobus Theron (EWT), Lourens Leeuwner (EWT), Kyra Lunderstedt (UNDP), Lehman Lindeque (UNDP), Insauf de Vries (EWT), Francois Koegelenberg, Dr Ilse Trautmann, Rudolph Roscher, Dr Dirk Troskie and Arie van Ravenswaay (all from the WCDoA).

'Better Together' drive, this multi-partnership brought a new view on drone utilisation, deepened the understanding of drone applications and also started an exciting conversation on drone usage", said Dr Ilse Trautmann, Chief Director: Research and Technology Development at the department and one of the members of the organising committee of the conference.

According to Cobus Theron from the EWT, "Unmanned aerial vehicles or drones are a rapidly evolving technology. They have the potential to radically influence the way we do environmental research and practice conservation. While the possibilities are myriad, there is still much work to be done to bring practice and theory together."

Lehman Lindeque, Global Environmental Facility (GEF5) SLM project manager explained, "During the past two years the SLM project realised the huge potential for using drones as a monitoring tool in the field of natural resource management. We also realised many practitioners in the field of natural resource management want to use this technology, but don't know how and are duplicating effort and 'reinventing the wheel'. Because knowledge management and sharing lessons learnt are project outcomes of the GEF5 SLM project, we decided to host this drone users conference with some of our key stakeholders in the agricultural (WCDoA) and conservation field (EWT)."

The conference was attended by 105 delegates from public and private organisations. The delegates hope to streamline activities and find common ground to create an environment where the regulations involved in managing drones can harmonise with the full potential and reach of drones within the respective sectors. The regulatory aspect remains one of the most common challenges mentioned throughout the conference. The dialogue from the two-day conference was recorded and will help provide guidance on the practicalities of effective drone regulations and the management thereof.

A second drone conference is planned for the latter part of 2020 and more details will be shared later. AP

SA WINE INDUSTRY TRANSFORMATION UNIT NPC

Black-owned wine brands make history at ProWine China

Beverly Farmer (Women in Wine), Malmsey Rangaka (M'Hudi Wines), Denise Stubbs (Thokozani), Sheila Hlanjwa (Lathitha Wines) and Carmen Stevens (Carmen Stevens Wines) at the recent ProWine China.

Eleven black-owned wine brands made history as the biggest delegation yet to attend the annual ProWine China trade show in Shanghai, China from 12 to 14 November 2019. They were Libby's Pride, Thokozani, Bayede!, Cape Dreams, Carmen Stevens Wines, La RicMal, Koni Wines, Lathitha, M'hudi, Women in Wine, and Bridge of Hope Wines. This was the result of a partnership between the SA Wine Industry Transformation Unit (SAWITU) and the Western Cape Department of Agriculture (WCDoA). They supported the brands financially to attend, some of them participating for the first time.

"Our investment in the black-owned brands to participate in this trade show is especially aligned with one of the Wine Industry Strategic Exercise (WISE) objectives that identified China, Africa and the USA as new focus markets for South African wine," says Wendy Petersen, operations manager of SAWITU. "Profitability in the wine industry is under pressure and the competition is tough, especially for our developing wine brands that are competing on a global scale with countries such as Argentina, Portugal, Spain, Australia, and France, among others."

ProWine China creates valuable business opportunities and interactions among producers, importers, distributors, buyers, and industry experts from across the world. It also provides a strategic brand-positioning platform for developing wine brands in this challenging market.

Bongiswa Matoti, Director for Agricultural Economic Services at the WCDoA, emphasised the role of government to create and maintain an environment in which businesses can thrive. This must be done by providing private sector-driven support led by demand, for key growth sectors such as the wine industry.

"For this to happen, partnerships are important and therefore the Western Cape Department of Agriculture collaborated with the South African Wine Industry Transformation Unit and Wines of South Africa to support 11 black-owned brands to participate at ProWine China, one of the biggest promotion platforms in China.

"In addition to strengthening the transformation agenda of the wine industry, ramping up exports and market access are the apex priorities of provincial government, therefore China is one of the growing and targeted markets for South African products, especially wine. It is a huge market, and significant impact in this market can only be realised if various role players join hands in supporting the sector in its marketing drive in this market", says Matoti.

Ms Petersen is excited about the prospects and opportunities for black-owned brands in China. "The overwhelmingly positive response to pinotage, a unique South African wine variety, was a highlight at this year's ProWine China, but it also clearly indicated that a lot more should be done in terms of educating the Chinese market about the variety and quality of our wines," says Petersen. "Packaging and presentation of our wines play a key role when consumers make decisions about which products they are going to purchase."

by Porchia Adams, porchia@phcomms.co.za

Issued by the South African Wine Industry Transformation Unit (SAWITU).

For more information, contact Wendy Petersen, Operations Manager, **wendy@witu.co.za**

Visit the website witu.co.za for more information about SAWITU and follow on Facebook (@WITURSA), Twitter (@witu_sa) or LinkedIn (SA Wine Industry Transformation Unit).

Prof. Robin Meeske.

Prof. Robin Meeske, the silage guy!

by Dr Chris de Brouwer, chrisdb@elsenburg.com

Silage made in wrapping.

Silage can be made from a range of crops and forages, the most popular being maize. Silage crops are harvested at a stage of development that optimises both yield and quality in terms of nutritional composition. The feed is preserved in a very palatable form for an extended period, which can potentially span years. Silage has wide applications in dairy, beef (feedlots) and small stock production systems and can form an integral part of the fodder flow in farming systems. Prof. Robin Meeske, specialist scientist in the Directorate Animal Sciences of the Research and Technology Development programme, has been working for the Western Cape Department of Agriculture since 1995, a career spanning 25 years. He has been the lead animal science researcher at the Outeniqua research farm near George where research into pasture-based milk production is conducted with a herd of jersey cows. Before working for the department, he participated in silage research that formed the basis of his postgraduate studies. He has achieved national recognition for his knowledge in the field of silage manufacturing and use. Because of the excellence of his work he was invited to be a permanent member of the National Silage Evaluation Committee that assesses silage across the country every year. In that capacity he presents the findings of the evaluation annually and gives input for improving silage quality as it forms the basis of many dairy (and feedlot) diets. Prof. Meeske is highly regarded and is mentioned in a recently published list of international silage influencers. He is the only South African on this list at present. AP

RSG 100-104 fm
DIS DIE EEN

Kom gesels en luister saam na *RSG Landbou!*

RSG Landbou (RSG 100–104 FM) word Vrydae om 04:45 en Saterdae om 11:45 uitgesaai en word vervaardig deur die Wes-Kaapse Departement van Landbou. Op die Vrydagprogram help ons graag landbouers met tegniese raad en kennis komende van 'n wye verskeidenheid van kenners. Belangrike nuusgebeure word ook op hierdie inligtingsryke program bespreek. Tydens die Saterdagprogram deel ons stories van hoop en inspirasie oor die mense in die landbousektor. Kontak my, Eloise Pretorius, indien jy self 'n bydrae wil lewer, of indien jy weet van iemand wat kan, by **eloisep@elsenburg.com**.

Listen to *RSG Landbou!*

RSG Landbou is broadcasted on Fridays at 04:45 and Saturdays at 11:45 on RSG 100–104 FM, nationwide. This programme is produced by the Western Cape Department of Agriculture. On Fridays, the programme is filled with useful information from an array of experts with the aim to support and inform the agricultural community. Technical advice is given and newsworthy items are discussed. During the Saturday programme we share stories of hope and inspiration about the people in agriculture. Feel free to contact me, Eloise Pretorius, should you wish to make a contribution on *RSG Landbou*, at **eloisep@elsenburg.com**.

JOIN US IN COOKING!

During the 2019 South African Cheese Festival, it was "cooking" in the Cape Made Kitchen. The new Cape Made Recipe Book 2019 was launched with mouth-watering recipes, meticulously developed by the young chefs of The Private Hotel School. The purpose? To showcase the use of alternative crops in the kitchen.

black cherry, biltong, and blue cheese tart

8 SERVINGS

INGREDIENTS

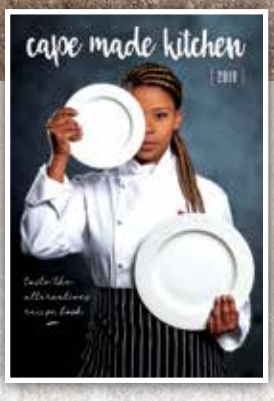
CHEDDAR BISCUIT BASE

150 g	butter, diced
150 g	cake flour
150 g	Cheddar, coarsely grated

TART FILLING

250 mℓ	cream
2	eggs
100 g	blue cheese, cubed
100 g	moist biltong, thinly sliced
100 g	black cherries, pitted and halved (fresh or tinned)

12 CAPE MADE KITCHEN 2019



MORE DELICIOUS **RECIPES**

will follow in future editions of *AgriProbe*.

www.elsenburg.com/resource-library/cape-made-taste-alternatives

METHOD

- Process the butter, cake flour, and cheese in a food processor to combine, and then pulse for 1-2 minutes until the mixture comes together.
- Turn out onto a lightly floured surface, knead until smooth, form into a disc, and wrap in plastic wrap. Refrigerate to rest for 30 minutes.
- Roll out on a lightly floured surface to 5 mm thickness; press into a tart pan, and rest for a further 30 minutes.
- Preheat the oven to 180 °C.
- Whisk the cream and eggs, and keep to one side.
- Place the biltong and cheese in the Cheddar base, pour over the cream mixture, and lastly place the cherries on top.
- Bake for 20-30 minutes until the custard is set, and the base browned and fully cooked.

CHERRIES DON'T IMPROVE ONCE THEY HAVE BEEN HARVESTED, SO THEY MUST ALWAYS BE PICKED 'RIPE AND READY'.

RECIPE BOOK 13

GRADUATION 2019

ELSENBURG AGRICULTURAL TRAINING INSTITUTE

by Maritjie Cornelissen, maritjiec@elsenburg.com

Graduation day! What a memorable day it is, -marking the end of a long academic journey, at times accompanied with both joy and sadness. Whichever one, the day signifies closure of one phase of life, while opportunities beckon on the horizon. As part of the academic tradition, the Elsenburg Agricultural Training Institute hosted another very successful graduation ceremony on 11 December 2019.

As the proud graduates crossed the stage to be capped, many of the staff were moved to tears. Both the lecturers and administrative staff witnessed these students transform from nervous but naively confident, first year students, into sophisticated graduates ready to face their agricultural careers of choice. Long-lasting friendships formed amongst students, providing valuable agricultural networks for the future.

In total, 220 students graduated – the certificate in horse mastership was awarded to 15 students, while 48 received a higher certificate in agriculture and 79 a bachelor's degree in agriculture. The diploma in agriculture was awarded to 20 students and 58 successfully completed the one-year national certificate in plant- and animal production.

All the graduates are now proud alumni of this prestigious institution. Notably, the College congratulates Dawn Loos, the 2019 dux student in the Bachelor of Agriculture degree. She received the following awards for her excellent academic achievements: Best Student in vegetable production, Best Student in agricultural management and Best Student in horticulture.

The *dux* students for the diploma and learnership programmes were Déan Fourie and Anzil Ontong, respectively.

In keeping with the song, '*Gaudeamus Igitur*', "Long live the institution"! AP

REGISTRATION DAY 2020

ELSENBURG AGRICULTURAL TRAINING INSTITUTE

by Maritjie Cornelissen, maritjiec@elsenburg.com

The Elsenburg Agricultural Training Institute welcomed a fresh intake of students on 23 January 2020.

The following first-year students registered: 94 for the bachelor's degree in agriculture, 73 for the diploma in agriculture, 68 for the national certificate in either plant or animal production, and 10 for the certificate in horsemastership, This brings the first-year group for 2020 to a total of 245.

Registration for the senior students took place on 30 and 31 January 2020, bringing the total number of students to 555.

The College is proud that agriculture is these students' career of choice. As the principal, Ms Hayley Rodkin, indicated in the Welcome Guide, the importance of this choice has a direct impact on the country's economy, but more especially that of the Western Cape. It cannot be emphasised enough that agriculture is "an essential source of food, jobs, research and development".

