AGRI PROBE

Vol 17 | No 4 | 2020
ISSN: 1810-9799

Smallholder farming “beefed” up

Supporting healthy ecosystems

Agriculture: the sunrise sector

Research and news magazine of the Western Cape Department of Agriculture

SUPPORTING AGRICULTURE TO FARM SMARTER MAKES SENSE. NATURALLY.

Farmers cultivate more than just their crops. They use technology for precision farming. 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.

Setting the SCENE

by Jerry Aries

This edition of the *AgriProbe* is a special one for me as it reflects the finishing line of a very tough year, which we have all managed to survive. Say this to yourself: "I am a survivor!".

If one looks at the agricultural landscape this year, it is not easy to see all the hurdles we had along the way. This is reflected in the fact that as a sector we still showed growth in the GDP.

But when savouring any victory, it is important to remember how one got there.

The articles in this edition of the *AgriProbe* recalls these highlights. Like how we managed to stay connected with our farmers and sector through new technologies. And how our interventions to make top beef breed genetics available to smallholder farmers enabled them to improve the volume and quality they can offer.

If ever you questioned why you are still in agriculture, then you had better read the piece entitled: "Agriculture: the sunrise sector". It will inspire you to reappraise the potential and impact the agricultural sector offers.

A kind request to our readers who are in the agricultural sector, as you page through this edition: see these stories as your own victory. We are in agriculture to serve others and each one of us had a part to play and played it well! A special word of thanks to our farmers and agri-workers for their outstanding support and unending dedication in ensuring food security.

If you are new to agriculture, don't you think we are great? Maybe it is time to join this machine that feeds the nation and that has sustainable ecological and human capital solutions for all!

Here's wishing you a safe and prosperous festive season. Please stick to COVID-19 protocols and do not become complacent. Wear your mask, wash your hands, and keep social distance. Let us recharge as we approach another sunrise – 2021! #ForTheLoveOfAgriculture

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

Rose Horne (022 433 8903)
roseh@elsenburg.com

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

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

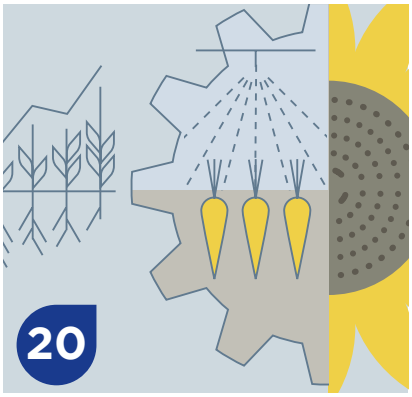
Brighton Shumba (021 808 5384)
brightons@elsenburg.com

Dr Lesley van Helden (021 808 5017)
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



ON OUR COVER

The Western Cape Department of Agriculture's Bull Project aims to make top beef breed genetics available to smallholder farmers to increase the volume and quality they offer to the market. The department has hit the bullseye with this smallholder beef producer -centred project.

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

Rising to the challenge

by Minister Ivan Meyer

The year 2020 was and is a challenging year. COVID-19 has been a challenge, but we have also decided that it would not defeat us.

When lockdown was announced, agriculture was declared an essential service and the sector continued to operate throughout the pandemic.

It was a challenging period, but through faith and support and resilience, the agricultural sector stood its ground.

We salute all our farmers, agri-workers, and producers both in primary and secondary agriculture.

We are now moving towards the next phase, and the Western Cape cabinet has adopted the following priorities:

- **Safety**
- **Jobs**
- **Dignity and well-being**

In agriculture, our focus is now on the following:

- **Stabilisation of the sector**
- **Adaptation**
- **Economic recovery**

We will continue to support the sector in the Western Cape as part of the post-COVID-19 agriculture recovery plan.

The Western Cape Department of Agriculture has recommitted itself to the ministerial priorities, namely:

- **Structured training, education and research**
- **Farmer support**
- **Rural safety**
- **Market access**
- **Climate change**

During COVID-19, we have continued to serve the agri-sector and our clients through virtual meetings, information days and webinars, as a way of embracing the Fourth Industrial Revolution.

We will overcome this pandemic because farmers in the Western Cape are resilient. We have already seen outstanding economic performance by the agricultural sector in the first and second quarters of 2020, growing by 28% and 15% respectively.

As we move forward, we need to support our wine industry, agritourism, drought-stricken areas and sub-sectors hit hard by COVID-19.

During the past two months we have been visiting our farmers and farm workers. I am inspired by their faith in agriculture despite the challenging times.

Agriculture will drive economic recovery in the Western Cape, and the sector is ready.

#LetsGoWork
#ForTheLoveOfAgriculture AP

Giving Western Cape smallholder beef producers "bull power"

by Dr Ilse Trautmann, ilset@elsenburg.com

The Western Cape currently produces approximately 4,5% of the national beef output. The contribution by smallholder producers is relatively small and the animals used for production are from many varied breeds including dairy cattle. The aim of the Bull Project of the Western Cape Department of Agriculture is to make top beef breed genetics available to smallholder farmers to increase the volume and quality they offer to the market. Normally stud bulls are very expensive and therefore difficult for these farmers to procure and this project addresses that challenge.

Results from the first bulls that have been distributed have already shown that smallholder beef producers are getting better prices and are selling heavier calves into the feedlot market at wean.

The project is a sterling example of collaboration and is managed by extension officers from the Farmer Support and Development programme. They engage with the farmers and provide on-farm support. Experts from the Research and Technology Development programme provide the bulls from a performance-tested Bonsmara stud, which ensures that quality breeding material

is made available to these farmers. The team from veterinary services ensures that the farm where the bulls are distributed to is free of notifiable diseases and that the bulls are well kept and in healthy condition.

The project has been underway since 2016 and 41 bulls have been distributed to 26 smallholder farmers in the Overberg, Eden, West Coast and Swartland districts. The farmers are selected according to a set of criteria, including having at least 20 cows, sufficient land and infrastructure, and a knowledge of beef cattle farming and management. There are about 1 540 cows in the project and the average herd size is 38 cows. The recipients of the bulls pay a nominal fee of R100 per year for three years that the bull has been on the farm. Extension officers visit all the farms quarterly and veterinary services provide support when needed.

The handover of the first group of seven bulls of 2020 to seven farmers from Genadendal took place at a recent event at Elsenburg (Kromme Rhee farm), hosted by Minister Ivan Meyer, Minister of Agriculture in the Western Cape.

Speaking at the event, Minister Meyer emphasised that the project brings together three of his key priorities, namely market access, research, and farmer support and development. He stated that by making top breed genetics available to smallholder farmers, they can increase the volume and quality of beef, which will enable easier and greater access to the market. The intention is to increase the participation of small-scale beef producers in the beef market in the Western Cape and ultimately on a national scale.