To all our students, a hearty welcome to Elsenburg, and may they enjoy our unique campus in the heart of the Cape Winelands! AP

An inclusive extension approach to successful service delivery: Treintjiesrivier communal farm project in Prince Albert

by Alfred Mokwele, alfredm@elsenburg.com and Vianca Erasmus, viancae@elsenburg.com

The farm Treintjiesrivier is situated south-west of Prince Albert in the Central Karoo region, an arid region with an average annual rainfall of 150 mm and temperatures ranging from -10 °C to 40 °C. The total size of the farm is 5 499,9 ha with grazing capacity of 42 ha/LSU (hectares per large stock unit). This amounts to 130,95 LSU, which is permissible on the farm. Farmers have secured lease agreements with the municipality for a period of nine years and eleven months.

The farm Treintjiesrivier was acquired through the Land Redistribution for Agricultural Development (LRAD) sub-programme of the Department of Rural Development and Land Reform, with the Prince Albert municipality as custodian of the land. The main purpose was to give communal farmers access for agricultural production. The farming enterprises and groups are diverse and the limited land available is increasingly becoming a trigger for conflict between groups on the land.

The services rendered are holistic and focus on sustainability, i.e. social, economic and environmental aspects. The extension approach on Treintjiesrivier is commodity-based to ensure inclusivity in all interventions. This approach has improved participation and adoption of advice given during site visits. The advice and services rendered are determined by the needs of the farmer, in a manner that is most suited to the educational, skill and experience level of the target group.

The following are considered to be the main enterprises on Treintjiesrivier, based on the level of production and size of the operations.

Willey Boerdery:

- Two male beneficiaries are farming with angora goat and meat master sheep for mohair and red meat production, with one shepherd.
- The project delivers mohair of very good quality to the formal market.

Hes-Mar Boerdery:

- Two female beneficiaries are growing vegetable crops and floriculture as the main farming enterprises.
- The project beneficiaries have received recognition and have won numerous prizes for the vegetable production garden before expanding to flowers.
- Two local formal market outlets (Gay's dairy farm and Lazy Lizard restaurant) are buying produce from this project.

Treintjiesrivier communal farm project:

- The project comprises 30 beneficiaries.
- It focuses solely on boer goat farming with an established market.
- Livestock are kept on veld and lucerne pastures as supplement feeding.

»

Permaculture project:

- Two male beneficiaries are focusing on the manufacturing of renewable waste from other agricultural commodities within the commonage to reduce synthetic agro-inputs, e.g. using pigs/kraal manure and crop residues to make compost, and establishing beehives to benefit flori-culture and vegetable production.
- The project strives to achieve three main permaculture ethics, namely caring for the earth, caring for people, and fair share.

The success of the project is highly influenced by the ability of beneficiaries to work in synergy, while sharing scarce resources of the Karoo, namely water and land. The extension approach and the ability of officials to resolve and mediate amidst conflicting situations are pivotal to the impact of the advice and services rendered.

> "The services rendered are holistic and focus on sustainability, i.e. social, economic and environmental aspects."

XHOSA SUMMARY

Ukuqukwa kutyelelo nokunikwa iingcebiso kwamafama kukhokelela kwimpumelelo kunikelo lweenkonzo: Iprojekthi kwifama yoluntu lwase Treintjiesrivier e Prince Albert

iFama i Treintjiesrivier ise Prince Albert, nebukhulu bayo buziHektare ezingama 5 499.9ha, zomhlaba. Le fama ifumaneke ngeNkqubo Yolwabiwo Lomhlaba woPhuhliso lweZolimo (LRAD) kwiSebe loPhuhliso Lwasemaphandleni Nokubuyiselwa koMhlaba woLuntu nguRhulumente (DRDLR) kunye nomasipala wase Prince Albert nongumgcini walo mhlaba. Eyona njongo ibikukunika amafama asekuhlaleni amathuba okulima/okufuya. Ohlukile amashishini ezolimo kunye namaqela, amanye ala mashishini alandelayo aqaliswa e Treintjiesrivier yi: Willey Boerdery, Hes-Mar Boerdery, Co-operative project kunye ne Permaculture project.

Ukutyelela nokunika iingcebiso kumafama ase Treintjiesrivier kuyakwenziwa kulawo avelisa iimveliso zorhwebelwano ukuze siqiniseke ukuba onke ayalufumana ungenelelo esilwenzayo. Ubungqina, olu tyelelo nonikelo lweengcebiso luyiphucule intatho-nxaxheba nokwamkelwa kweengcebiso xa siwatyelele amafama kwiifama zawo. Iinkonzo zotyelelo neengcebiso esinikela ngazo luqhutywa ziimfuno zamafama, kukulungelelanisa iinkonzo nomgangatho wemfundo, izakhono kunye namava omgama lowo. AP

DYNAMIC QR CODES

AgriProbe readers will be familiar with the QR codes that appear a number of times in the magazine as a fully integrated content and marketing solution across print and digital platforms. But not everyone knows what they are or how to use them.

A QR code (an abbreviation for Quick Response Code) is a square two-dimensional barcode that was originally designed for use in the automotive industry in Japan. The barcode is machine-readable, which means you can capture the QR code by means of a scanner app on a smartphone.

This low-tech solution is extremely useful as it makes it possible for you to access interactive material that will enhance your experience of text – for example, if *AgriProbe* runs a story on alternative crops and its uses, you will be able to see a video of the interviews simply by pointing your smartphone at the QR code in question. No effort required!

STEP 1

The first step is to download a scanner app from the app store on your phone (simply type in 'QR reader' and a variety of scanners will appear in the menu).

STEP 2

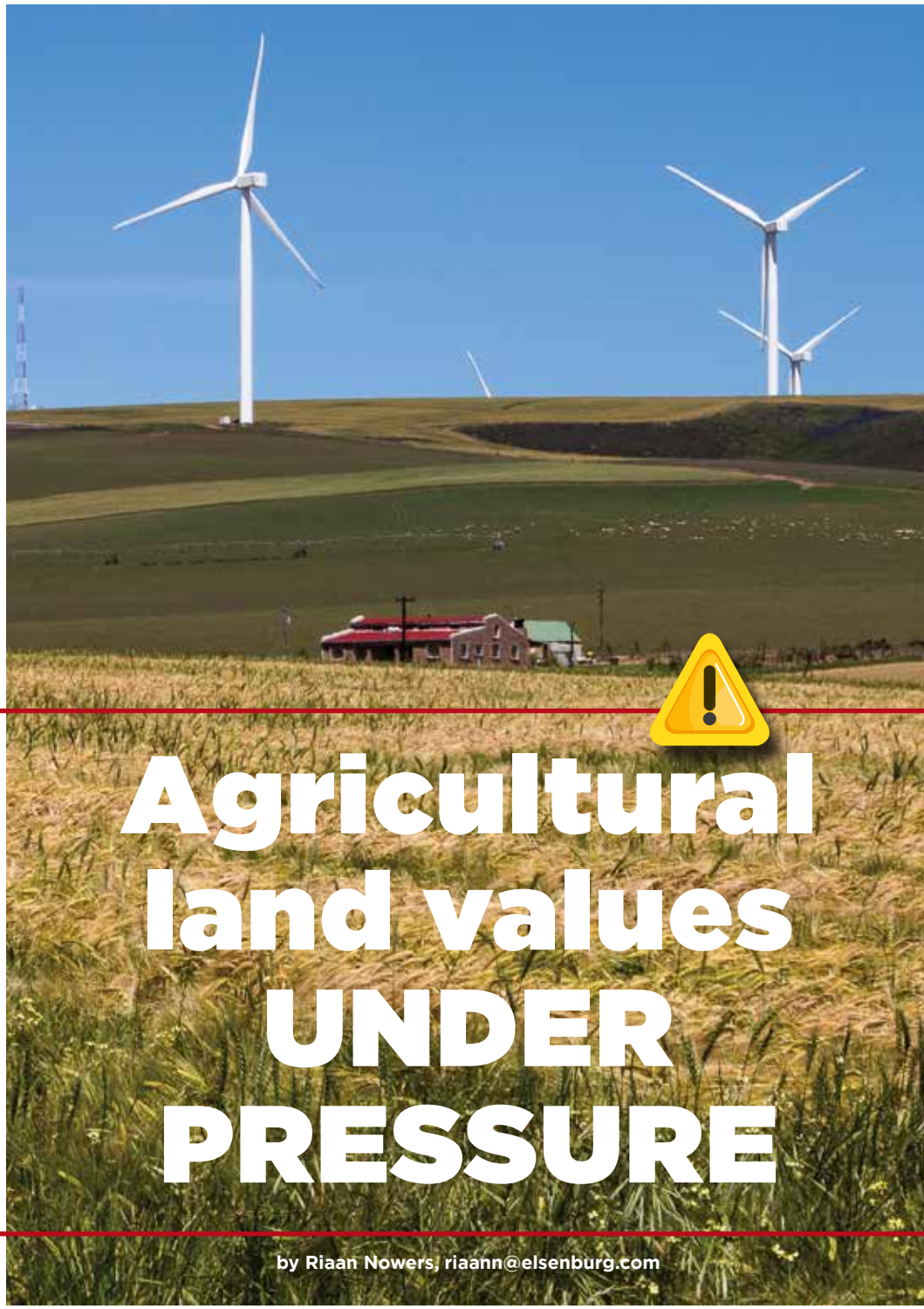
Once you have downloaded the app, open the app on your smartphone.

STEP 3

Point your smartphone's camera at a QR code appearing on the page of t he magazine.

STEP 4

Wait while the camera captures the barcode and directs you to the desired video or website.



Agricultural land values UNDER PRESSURE

by Riaan Nowers, riaann@elsenburg.com

Land, especially agricultural land, has for the past few years been one of the biggest socio-economic issues within the political arena in South Africa. The redistribution of land to designated groups remains one of the central themes of many a political agenda.

The Western Cape Department of Agriculture has kept track of market price movements of agricultural land since 2003. The aim is to follow land price trends provincially, but particularly at local municipal level.

The database discriminates between small, medium, and large farms and makes provision for both traditionally intensive cropping areas (read Cape Winelands) as well as traditional livestock farming areas such as the Little and Central Karoo regions. This comprises 108 datasets, which enables the tracking of land price trends across the Western Cape as well as neighbouring farming areas.

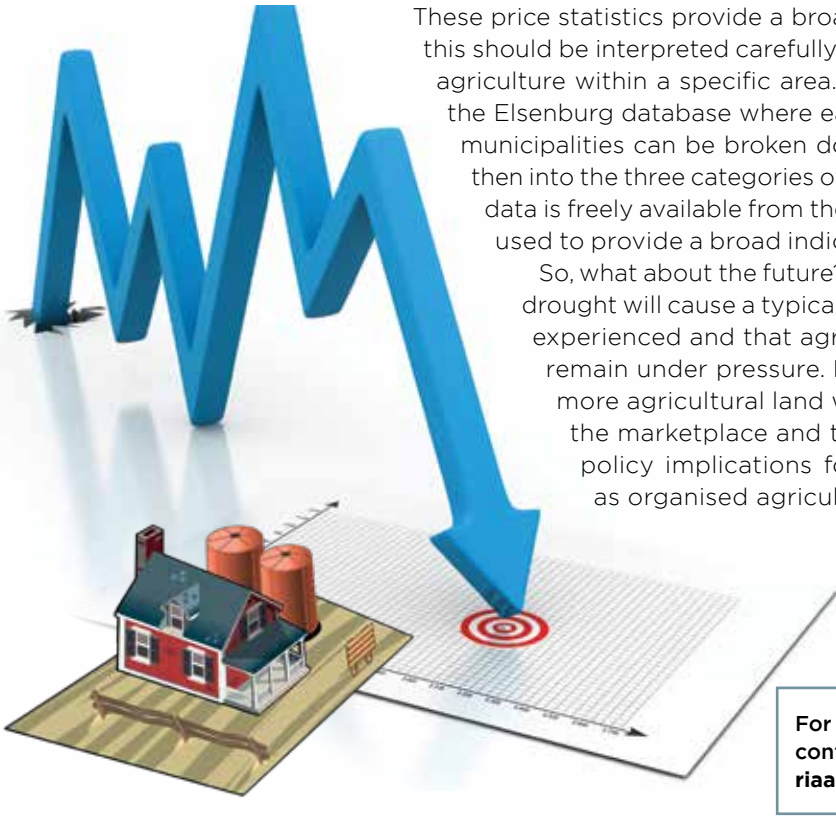
Whereas this database provides a valuable tool for price trend analysis, it should only be used to understand broader price movements, since it does not discriminate between the infrastructure on farms, high-, medium- or low-potential agricultural land, or the availability and quality of water on the land itself.