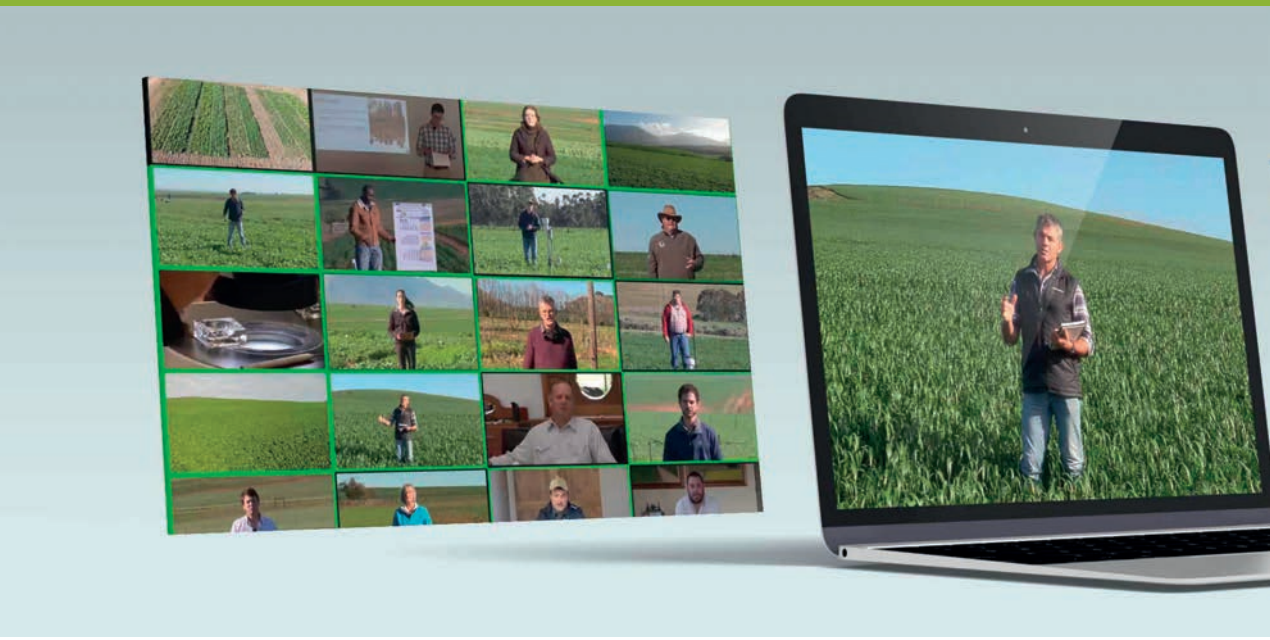
Dr Mogale Sebopetsa, Head of Department, highlighted that the department would continue to support smallholder farmers. "Now that these farmers have received bulls with superior genetics, we will provide them with advisory and veterinary support services. With our continued support, they can grow their herds and their businesses." AP

The Bull Project team with Minister Meyer. From left to right: Minister Meyer, Chris van der Walt, Hennis Germishuys, Prof. Ters Brand, Head of Department Dr Mogale Sebopetsa and Dr Chris de Brouwer.

Bulls ready for distribution to smallholder farmers.

Minister Meyer with the smallholder farmers of Genadendal receiving bulls.

First footsteps into virtual conferencing and information days **leave huge footprints**



by Dr Ilse Trautmann, ilset@elsenburg.com and Dr Johann Strauss, johannst@elsenburg.com

The Fourth Industrial Revolution (4IR) has elicited statements like "we stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another". Little did we know that the COVID-19 pandemic would fast-track our understanding of technology, the application thereof and the ease with which we would adapt to the new way of doing business and communicating with our clients.

The Western Cape Department of Agriculture has an annual technology transfer calendar, which delivers client-focused and problem-solving technical information emanating from the extensive research portfolio of the Research and Technology Development programme to farmers in the Western Cape.

Due to the COVID-19 pandemic, the first event to be presented virtually (online) was the Conservation Agriculture Western Cape (CAWC) conference, better known as the CAWC "Jack Human" conservation agriculture week. The week brings together national and international researchers, industry role-players, and farmers to share their knowledge and experiences around conservation agriculture. The conference has proven very successful over the past seven years, which is due to an excellent group of collaborators in the CAWC, *Landbouweekblad*, and the department.

»

Initially, the conference was to be conducted live, but after some consultation it was decided to rather go with pre-recorded contributions. Attendees could still comment and ask questions while watching the different lectures and practical sessions, all of which were to be answered following the closing of the event. The conference remained "open" for a week of viewing to accommodate possible issues with poor internet connections in the countryside and time differences with international speakers from different time zones.

The production of the virtual event was done by the experts of the department. A fast learning curve and long hours of recording and editing brought an excellent and very successful conference to the viewer – or rather the "online delegate".