The database indicated that 855 farm transactions were concluded during 2019. This is in line with the long-term average of 823 farm transactions and it constituted 572 418 hectares. This is 5% of agricultural land in the Western Cape (long-term average is 4,9%) and is somewhat lower than expected. Drought conditions led to speculation that more farms than normal would be made available in the land market. As can be expected, the Central Karoo transacted the biggest area (183 043 ha), followed by Eden with 86 441 ha. The Little Karoo is part of this district municipality. In most of the district municipalities, agricultural land values declined as shown below (R/ha):

	2017	2018	2019
Central Karoo	**2 019**	**2 045**	**1 895**
Overberg	**30 708**	**34 608**	**37 932**
Eden	**49 074**	**20 036**	**14 004**
Cape Metropole	**149 619**	**105 337**	**99 265**
Cape Winelands	**38 951**	**31 886**	**27 070**
West Coast	**1 063**	**1 502**	**1 340**

“Agricultural land prices will remain under pressure.”

»



These price statistics provide a broad analysis of trends but this should be interpreted carefully against the dynamics of agriculture within a specific area. This can be done using the Elsenburg database where each of the above district municipalities can be broken down into rural areas and then into the three categories of farms for each area. The data is freely available from the department and can be used to provide a broad indication of farmland value.

So, what about the future? It is anticipated that the drought will cause a typical time-lag of effects to be experienced and that agricultural land prices will remain under pressure. It is to be expected that more agricultural land will be made available in the marketplace and this may have important policy implications for policymakers as well as organised agriculture.

For more information, please contact Riaan Nowers at riaann@elsenburg.com.

XHOSA SUMMARY

Ixabiso lemihlaba yezolimo liphantsi koxinezelelo

Kule minyaka idlulileyo, umhlaba, ingakumbi umhlaba wezolimo ube yeyona nto ingundaba-mlonyeni kwezoqoqosho-nentlalo kupolotiko eMzantsi Afrika.

Ukususela ngomnyaka ka 2003, iSebe leZolimo eNtshona Koloni libeke esweni ukuhla-nokunyuka kwamaxabiso emihlaba yezolimo ezimarikeni.

Ulwazi oluselugcinweni lubonise ukuba ngonyaka ka 2019, ngama 855 iifama ekuthengiselwene ngazo nekuyinto elinganayo nomminge weminyaka eliqela apho kuthengiselwene ngeefama ezingama 823. Oku kwenza kangange 572 418 yeeHektare zomhlaba olingana ne 5% kumhlaba wezolimo eNtshona Koloni uphela (umminge wexesha elide woba yi 4.9%). Kuninzi looMasipala beziThili, lihlile ixabiso lemihlaba yezolimo kunokuba bekulindelekile nokubangelwe yimbalela ebethe kwiingingqi ezininzi.

Ezi nkcukacha-manani zalamaxabiso angentla, zisinika uhlalutyo olucacileyo lwemizila, kodwa nanjengokuba sekuphawulwe, oku kufuneka kutolikwe ngobulumko kujongwe nezinye iinkalo zezolimo ngokushiyana kweendawo. AP

Game on! or Game over!

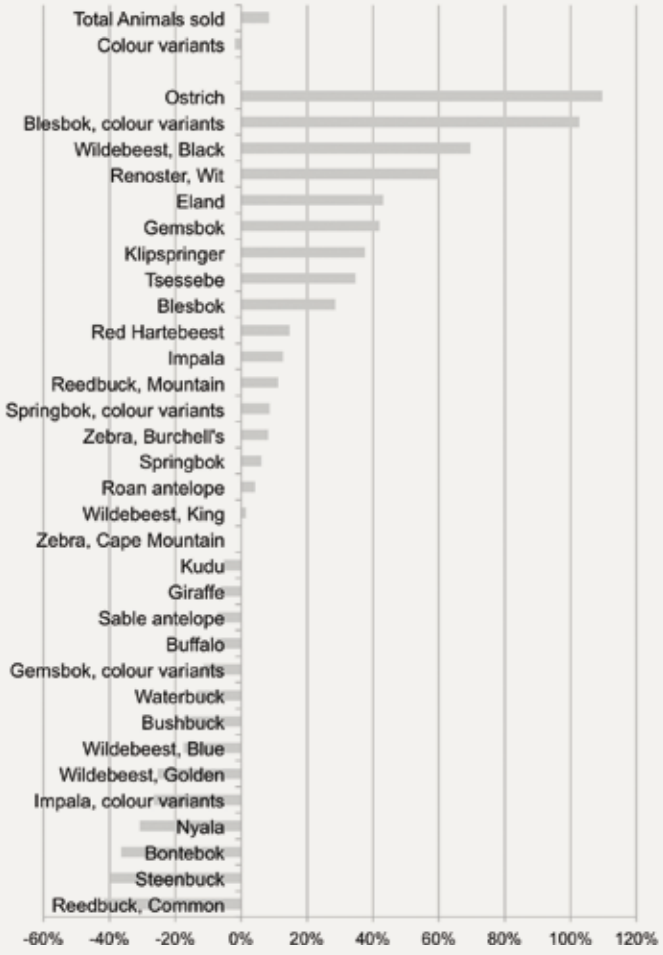
by Riaan Nowers, riaann@elsenburg.com

The game auction database housed at Elsenburg by the Western Cape Department of Agriculture contains game auction data from 1986 onwards. It is a powerful tool for tracking the growth and structural changes within the growing game industry of South Africa.

In previous articles, this database showed how the game auction industry reached its pinnacle in 2015 with a gross turnover of more than R2,327 billion. The 2019 season (turnover of R657,8 million) realised another high in terms of most animals ever sold, namely 49 799.

Graph 1 demonstrates the fluctuation in sales of selected species between 2018 and 2019. Black wildebeest, eland, gemsbok, klipspringer, tsessebe and blesbok proved to be popular in 2019. Bontebok, nyala, blue wildebeest, bushbuck, waterbuck and even sable antelope and buffalo sales showed a decline of more than 7% in 2019.

Graph 1: Percentage change in numbers sold during 2018 vs 2019 of selected species



»

Colour variant sales hovered around 10% of animals sold, and the average price plummeted to new lows, as in previous years. Although most species' average prices came down somewhat because of the higher number sold, the good news is that it seems to have stabilised as supply and demand evened out. On the positive side, exceptional quality animals achieving record prices were available on auction.

Looking at Figure 1, it becomes evident that in 2018 most game auctions realised a turnover between R1 million and R3 million. However, during 2019 it became clear that turnovers dropped drastically with a turnover between R1 million and R2 million for most of the auctions. Table 1 also supports this drop in turnover with the average now being the lowest since 2015, notwithstanding the increase in numbers of game sold.

This may sound like the game auction industry is moving backwards but the opposite is true, as more role players at various levels have now entered the industry. More auctions by more auction houses, higher numbers of game sold and persistent

"On the positive side, exceptional quality animals achieving record prices were available on auction."

record prices point to a game industry that has flourished and stabilised with supply and demand reaching equilibrium.

It becomes clear that in order to be successful in this continuously growing industry, quality animals, effective marketing of auctions and game suppliers, ethical business deals, and properly researched and managed vertical integration within the ecotourism market are needed.

If this can be achieved, we can safely say "Game on!"

Figure 1: Numerical spread of auction turnovers

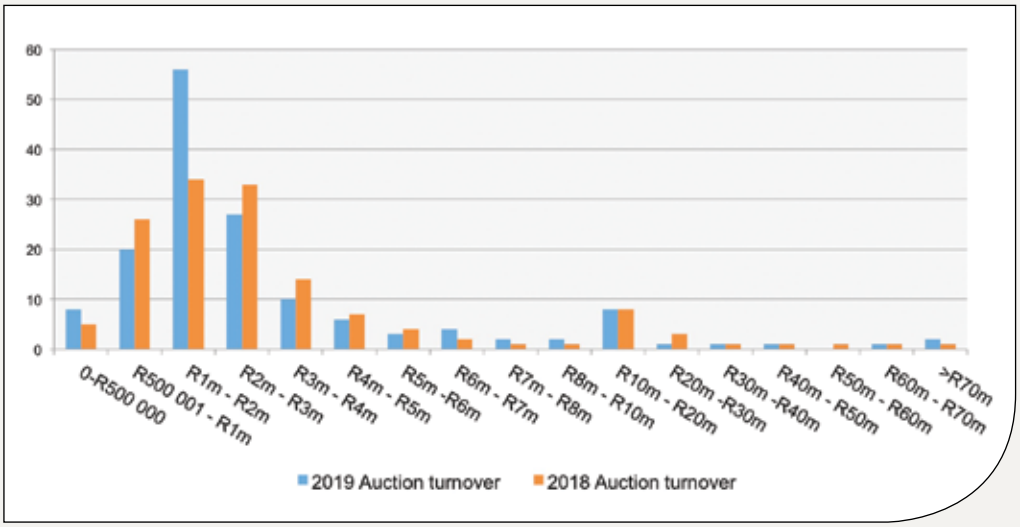
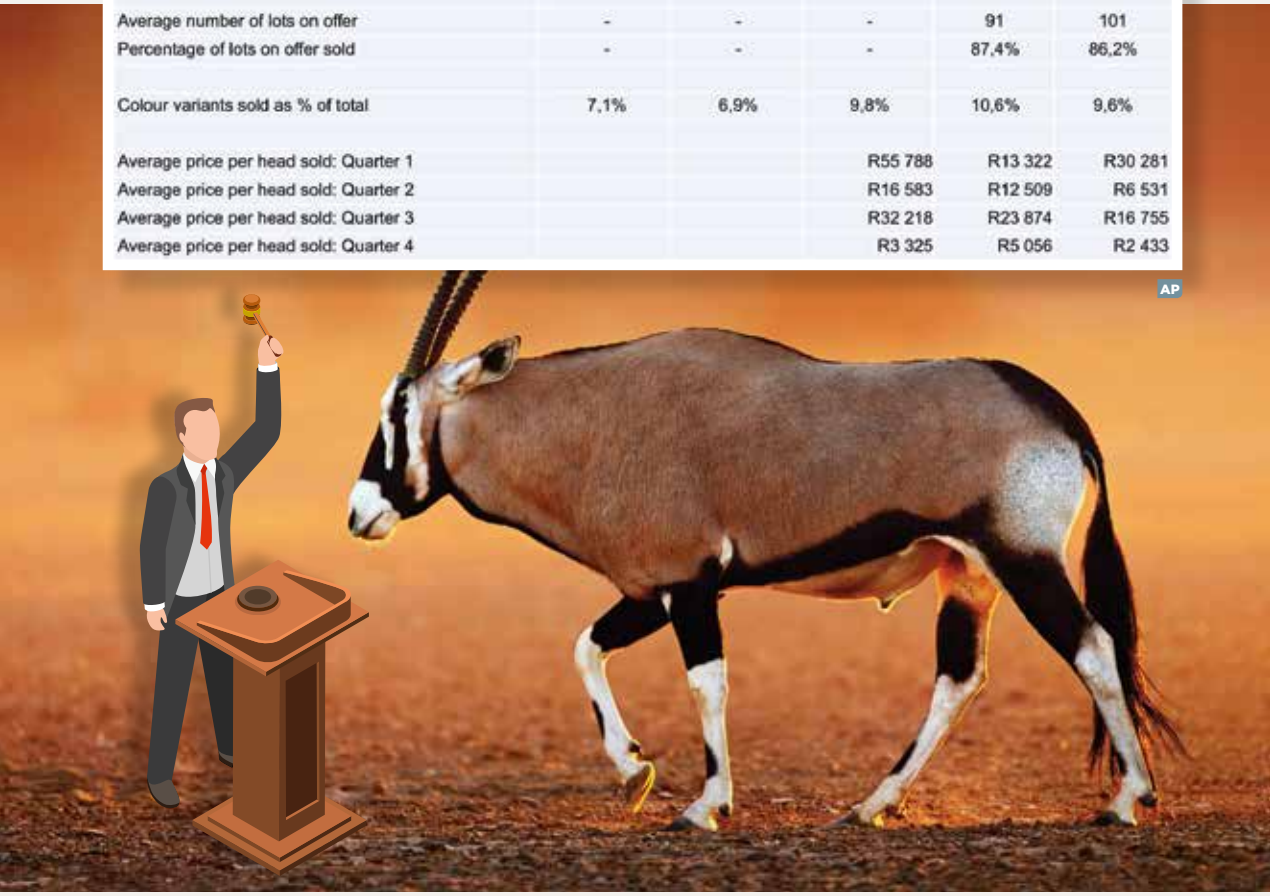


Table 1: Performance of game auction industry: 2015-2019

PERFORMANCE OF GAME AUCTION INDUSTRY: 2015-2019

	2015	2016	2017	2018	2019
Number of auctions	128	127	137	143	151
Gross turnover	R2 327 107 815	R1 953 438 736	R1 085 151 325	R737 817 664	R657 796 780
Total head of game sold	46 982	44 605	44 058	45 929	49 799
Average auction turnover	R18 180 530	R15 381 407	R7 920 813	R5 159 564	R4 356 270
Average auction turnover: Quarter 1	-	-	R12 886 963	R4 987 796	R8 120 426
Average auction turnover: Quarter 2	-	-	R6 000 194	R4 027 752	R2 703 310
Average auction turnover: Quarter 3	-	-	R8 019 562	R7 227 338	R4 540 771
Average auction turnover: Quarter 4	-	-	R2 890 617	R1 618 001	R1 139 736
Average number of game per auction sold	367	351	322	321	330
Average head of game sold: Quarter 1			231	374	268
Average head of game sold: Quarter 2			362	322	414
Average head of game sold: Quarter 3			249	303	271
Average head of game sold: Quarter 4			869	320	468
Average percentage of animals sold per auction			86,7%	86,7%	89,3%
Average number of lots on offer	-	-	-	91	101
Percentage of lots on offer sold	-	-	-	87,4%	86,2%
Colour variants sold as % of total	7,1%	6,9%	9,8%	10,6%	9,6%
Average price per head sold: Quarter 1			R55 788	R13 322	R30 281
Average price per head sold: Quarter 2			R16 583	R12 509	R6 531
Average price per head sold: Quarter 3			R32 218	R23 874	R16 755
Average price per head sold: Quarter 4			R3 325	R5 056	R2 433




ADD TO CART
E-COMMERCE

E-commerce: opportunities and challenges for the Western Cape agricultural fresh produce sector

by Vanessa Barends-Jones, vanessab@elsenburg.com

Farmers face the challenge of where to market their produce on a daily basis, especially the smallholder farmers who have little or no bargaining power. E-commerce could be the answer to the "where-to-sell" question for many South African farmers. This mechanism provides small and large businesses with an electronic platform to expand their businesses into previously inaccessible markets at minimal or no cost. As more markets are penetrated, sales will increase, which will lead to more opportunities for expansion due to the need for more outputs. This will, therefore, lead to more jobs being created. Farmers making use of online platforms sell directly to the buyer and are, therefore, cutting out the middleman. This leads to better prices for the farmer, and fresher produce reaching the consumer on time with less food wastage. Since agriculture and its related industries make up a significant share of GDP and employment, the online option is set to boost sales and lower transaction costs, resulting in greater economic growth and job creation.

Globally, the sale of fresh produce being sold online accounts for a small share of total sales, which is expected to grow to approximately 7% by 2030. In South Africa, e-commerce amounts to 1% of total retail sales, which includes food and drink. Combined, the food and drink category makes up 14% of total online sales and includes agri-processed goods. The South African agricultural community is a close-knit community and business is mostly driven by personal relationships. This implies that more one-on-one transactions take place and decisions are not purely based on economic principles. Factors affecting the speedy adoption of e-commerce for the agricultural sector are as follows:

- Limited personal interaction (trust is lacking)
- The quality and perishability of fresh produce
- An accurate balance between supply and demand

»

- Specialised storage facilities and transport modes (high capital investments)
- Security concerns – payment and fraud
- Lack of specialised IT (information technology) skills within the farming community
- Absence of and/or limited internet/network connectivity in rural areas (the hub of smallholder farmers)
- The reluctance to use a computer or a smartphone as a business tool where money is involved
- Computer illiteracy among the older farmers

The e-commerce platform for the agricultural sector has both positive and negative spin-offs, and they can be used as an advantage against the competition. Opportunities that exist are as follows:

- Entry to larger and diverse markets
- Barriers to entry for smallholder producers are disappearing
- Potential higher income for producers
- Ability to link with third-party marketplaces that are already established and are reaching a bigger and wider audience
- Post-harvest wastage can be minimised
- Social media can be used as free or cheap marketing tools
- Opportunity to add value in order to extend the lifespan of the product

The disadvantages of adopting an e-commerce model are as follows:

- The website could crash due to high volumes and poor bandwidth
- Security concerns – protecting consumers' personal and financial information
- Quality and consumer satisfaction – products are intangible online and customer satisfaction can only be measured after delivery
- Late delivery due to unforeseen circumstances such as strikes, accidents and road closures
- High labour cost of the technical team that operates and maintains the website

Various online platforms for farmers selling their fresh produce exist in South Africa. Two of these platforms could be beneficial to the smallholder farmers. One is similar to a trading platform for buyers and sellers and the other is a box scheme concept. The latter is a specific production market value chain where a variety of locally sourced fresh vegetables, fruits, and herbs are sold directly to the online consumer. Consumers can choose from tailor-made boxes to seasonal box schemes. These are two of the marketing options for the Western Cape smallholder farmers, but further research needs to be conducted to see which option meets their needs best and how the adoption of e-commerce models might benefit them. Research also needs to be conducted to weigh the factors affecting the uptake of e-commerce versus the opportunity costs to determine the viability of such a platform.

The adoption of e-commerce has the potential to assist in solving constraints faced by smallholder farmers to access market opportunities. This platform can also be used to promote the development of rural economies with regard to economic growth, poverty relief and employment growth and illustrates the importance of undertaking further research. Further information on these marketing channels can be obtained from vanessab@elsenburg.com. AP

Hot topics under discussion by African agricultural economists

by Mr. Tshepo Morokong, tshepom@elsenburg.com and Dr Dirk Troskie, dirkt@elsenburg.com

Two officials from the department recently attended the sixth triennial conference of the African Association of Agricultural Economists (AAAE) in Abuja, Nigeria. The role of farming in African economies, food insecurity, gender dynamics, agriculture as a catalyst for economic development, and changes in farm size were some of the important topics being discussed within the African context.

The presidential address by Dr Edward Mabaya focused on the importance of seeds in African agriculture. He reminded the audience of the importance of agriculture and that 160 million Africans are still food-insecure. Coupled with the fact that Africa's population growth is the highest in the world (and expected to accelerate), the increasing demand for food in the face of the continent's low agricultural productivity is an area of concern.

In sub-Saharan Africa, agriculture contributes 15% to the Gross Domestic Product (GDP) and employs 50% of the labour force. Of the farmers, 80% are smallholders and women produce 40% of

»

the food. A comparison of fertiliser use between sub-Saharan Africa and the rest of the world shows an average of 15 kg/ha in Africa and 135 kg/ha for the rest of the world. Cereal yield in Africa is 1,5 tonnes per hectare compared to 6 tonnes per hectare in Northern America and Europe. Providing the technology embedded in improved seed cultivars is one of several ways to enhance agricultural productivity. To this end The African Seed Access Index (TASAI) was developed and it currently covers the four most important seed types in 21 countries (including South Africa). For more information about TASAI use the following link: **tasai.org.**

Prof. Cheryl Doss from Oxford University is a development economist with research interests in assets, agriculture, and gender issues. She delivered the memorial address on the topic "Gender dynamics in households". She argued that it is incorrect to assume that a household as a unit has a single utility function. Her experience with collecting household data shows significant dynamics within households and that the relationship between husband and wife greatly influences the nature of answers provided.

Professor Emeritus John W Mellor from Cornell University addressed the topic "Core requirements for rapid agricultural growth and poverty reduction in sub-Saharan Africa".

Dr Mabaya concluded by sharing words of wisdom for young economists. They must:

- master the tools of analysis (econometrics and other quantitative analytical tools) – these make them economists;
- conduct applied research, which should answer the "so what" question;
- build international and professional networks – reach out to the "thought" leaders in the field;
- keep the passion by understanding the stories behind the data; and
- explore new frontiers – make their advisers uncomfortable (e.g. conduct research on new topics such as climate change, nutrition and the Fourth Industrial Revolution).

Local people sell farmer products and other goods on the rural market in a slum along the road nearby Nairobi.

He argued that agricultural growth is still possible in Africa but for it to happen, investment in rural infrastructure, agricultural research and extension is required. He emphasised that farming is biological in nature and geographically diffused; therefore diffused agricultural support is important to ensure tailored research for each farming area.

The trend away from smallholder farming and towards medium-scale farms (5 to 100 ha) was confirmed by Dr Hambulo Ngoma (Zambia) and Prof. Tom Jayne (Michigan State University). These trends were first described during the 2016 AAAE Conference. Dr Ngoma indicates that the 5 to 20 ha farms in Zambia have increased by 400% between 2009 and 2018 and clear positive direct and indirect spillover effects could be observed. Prof. Jayne argues that the "land grab" was not so much driven by foreign investors, but rather by citizens of the various countries themselves. The same trends are also visible in Ghana and Tanzania. Medium-scale farms in Africa appear to be a source of rural dynamism by attracting large-scale traders (e.g. Cargill, Afgri), mechanisation rental markets and also agricultural input and service providers.

Prof. Miet Maertens from KU Leuven discussed the export boom in horticultural products from Africa, with countries such as Kenya and Senegal at the forefront. It started with smallholder contract farming, but the predominant model has changed to large-scale integrated farming. The main reason is the rise of standards in export markets with the unstated implication that producers must provide certain guarantees. Hence, smallholder farmers have now moved from product market participation to participation in the labour market. It was argued that contract farming is more exclusive and its impact more concentrated than employment provision. About 35% of households in the research area now supply employment to large-scale farms and the number of people living below the poverty line declined from 55% in 2006 to 25% in 2013. The Gini coefficient declined from 0,432 in 2006 to 0,385 in 2013.

At the end of the conference Dr Troskie stepped down as Southern African representative on the Executive Committee of the AAAE. Ms Lulama Traub from the Department of Agricultural Economics at Stellenbosch University will now assume this role. Dr Troskie will continue as e-newsletter editor. AP

For more information about the AAAE use the following link: aaae-africa.org.

The launch of the Pan-African Network for Economic Analysis of Policies (PANAP) in Addis Ababa, Ethiopia

by Tshepo Morokong, tshepom@elsenburg.com and Dr Emanuele Ferrari, Emanuele.FERRARI@ec.europa.eu

The Pan-African Network for Economic Analysis of Policies (PANAP) is a network for researchers, data producers and analysts from governmental bodies and other research institutions in various partner countries. These countries collaborate with the European Commission and the African Union Commission in developing research on agricultural economics and policy issues with the focus on Africa. The objective of the PANAP network is to strengthen the liaison between researchers/scientists and policymakers in Africa and to stimulate their cooperation on selected topics linked to policy priorities that reinforce the agricultural sector's stability in Africa. The collaboration between the Joint Research Centre (JRC) team and seven pilot African countries (Kenya, Tanzania, Côte d'Ivoire, Niger, Senegal, Sierra Leone and Ethiopia), resulted in intensive sharing of knowledge on applied policy impact analysis in agricultural and food sectors. However, to continue collaboration with other African countries, most of the JRC's efforts will now be channelled through PANAP.