Twelve lectures and nine practical sessions on the research trials at our Langgewens and Tygerhoek farms brought both theory and "look and see" to the delegates. Topics such as effective nitrogen fixing by legumes, the importance of carbon for the farmer, effective nitrogen management, insect dynamics in conservation agriculture and the advantages of cover crops were delivered to 267 attendees. Speakers from Western Australia, the University of the Free State, and local researchers and farmers delivered interesting talks. The feedback has been very positive. The advantage of the virtual offering was that more delegates could attend, less time was spent on travelling and conference arrangements, and international speakers could attend without any flight challenges.

The success of the first virtual event was followed by three more information days: the Hopefield, SKOG and Riversdale days, which went live on the CAWC website on 7 September 2020. The information days are accessible on **www.blwk.co.za**.

The last virtual event for 2020, launched during September, was the popular Outeniqua information day where our latest pasture and dairy research was showcased.

The face-to-face contact between researchers and farmers and other stakeholders, however, is still the ideal, but the success of the first virtual event during the current COVID-19 pandemic is testimony to the ability of our department to respond to external challenges in a rapid and effective way, thereby ensuring that our stakeholders continue to receive the latest technical information. AP

Department of agriculture scoops another "hot" climate-change award

by Dr Ilse Trautmann, ilset@elsenburg.com

In less than a year after being awarded the 2019 Eco-Logic gold award in the category "Climate Change" for its SmartAgri plan, the department once again took centre stage at the 2020 Eco-Logic Awards ceremony, which was presented in a virtual format during September. This time the gold award in the category "Climate Change" was awarded to the very popular radio series *Die Kwik Styg* (refer to *AgriProbe* Vol 15 (2) and (3) (2018) and Vol 17 (2) of 2020).

Western Cape Minister of Agriculture, Dr Ivan Meyer congratulated the Western Cape Department of Agriculture for winning the gold award and said, "Tackling climate change is one of my priorities. So I am extremely proud of Dr Trautmann and her team. Creating awareness among South Africans of the challenges and opportunities of climate change is critical in our campaign to develop innovative solutions to the challenge it presents. *Die Kwik Styg* provided the perfect platform for the Western Cape to contribute to the building of a climate-resilient South Africa."

In an attempt to encourage prevention and planning that may lead to a climate-resilient South Africa, the department embarked on this innovative project to produce a radio series on climate change called *Die Kwik Styg* in 2018. This initiative was also one of the communication tools of the SmartAgri plan, the first ever provincial sector plan for the agricultural sector in South Africa. *Die Kwik Styg* was the first radio series on climate change produced and broadcast in South Africa.

The judges commented by saying, "This

»

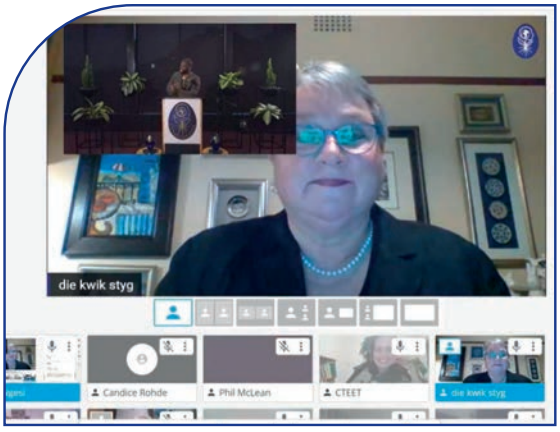
radio programme won the gold award because of the brilliant use of such a potent medium that is able to reach many communities in their own language by bringing the scientific discussion down to the level of ordinary people. It makes it believable and assists in making a significant impact in the lives of ordinary people".

Lizma van Zyl presented 104 programmes on Radio Sonder Grense (RSG), with the last programme aired on 3 April 2020. The series was an audio "painting" of various aspects of climate change, and the selection of experts as speakers generated interest on many levels. The focus was to bring the pieces of the climate-change puzzle into a well-planned and holistic picture to foster climate change awareness. According to Dr Ilse Trautmann, chief director of Research and Technology Development and the project leader of *Die Kwik Styg*, one of the objectives was to take a very complex subject like climate change to the listener in bite-size chunks of information to create a better understanding of climate change.