The launch of PANAP took place during November 2019 in Ethiopia, and one official from the Western Cape Department of Agriculture attended this event. He said that empirically tested economic models based on reliable data are important to formulate

scientifically based evidence, which would then inform sound agricultural economic and food security policies.

The State Minister of Agriculture in Ethiopia, Mr Sani Redi, explained that agriculture is the backbone of the economy and makes a significant contribution to poverty reduction relative to other sectors of the economy. He appreciated the strategic collaboration that his country has with the JRC team from the European Union Commission. He also said that the JRC assisted with the quantification of rural job creation and agricultural impact on the economy through analysis of the farms sector and future food systems. He emphasised that PANAP would serve as a good platform to increase international interaction and the continued analysis of economic policies.

Dr Godfrey Bahiigwa from the African Union Commission, Department for Rural Economy and Agriculture (DREA), indicated that PANAP is premised in the European Union (EU) and African Union (AU) partnership, and it is an embodiment of the commitment by the EU to build economic policy modelling capacity among member states. This will enable member states to formulate reform policies based on scientific evidence. On the second and last day of the conference, the participants attended a workshop on the quantitative impact of agri-food policies at macro and farm household level economic models based on selected country case studies.

The PANAP initiative can be beneficial to South Africa and the Western Cape in terms of lesson exchange on the use of economic models to assess the impact of agriculture and food security policies. Furthermore, PANAP contributes to closing the statistics data gap that exists in the continent by ensuring the availability and accessibility of country-specific data at farm household and national level. AP

For examples, follow this link or scan the QR code: datam.jrc.ec.europa.eu/datam/area/PANAP

Signs of recovery in the Western Cape agricultural sector

by Andrew Partridge, andrewp@elsenburg.com, Tshepo Morokong, tshepom@elsenburg.com and Ayabonga Sibulali, ayabongas@elsenburg.com

The *Western Cape Agricultural Sector Profile* is an annual publication developed by the Agricultural Economics Services Programme of the Western Cape Department of Agriculture. It provides a comprehensive and up-to-date overview of the Western Cape agricultural sector and highlights key trends shaping the sector, analysing them in the context of the current economic and policy climate. The 2019 *Sector Profile* has now been completed and is freely available.

The agricultural sector in the province is still in recovery following the recent drought, which has had a devastating impact on agriculture in the Western Cape (WC). There were real declines in gross value added (GVA) in agriculture (-7,9%), food (-4,2%), and beverages and tobacco (-1,0%). The fall in the food-processing subsector is a matter of concern as this sector has been performing very well in recent years. It could be a delayed impact due to the drought affecting the subsector through the strain on the province's agricultural sector, which supplies intermediate goods for food-processing production.

Despite sector decline, exports in the WC agricultural sector have continued to grow strongly even in real terms. For the second consecutive year, exports of food, beverages and tobacco fell in real terms after growing strongly in the previous years. In recent years there has been an observed shift in exports away from traditional markets, particularly in Europe, in favour of African and Asian destinations. However, 2018 marked a slight recovery of these markets, resulting in an increase in share of exports from the previous year, albeit still lower than the share of exports in 2008. Oranges, table grapes and bottled wine remain the province's main agricultural

> The 2019 *Sector Profile* has now been completed and is freely available."

outputs, jointly accounting for 28% of all agricultural exports. Citrus products performed particularly well in the past year.

There were signs of recovery in terms of employment, with an upturn in seasonally adjusted employment numbers in the agricultural sector. Between the last quarter of 2017 and the last quarter of 2018 there were 7 115 seasonally adjusted new jobs added. Employment in the food, beverages and tobacco sector fell slightly in the past year. The two sectors, jointly analysed, also exhibited an increase in terms of the share of employment made up of female and black workers, but a decrease in the youth employment share. The year 2018 was the third consecutive year where the number of households participating in agricultural activities outside of paid employment fell after having grown strongly up to that point.

Investment has been declining in both the agricultural sector and the food, beverages and tobacco sector. This is another cause for concern as investment is needed to develop the sector and grow moving forward. A positive side note on investment was the real increase in investment in research and exploration in both sectors.

The growing population and decreasing average household size have also meant that the number of households has grown in the province, providing a growing domestic market. Inflation in the WC, and particularly food inflation, was again lower than national inflation. However, inflation on alcoholic beverage products increased dramatically from 2017 to 2018, probably as a result of correction after very low international wine prices in 2017.

The picture overall is still relatively gloomy; however, there are more and more pockets of light breaking through. The outlook for the WC agricultural sector seems to be promising. AP

To obtain the 2019 *Western Cape Agricultural Sector Profile*, email Andrew Partridge (andrewp@elsenburg.com) or Tshepo Morokong (tshepom@elsenburg.com)

Monitoring and evaluation evidence use and the influence on government policy

by Shelton Mandondo, sheltonm@elsenburg.com

The Western Cape Department of Agriculture (WCDoA) has commissioned 24 external evaluations over the past six years. The programmes evaluated were identified for a variety of reasons, mostly related to questions of relevance, focus/scope, effectiveness, and alignment with emerging government priorities and mandates. However, some evaluations commissioned have had a forward-looking interest, such as the opportunities provided by the Fourth Industrial Revolution (4IR). Managers found the evaluation process to be valuable because it caused the programme staff to reflect on what they were trying to achieve through their programmes, as opposed to simply delivering services. There is widespread evidence of improvements in programme delivery and effectiveness of programmes in keeping with improvement plans.

Evidence generated has caused a new way of thinking that recognises that programme achievements are as often as not the outcomes of interaction between different programmes and agencies. This emerging framework causes a more evidence-based systemic approach, through mapping out the relationships between programmes, sub-programmes, internal and external partners. It recognises the interrelationships between programmes and their desired impacts.

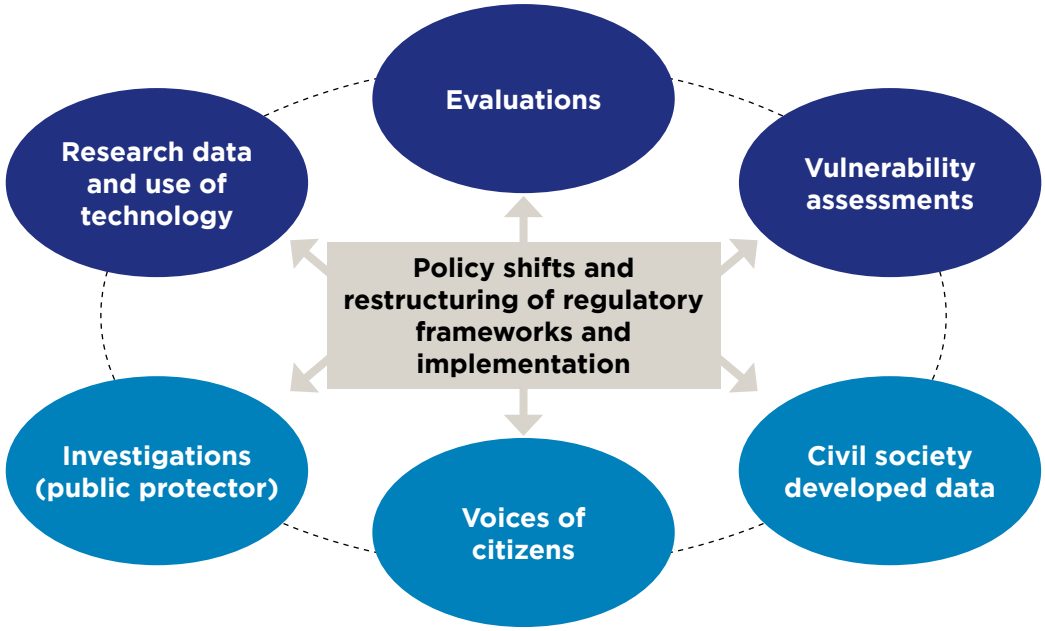
The WCDoA approach has been acknowledged nationally. At the recent South African Monitoring and Evaluation Association Conference[1] (SAMEA), delegates placed greater emphasis on using evaluation evidence to influence government policy decisions and to restructure regulatory frameworks worldwide. Evidence use can be loosely described as the use of the best

available data, information and knowledge that are gathered with an objective evaluation process. Decisions can then be made that optimise planning processes, improve outcomes and have the greatest community impact.

The use of evidence is important for improving development outcomes in a number of ways. It can trigger resource allocation, policy shifts and accountability, and ensure good governance. Different types of evidence answer different questions and therefore evidence synthesis is needed because one manifestation may not be enough to justify decision-making. Government intervention policy ought to be guided by robust evidence to ensure the greatest impact on citizens. However, it is equally important to target the correct levels of power to secure the greatest buy-in. Strengthening evidence use for example in the executives, parliament, civil society, and media will go a long way towards making informed choices for policymaking and refinement, and effective implementation thereafter. The evidence must be disaggregated to reflect the realities of different stakeholders, especially the disadvantaged. The South African Monitoring and Evaluation Association (SAMEA) preferred evidence generation toolkit for policymaking is represented in Figure 1 below:

Policymaking – evidence generation process

SAMEA preferred route

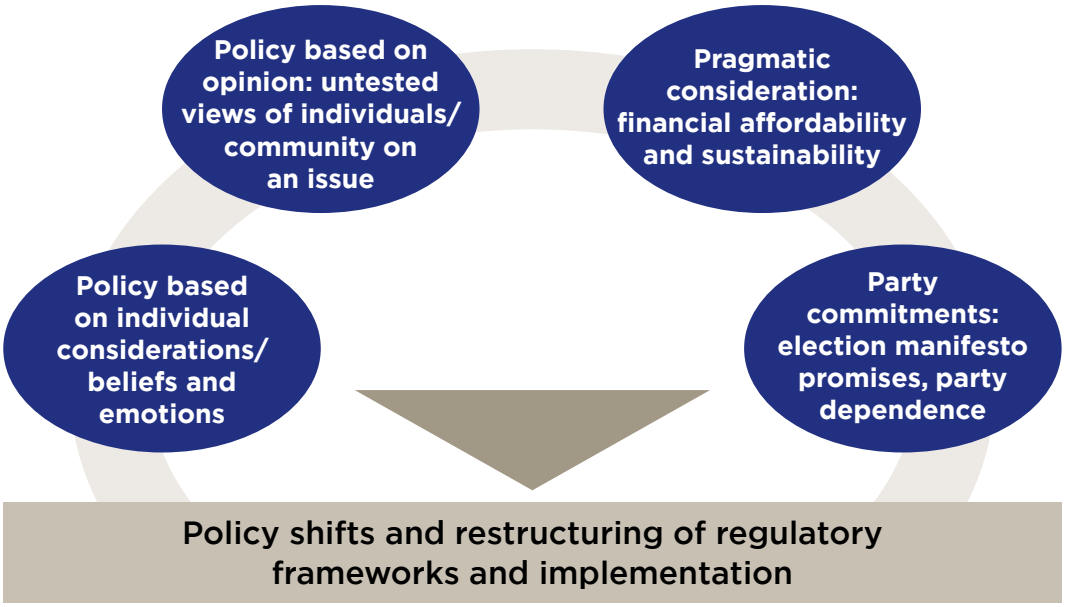


[1] The 7th South African Biennial SAMEA Conference was held from 21 to 25 October 2019 at the Emperors Palace in Gauteng and 582 delegates from the five continents attended.

While practitioners are advocating for evaluation evidence to guide policy shifts and effective governance, other informants have influenced policymaking and the extent of evidence use in government. Figure 2 represents alternative policymaking informants:

Policymaking – evidence generation process

Alternative influences



The above informants clearly show that evaluation evidence use is only one criterion for policymaking and rarely gives an uncontested solution to complex public problems. That being said, there is a growing body of evidence proving that evidence use and good governance can complement each other. Figure 3 represents the relationship between monitoring and evaluation evidence use and good governance:

Evidence use and good governance

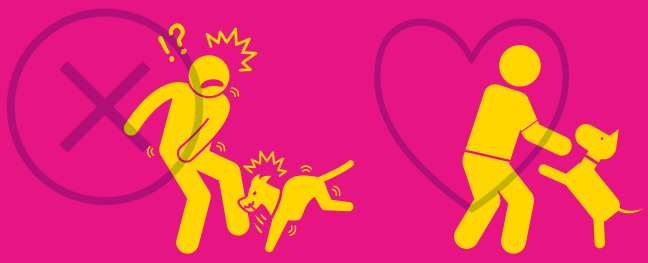
Evidence use in the executives, parliament, civil society and media leads to better choices, influence on policymaking and effective implementation

So what?

The WCDoA demonstrated that evidence use is important for improving development outcomes in government. It can trigger policy shifts and resource allocation when applied without external influences. However, the data must be disaggregated to reflect the realities of different stakeholders (interested and affected) for effective utilisation. As different types of evidence respond to different questions (for example, a solid research report may be an enabler, but not sufficient for evidence use) and therefore evidence synthesis is needed to justify decisions.

It is important to note that many factors can constrain evidence-informed policymaking, resulting in different outcomes when implemented. Literature shows that specific contexts and traditions, political priorities, individual beliefs and preferences, social values and available resources all play a role. This means that some intervention decisions could be based on perceived short-term opportunities, without any systematic planning and review of the best evidence for an effective approach.

The evaluation process to generate evidence should not just be construed as an evidence-extracting exercise. It should be dialogical and reflexive. Making sense of the experiences of programme staff and beneficiaries will help them to develop deeper understanding and insight. Practitioners can celebrate evaluation evidence use as the way to go towards sustainable interventions, but it is only one criterion for policymaking and rarely gives an uncontested solution to complex public problems, especially in a developing and culturally diverse country, such as South Africa. AP



Fare-well rabies – hello well-fare!

A fun educational event

by Dr Catherine-Anne Fox, cathyf@elsenburg.com

Since World Rabies Day fell on 30 September and World Animal Welfare Day a few days later on 4 October, a combined World Animal Day event was held at the state veterinarian's office in Oudtshoorn in October 2019.

The aim was to create broader awareness of the dangers of rabies among the public and to improve local awareness of animal welfare and pet care through school education. Over 3 800 pamphlets were distributed to create awareness of the event locally. Seven different schools and institutions attended the dog obedience and animal magic shows. They were: Laerskool Wesbank, Laerskool Laurus, Pikkie Paradys, Eljada Disabled Adults Facility, Eljada Cairos School, Little Bo Peep Pre-primary, and Dassie Voorskool. Local newspapers and radio stations also covered the event.

Local dog trainer Loraine Weldon of Well-Done Dog Training School (and Jessie the dog) hosted the dog obedience show, which all the children enjoyed. Magician Tony van Sittert presented the animal magic show and delighted the children with his antics. The almost 200 children all received rabies educational booklets and treats and were encouraged to bring their dogs and cats that afternoon for the free rabies vaccinations provided by the state veterinarian team members. They worked extended hours on World Animal Day to accommodate the different needs of working local citizens.

↖ **Excited Laerskool Laurus pupils posing with Loraine Weldon, the local dog trainer.**

Photo: Wayne Boshoff Photography

↘ **Prize-giving time.**

The local public brought 461 dogs and cats to receive free rabies vaccinations, rabies information pamphlets, freebies and pet vaccination cards. This is almost double the number of animals vaccinated last year on World Rabies Day. The rabies event is growing in popularity in this Little Karoo town.

Various animal welfare groups participated in the event including Animal Care Team SA, People's Dispensary for Sick Animals (who travelled all the way from George), Friends of Calitzdorp Animals and others. Various animal-related companies also sponsored prizes for the schoolchildren and raffle prizes including MSD and various local private vet practices. A variety of dog food, pet toys, dog beds, dog clothing and dog treats were available to raise funds for local animal welfare – even knitted animals were available for the children! For the pets that attended (besides getting their free rabies vaccination) there was dog grooming, dipping, and nail clipping. There were dog identification tags for sale, a pet photo parlour, and even a "doggy and me" obstacle course with great prizes to be won. The local animal welfare groups sold refreshments and food to the visiting public to raise funds and to create awareness of its importance in our society.

»

↙ A happy participant in the “doggy and me” obstacle course.

Photo: Wayne Boshoff Photography

↗ The dog agility show in action for the schoolchildren.

Jessie the dog in action.

Photo: Wayne Boshoff Photography

What participants had to say:

- Connie en Rampie Alberts: "...het die dag vreeslik geniet, veral om al die mense en hul diere te ervaar"
- Moira Gibbs: "It was a great event and I am looking forward to next year"

This citizen-centric approach added value to the state veterinary rabies vaccination services and allowed for options to improve and expand to meet the needs of the pet-owning public. The services provided created an ethos of compassion and nurturing for animals in a positive manner, which is vital in today's self-seeking cultural norm.

World Veterinary Association president, Dr Johnson Chiang, said: "To meet the target for eliminating dog-transmitted rabies by 2030, dogs need to be vaccinated and kept free from rabies. There also needs to be more public awareness with greater collaboration between government and non-governmental bodies. Dog owners need to give their animals good housing, feeding, appropriate veterinary care and compliance with scheduled anti-rabies vaccination at approved facilities. Responsible pet ownership also includes education and dog safety awareness education for school-aged children."

This event fulfilled all the above targets. Due to its success it has become an annual event using a number of public–private partnerships to create a fun-filled World Animal Day for everyone (and their pets!). AP

"This citizen-centric approach added value to the state veterinary rabies vaccination services, and allowed for options to improve and expand to meet the needs of the pet-owning public."

References:
"Call to end dog-transmitted rabies by 2030 press release" WVA and WMA

The rehabilitation site near Redelinghuys.

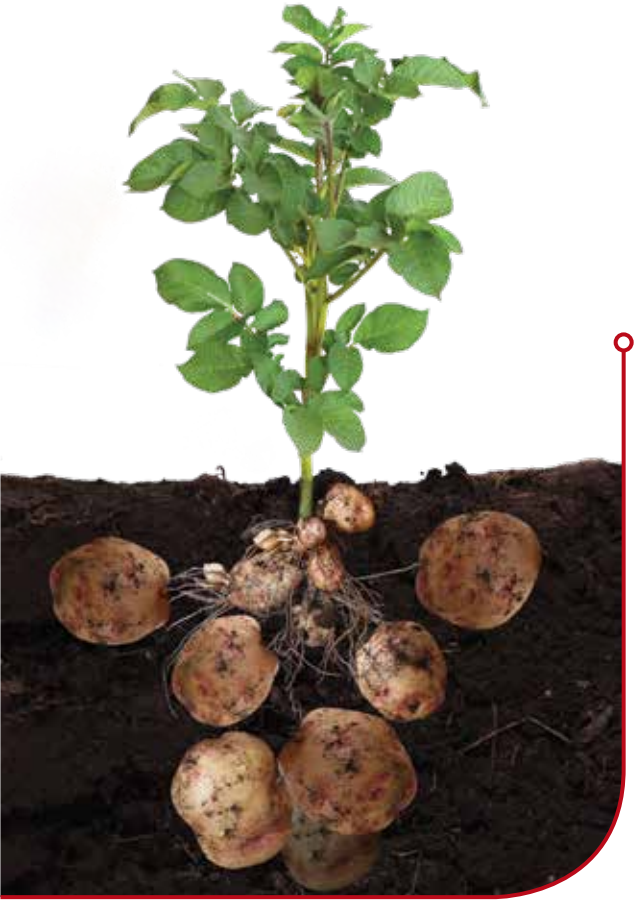
SOIL BIOLOGY on abandoned potato production circles

by Nelmarié Saayman, nelmaries@elsenburg.com

Potato production lands are common in the Sandveld along the west coast of South Africa. These lands usually lie fallow for three to four years to break the cycle of possible soil-borne diseases before they are planted again with potatoes. Having become economically unviable, many of the lands were withdrawn from production due to high input costs and/or diseases. Others are close to drainage lines and wetlands and pose problems for the natural environment. Many of these abandoned circles are in the endangered Leipoldtville Sand Fynbos vegetation type and rehabilitation has become a priority.

In 2017, an article was published on a planned rehabilitation project at three sites near Elands Bay, Redelinghuys and

Sandberg. This article is a follow-up with preliminary results and it focusses on soil health and high phosphorus levels in the soil, to which the local fynbos is not adapted. It also looks at which plant species' seed are in the soil seedbank. The phosphorus (P) levels of the three abandoned lands range from 35 to 63 mg P per kg soil, compared to the adjacent veld where it is only 4 mg/kg. Phosphorus does not easily leach from the soil and will stay in the soil for two to three decades. One method to lower the P-levels in the soil is to plant a cover crop mixture including lupines, which can mobilise poorly soluble phosphorus from the soil. At the end of the growing season, the crop is harvested and removed from the land. The additional advantage of the cover crops is that it can initiate nutrient cycling in the soil.



> The cover crops did, however, have a positive impact on the soil biology with an increase in soil microbial activity and diversity, starting the nutrient cycle in the soil.

In May 2017, soil samples were collected for a soil seedbank study and to determine some aspects of the soil biology before any rehabilitation. In June 2017, the first cover crop mixture was planted. Due to the drought of 2017, there was almost no establishment of the cover crops and it was planted again in May 2018. The cover crops were harvested and removed during September 2018 and another set of soil samples was taken to determine the impact of the cover crops on the soil health and soil P-levels.

The long-term average annual rainfall for the region is 280 mm, with only 140 mm measured during 2017 and 290 mm during 2018. Although the cover crop stand was better in 2018 than in 2017, it was still too low to have any effect on the soil P-level. The cover crops did, however, have a positive impact on the soil biology with an increase in soil microbial activity and diversity, starting the nutrient cycle in the

»

soil. This can assist in the establishment and survival of the indigenous plants that will be planted in 2020. The plant material (seeds and cuttings) will be harvested in an area with higher soil P-levels, in order for it to be adapted to the higher soil P-levels at the study sites.

Mainly annual plant species were found in the soil seedbank, but it did include species such as rooisaadgras/veldt grass (*Ehrharta calycina*) at two of the sites in 2017. In 2018, there were fewer species and individual plants despite the better rainfall. This might be due to the low rainfall of 2017 with seeds germinating after the first rains but not surviving until seed set, resulting in fewer species and less abundance in 2018. The near absence of indigenous perennial species found in the natural veld adjacent to the abandoned lands emphasises the importance of adding seed and/or plugs of these indigenous species to the lands in an attempt to rehabilitate it to as close to a natural state as possible.

One can try to rehabilitate abandoned lands and degraded areas, but in arid regions, rainfall remains the deciding factor for the success of any project. AP

Soil collection for seedbank studies and soil analyses.

Soil cultivation at one of the old potato circles.

ELSENBURG JOURNAL

Vol 17 | No 1 | 2020

Pedigree analysis of the Elsenburg Merino resource flock

Logic for implementation: causality argument for the next five years

Pedigree analysis of the Elsenburg Merino resource flock

by P Jorgensen[1], CL Nel[1,2], AJ Scholtz[1] and SWP Cloete[2]

[1]Directorate: Animal Sciences, Research and Technology Development, Western Cape Department of Agriculture, Private Bag X1, Elsenburg, 7607, South Africa
[2]Department of Animal Sciences, Stellenbosch University, Private Bag X1, Matieland, 7602

Take-home message

The Elsenburg Merino resource flock has been divergently selected for over three decades as a selection experiment to assess the genetic improvement in reproduction of ovine animals. The study of inbreeding and pedigree analysis is pertinent to modern livestock improvement programmes. They use intense selections regimes on a small number of individuals or families to greatly improve genetic gains, but this results in a corresponding increase in rates of inbreeding. The objectives of this study were to analyse the pedigree and calculate inbreeding parameters for the two lines of the divergently selected Elsenburg Merino flock. Inbreeding in both Elsenburg lines was managed within acceptable boundaries. Inbreeding was thus unlikely to play a role in the observed selection responses.

Introduction

The Elsenburg Merino high (H) and low (L) lines divergently selected for maternal rearing ability have been maintained as a selection experiment to assess the genetic improvement of reproduction in ovine animals. The importance of reproduction to overall output is self-evident, and the unique structure and wide array of recordings allow for the assessment of the relationship of reproduction with many other easy- and hard-to-measure traits. Long-term selection experiments such as this is used to estimate the degree of variation, and lines with very different characteristics are critical in understanding underlying genetic mechanisms (Hill, 2011). Previous results reported about the lines have already helped to change the traditional perspective of reproduction (i.e. from sire-centric to considering dam performance as well). The L line serves as the backbone of the experiment, both as a reference point for the H line, but also for the distribution of the performance of a trait that has a narrow phenotypic variation. With such an approach, the inclusion of poor performing animals is as essential as those on the upper end of the curve. The Elsenburg H and L lines therefore provide a unique opportunity to investigate the genetic mechanisms underlying reproductive performance. These animals now provide the ideal opportunity

for genomic assessment for both local and international projects. A complete pedigree analysis of the Elsenburg Merino lines will be valuable in properly characterising them in terms of the level and rate of inbreeding, as well as determining the effective population size of this genetic resource.

The study of inbreeding and pedigree analysis is pertinent to modern livestock improvement programmes. The intensity of artificial selection drives genetic gain, but this results in a corresponding increase in the rates of inbreeding (Weigel, 2001). Although passive inbreeding (inbreeding coefficient < 6,25%) that arises from the unavoidable mating of related animals due to a small effective population in selection experiments, accumulates at a slower rate than active inbreeding, the key concern to farmers is inbreeding depression (Falconer and Mackay, 1996; Miglior, 2000).

Inbreeding depression has a harmful effect on additive genetic variance and the phenotypic expression of traits under selection, impairing reproduction and fitness in particular (Lamberson and Thomas, 1984; Erasmus *et al.*, 1991; Van Wyk *et al.*, 2009). The loss of genetic variation in these selected populations due to inbreeding can be mitigated by correctly managed selection programmes (Erckanbrack and Knight, 1991; Miglior, 2000). Inbreeding is also an important tool used in the development of breeding stock to reveal and possibly eliminate deleterions alleles (Erckanbrack and Knight, 1991; Hedrick, 1994).

The net effect of inbreeding in a selection programme will depend on the magnitude of the selection response relative to the possible depression and rate of accumulation of inbreeding (Weigel, 2001; Swanepoel *et al.*, 2007; Van Wyk *et al.*, 2009). To manage the possible effects of inbreeding in a selection programme, inbreeding coefficients should be considered in setting up mating lists (Van Wyk *et al.*, 2009).

The level of inbreeding is influenced by the ratio of males to females, reproduction ability, mating systems and population size (Norberg and Sorensen, 2007; Ceyhan *et al.*, 2011). It is therefore important to have knowledge of the effective size of a population (Ne) and the rate of inbreeding (ΔF), which is the relative increase in inbreeding by generation (Boichard *et al.*, 1997). Wright (1923) defines the effective size of a population as the size of an idealised population, and is determined by the rate of inbreeding in preceding generations (Boichard *et al.*, 1997; Gutierrez *et al.*, 2003).

An outcome of selection programmes is that inbreeding is accumulating rapidly in most commercial livestock species (Weigel, 2001). Inbreeding may also have contributed to the selection response in the L line. The Elsenburg Merino resource flock has been divergently selected for over thirty years and a retrospective pedigree analysis could provide useful information to conserve these lines in the future.

Aim

The purpose of this study was to assess the existing pedigree and determine the current population structure and inbreeding status of the high (H) and low (L) lines of the Elsenburg Merino flock in order to advise a breeding strategy to conserve the genetic resource.

Methodology

Two lines of Merino sheep were divergently selected from the same base population from 1986 to 2019, using maternal ranking values for the number of lambs reared per joining (Cloete *et al.*, 2004). Ewe and ram progeny of ewes rearing more than one lamb per mating (reared twins at least once) were preferred as replacements in the high (H) line. Replacements in the low (L) line were preferably descended from ewes that reared fewer than one lamb per mating (barren or lost all lambs born at least once). Initially,

»

progeny of ewes that reared one lamb per mating were occasionally accepted in both lines depending on the average reproduction of the lines and the replacement needs. In contrast, very few female progeny are available in the L line at present as a result of successful downward selection; thus progeny from ewes rearing one lamb per mating often have to be selected to maintain the line. Selection decisions were generally based on more than three maternal matings for rams. Due to the greater replacement needs in females, progeny from ewes with fewer records were also selected as replacements (Cloete *et al.*, 2009).

The resource flock studied was maintained at the Elsenburg research farm from 1993. The climate at the experimental site is Mediterranean, with a winter lambing season (June to July).

The complete pedigree data used in this study comprised 8 515 records of the Elsenburg Merino flock collected from 1979 to 2019. Only the relationships between animals belonging to the base population H and L selection lines were used in the pedigree and inbreeding analysis using POPREP (Groeneveld *et al.*, 2009).

Results and discussion

Inbreeding increased with time (Figure 1), as is expected in any population of finite size. Inbreeding in the H line initially appeared to accrue somewhat faster than in the L line, until the rapid increase in the L line in 2011 (F_i = 9%) and again in 2015 (F_i = 8,7%). Overall, maximum inbreeding for individual animals declined (Figure 2).

The implementation of Multiple Ovulation and Embryo Transfer (MOET) in the H line in 1991 to 1992 and in both lines in 2009 to 2014 served to mitigate the effects of inbreeding. It was possible to curb in-breeding in the period 2003 to 2009, when structured crossbreeding was practiced, as ewes (where all ram-ewe combinations resulted in levels of inbreeding exceeding 6%) were simply allocated to the other line. From 2008 onwards, inbreeding in the H line could be controlled by introducing external unrelated

Figure 1: Average inbreeding coefficients (F_i) of the H and L lines by year

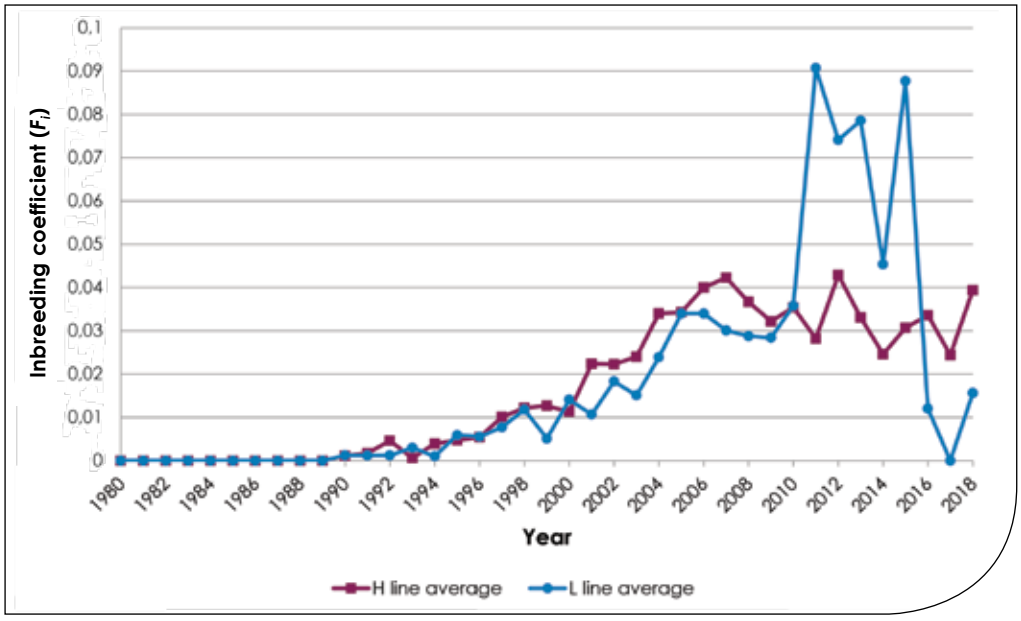
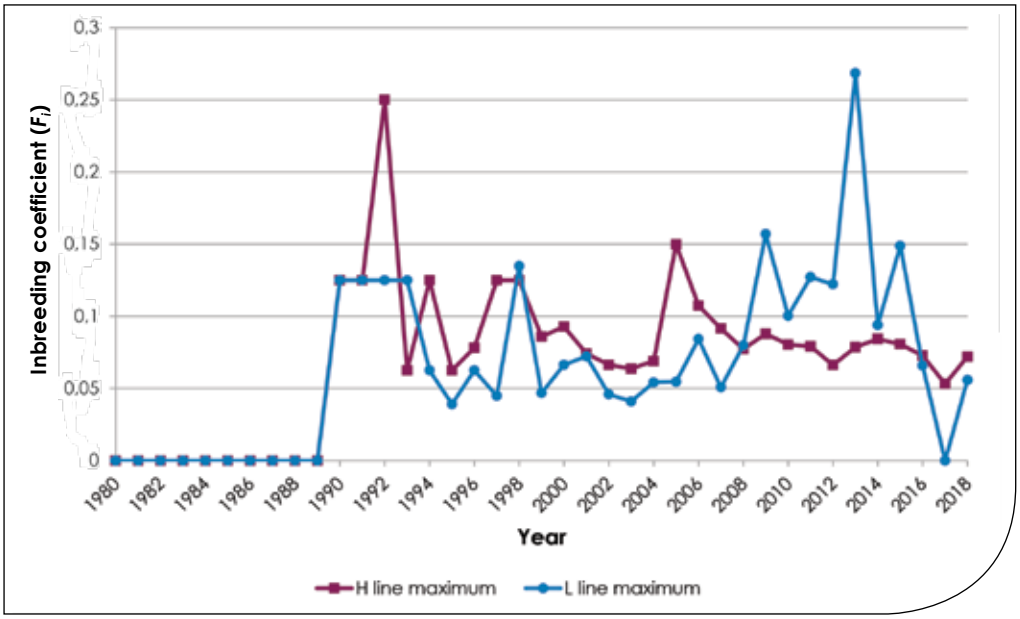


Figure 2: Maximum inbreeding coefficients of individuals of the H and L lines by year



sires from industry into the line. External sires were not introduced into the L line as it was difficult to find suitable candidates for introgression at that stage. All subsequent matings were thus within the L line, which accounts for the high levels of inbreeding in the L line post-2009, but this has since been resolved with the introduction of migrants from Tygerhoek Research Farm, as reflected by reduced levels of inbreeding since 2016 (Figures 1 and 2).

The rate of inbreeding is of vast importance in small populations (Meuwissen and Woolliams, 1994). ΔF per generation was 0,80% for the H line and 0,46% in the L line. Nicholas (1989) suggests a ΔF of < 0,5%, whereas the FAO (2000) suggests a ΔF of < 1%. The rate of inbreeding per generation for both the H and L lines fall within the FAO recommendations. The rate of inbreeding estimated for the Elsenburg Dormer sheep stud was estimated at 1,53% per generation over 19 generations in a flock developed under planned mating to avoid inbreeding (Van Wyk *et al.*, 2009). This suggests that the Elsenburg Merino lines have been managed well to mitigate the effects of long-term selection on inbreeding.

The average inbreeding coefficient (F_i) was 3,9% for the H line and 1,6% for the L line (Table 1). According to Miglior (2000) inbreeding coefficients of below 6,25% are an indication of passive inbreeding, which accumulates slowly over time. Natural and/or artificial selection can therefore eliminate most undesirable genes under such conditions. Previous analyses (Cloete, 2002; Naidoo, 2013) also report the average inbreeding coefficients in the H and L lines as below 5%. The additional pedigree data in this study allowed these estimates of F_i to be updated.

The effective population size is the number of individuals that would give rise to the observed or calculated rate of inbreeding if bred in the manner of

»

Table 1: Summary statistics of the pedigree analysis of the H and L lines of the Elsenburg Merino resource flock

Variable	H line	L line
Size of population	6 100	2 415
Base population (one or more unknown parents)	548	475
Effective population size (*Ne*)	330	44
Average inbreeding coefficient ((F_i)(%))	3,9	1,6
Generation interval	3,27	3,32

the idealised population (Falconer and Mackay, 1996). The effective population size was computed using POPREP to calculate *Ne* based on the number of parents as 330 for the H line and 44 for the L line. The FAO (2000) guideline advises a minimum effective population size of 50 animals per generation for conserved populations. Meuwissen and Woolliams (1994) suggested a minimum range for *Ne* of between 31 and 250 individuals to maintain population fit-ness; both lines fall within these guidelines.

Conclusion and recommendations

The overall rate of inbreeding per generation in the H and L lines falls within acceptable levels. However, the low effective population size, high proportion of inbred animals and increase in ΔF is of concern in the L line if this population is to be conserved for future genomic studies and will need continuous monitoring. The effects of the introduction of migrant sires mitigate the inbreeding in this line while maintaining it as a reference point for the H line, and importantly, also for the distribution of the performance of a trait that has a narrow phenotypic variation. AP

Scan the QR code for the list of references used.

Logic for implementation: causality argument for the next five years

by Dr Dirk Troskie, dirkt@elsenburg.com

Following South Africa's sixth democratic election, each government department in the country had to develop a new set of medium-term planning documents for tabling in the legislature during March 2020. The Western Cape Department of Agriculture (WCDoA) went through an extensive process, which included internal and external research to determine its strengths, weaknesses, opportunities and threats (SWOT). The SWOT was placed in the context of the policies and strategies from all spheres of government to develop the department's strategic direction, impact statement, outcomes as well as a macro-level theory of change (or, in plain English, the argument for focussing on specific interventions over the next five years).

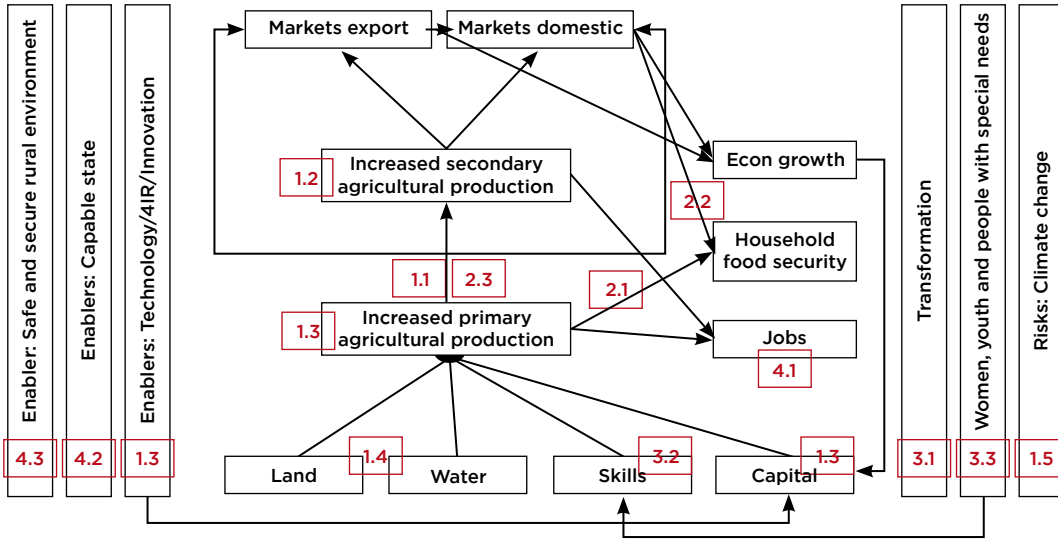
According to the Constitution of the Republic of South Africa (Act 108 of 1996), agriculture is a Schedule 4A or "concurrent" function. This means that both the national and provincial spheres of government have legislative power over agriculture. In Chapter 3 the Constitution also prescribes cooperative government and it must be kept in mind that farming is the key economic activity in most municipalities in the Western Cape. At international level agriculture also plays a key role in the achievement of the Sustainable Development Goals (SDG) of the United Nations as well as Agenda 2063 of the African Union. This amounts to 105 policies, strategies, and priorities that the WCDoA needs to consider when it plans ahead. As the department cannot respond to these priorities on an individual basis, it uses the expectations as well as the realities of agricultural production to develop its macro-level theory of change (TOC).

Agricultural production is the combination of natural resources (e.g. land and water), human resources (technical and management skills), and capital (monetary and intellectual assets) during the production process. Primary production can either take the form of subsistence (urban or rural), communal (collective or commonage), smallholder (resource-poor or lifestyle), or commercial production (small, medium, or large). The output from primary production will go directly to households, markets (domestic or export) or to secondary production (i.e. agri-processing or other forms of value-adding). From secondary production the value-added products then flow to domestic or international markets (Figure 1).

The number of jobs needed in primary and secondary agricultural production is directly related to the nature of the production process (the production system that is employed); in other words, in the way that the various inputs are combined during the production process. Similarly, economic returns from agricultural production come from domestic or international markets. Economic growth, in turn, adds to the pool of monetary capital necessary for agricultural production.

Households can either produce food for »

Figure 1: The high-level TOC of the WCDoA indicating links to sub-outcomes



Source: WCDoA (2019)

own consumption by means of household or communal food gardens, or by consuming part of the output from smallholder or commercial production. However, the number of households with access to resources for "own production" is declining and one of the consequences of urbanisation is that households are becoming divorced from their means of production. These households therefore obtain their food from domestic markets.

In this instance, domestic markets can either be in the form of formal markets (e.g. supermarkets), informal markets, or social markets (e.g. food distribution schemes or food aid). Imported products (e.g. rice not produced in South Africa), also find their way to local households via domestic markets. In order to obtain products from the domestic market, households must have some form of currency (either monetary or social), products must be obtainable (e.g. within reasonable travelling distance), they must be culturally acceptable (e.g. halal, vegetarian), and they must be safe (e.g. not contaminated).

Because there is an inverse relationship between the share of food in the household expenditure on the one side and the socio-economic measurement (SEM) of households on the other, households on the margin of food security are also the most vulnerable to changes in food prices. At the same time, it is also well known that the consumer price of a food item drastically declines if a commodity moves from import parity to export parity.

For an agricultural system to operate successfully, several enablers (some may call it sanitary factors) need to be in place. There must be:

- a safe and secure rural environment;
- a competent state creating a viable institutional environment; and
- systems in place to provide the right technology, ensure innovation and ensure the adoption of 4IR challenges and opportunities.

The latter enabler adds to the skills base and intellectual capital underpinning the production process.

At the same time several externalities need to be internalised if the agricultural system is to be sustainable over the long term. In the first instance transformation needs to take place, not only in terms of resources, but also throughout the value chain from primary production to markets. The same applies for the system to be able to absorb women, youth, and people with special needs. Finally, the system needs to adapt itself to climate change and its associated risks.

In short, it is argued that increased demand for primary and secondary agricultural products (from households, domestic and international markets) will lead to increased production. This, in turn, will stimulate economic growth, improve food security, and create jobs. For agricultural production to increase, resources of the right quality and integrity must be available at appropriate cost to the system. For the entire system to operate, several enablers must be in place, and to ensure its social and natural sustainability, several externalities must be internalised.

Based on this causality model, a number of outcomes and sub-outcomes can be developed to be achieved over the next five years (Table 1). To increase agricultural production in a sustainable manner (Outcome 1):

- the export position of the provincial agriculture sector must be maintained;
- value must be added in agri-processing;
- primary agricultural production must increase; and
- the sustainable use of water and land resources must be ensured.

Table 1: Outcomes and sub-outcomes to be achieved by the WCDoA over the next five years

Outcome	Sub-outcome
1. Increased agricultural production in a sustainable manner	1.1 At least maintain the export position of the provincial agricultural sector.
	1.2 Enhance the agri-processing value-add in the province.
	1.3 Increase sustainable agricultural production (primary provincial commodities).
	1.4 Optimise the sustainable utilisation of water and land resources.
	1.5 Enhance the climate change resilience of the sector.
2. Improved food security and safety	2.1 Increase access to community/household-produced food.
	2.2 Ensure affordability of food (Minimise food inflation or reduce inflationary costs as indicators).
	2.3 Ensure that animal products are safe for consumption.
3. Transformed and inclusive agricultural sector	3.1 Improve the success of agricultural activity among black farmers.
	3.2 Increase relevant skills within the agricultural sector.
	3.3 Improve the participation of youth, women, and people with disabilities in the agricultural economy.
4. Innovative and resilient rural economies	4.1 Increase access to agricultural and related economic opportunities for rural communities.
	4.2 Develop an enabling environment for job creation in the agricultural sector.
	4.3 Improve safety and security in rural areas.

Source: WCDoA (2019)

»

Table 2: Outcome indicator and targets to be measured over the next five years

Outcome	Outcome indicator	Baseline	Five-year target
Increased agricultural production in a sustainable manner	O.1: The provincial agricultural sector increases its export by at least 5% over the next five years.	R68,2 billion in 2018	R71,6 billion
	O.2: Enhanced agri-processing capacity at both primary and secondary level.	R17,41 billion in 2018	R19,151 billion by 2024
Improved food security and safety	O.3: Increased gross value added (GVA) through sustainable agricultural production in the Western Cape.	GVA R16,254 billion in 2018	GVA R17,879 by 2028
Transformed and inclusive agricultural sector	O.4: Success of supported land reform projects.	72% success rate (based on 2018 external evaluation)	At least 70% of all supported agricultural land reform projects in the province are successful over the next five years
Innovative and resilient rural economies	O.5: Development of an enabling environment to increase agricultural and related jobs.	325 703 (2018)	358 274 (2023)

Source: WCDoA (2019)

Improved food security and safety (Outcome 2) must link closely with primary production by increasing access to community/household-produced food (own production for own consumption in household or community gardens). The second sub-outcome is the containment of food price inflation by increased production because those who cannot produce their own food need to purchase it. The third sub-outcome addresses food safety matters.

In order to realise Outcome 3 (Transformed and inclusive agricultural sector), the success rate of production among black farmers must receive increased support through initiatives such as skills development and training programmes. This would allow for the growth of both primary and secondary agricultural production. The third sub-outcome addresses the need to improve the participation of youth, women, and people with disabilities in the agricultural economy.

For Outcome 4 (Innovative and resilient rural economies), it is necessary to increase access to economic opportunities for rural communities. At the same time, an enabling environment for job creation in the agricultural sector needs to be created while safety and security need to be improved to ensure resilient rural communities.

For each of these outcomes at least one indicator, with a five-year target and a baseline, has been developed (Table 2). Similarly, for each sub-outcome a logic underpinning the achievement as well as indicators, was identified. However, a discussion of these will be covered in a subsequent edition of AgriProbe.

References

BAct 108 of 1996 The Constitution of the Republic of South Africa (1996). Government Printers, Cape Town.

WCDoA (2019) Strategic plan for 2020/21–2024/25 of the Western Cape Department of Agriculture. Western Cape Department of Agriculture, Elsenburg. AP

Farmers produce more than just food. They create jobs and grow the economy.
This is why we support farmers and create an enabling environment.
Visit **www.elsenburg.com** to see how we can support you.

Western Cape Government
Agriculture

BETTER TOGETHER.

Supporting farmers
for a better future
BETTER TOGETHER.

AGRIPROBE

Is a quarterly magazine, distributed to subscribers at no charge by the Western Cape Department of Agriculture.

Subscription
For free subscription to this quarterly magazine, please submit your details to Magrieta de Lange.
Tel: 021 808 7613
Email: info@elsenburg.com

Contact us
Western Cape Department of Agriculture
Tel: 021 808 5111
Email: info@elsenburg.com
Web: www.elsenburg.com

Printing
Shumani RSA
Tel: 021 951 6391

Packaging
Stellenbosch Work Centre for Adults with Disabilities
Tel: 021 887 8688
Email: jjja@sun.ac.za

You can also read your copy online and subscribe at www.elsenburg.com/resource-library/agriprobe

Don't forget to tune into RSG Landbou every Friday morning at 04:45 and on Saturdays at 11:45. Listen to the highly informative programmes on the Western Cape Department of Agriculture and the Agricultural Sector in general. If you miss it on the radio, you can also listen to the programmes of the week on www.elsenburg.com/resource-library/radio-elsenburg

Luister elke Vrydagmiddag om 12:45 na Die Kwik Styg op RSG waar kenners gesels oor klimaatsverandering.

Western Cape Government

Agriculture

ISSN: 1810-9799