The point of departure for each programme was stating the facts, and then changing into a proverbial "next gear" of innovative and sustainable solutions. A positive message that all is not doom and gloom and that we can strive towards a sustainable and better

future, was conveyed at the closing of every programme. Planning for a better tomorrow today, is the best insurance policy for a sustainable future. Connecting the right dots and understanding interlinkages are pivotal to the survival of and on our planet. Each programme of *Die Kwik Styg* therefore ended with the slogan "Die aarde is kosbaar; kom ons bewaar dit".

We would like to thank the judges and organisers of the Eco-Logic Awards, the Department of Environment, Forestry and Fisheries for sponsoring the award, RSG for giving us the opportunity to broadcast the series, Lizma van Zyl for her sterling work as presenter, and Lindsay Johnson for the technical editing of each programme. We would also like to thank all the experts who took part in *Die Kwik Styg* for their time and valuable input.



For readers who missed the series, please visit our website at elsenburg.com/drought/?page_id=975 where you will find all 104 programmes or scan this QR Code. AP

JOIN US IN COOKING!

During the 2019 South African Cheese Festival, it was "cooking" in the Cape Made Kitchen. The 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.

white chocolate, honey, and nut truffles

28 TRUFFLES

INGREDIENTS

30 mℓ	cream
200 g	white chocolate, chopped
30 mℓ	honey
100 g	hazelnuts, toasted and chopped
200 g	white chocolate, melted for coating

PISTACHIO IS KNOWN AS THE "SMILING NUT" IN IRAN AND THE "HAPPY NUT" IN CHINA.

62 CAPE MADE KITCHEN 2819

MORE DELICIOUS **RECIPES**

will follow in future editions of *AgriProbe*.

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

METHOD

- Over a double boiler, combine the cream and chocolate.
- Heat until completely melted.
- Whisk in the honey.
- Remove from the double boiler, and leave the mixture to cool at room temperature until firm.
- When firm enough to roll, roll into equally sized balls.
- Refrigerate for 15–20 minutes until firm enough to dip in melted chocolate.
- Sprinkle the truffles with chopped toasted hazelnuts or just dust with cocoa powder.
- Keep in an airtight container at room temperature.

RECIPE BOOK 63

BICYCLE PARTNERSHIPS help farmers and youth move forward

by Giselle Terblanche, gisellet@elsenburg.com

Government is unable to solve society's problems alone and therefore partnerships with other organisations are vital. Thanks to such partnerships, various stakeholders were handed bicycles during the months of August and September. The bicycle is often seen as a symbol of mobility. It is a tool of empowerment and improvement of socio-economic conditions.

In one instance, seven bicycles were handed to pig farmers in Caledon. These farmers, known as Shaw's Pass Emerging Farmers (SPEF), are a registered entity, consisting of 32 beneficiaries. Some of them own vehicles to travel the 9 km to the project site, while others have to hitch-hike. The bicycles handed over by the Western Cape Department of Agriculture and Qhubeka will greatly assist these farmers who do not have other means of transport. As a non-profit organisation, Qhubeka changes lives by supplying commendable recipients of various projects with bicycles. Smallholder and subsistence farmers in the Swartland, Cape Winelands, Cape Metropole, Little Karoo, Central Karoo, Garden Route, West Coast and North West Coast also received bicycles.

The youth also benefited from this amazing initiative. The department, in collaboration with the Pedal Power Association, delivered 15 bicycles to Naastedrift Primary School in Vredendal. The arrangements were made through the Landbou Gemeenskap Ontwikkeling (LGO), a non-profit agricultural community development organisation based in Vredendal. The LGO nominated Naastedrift Primary School, since an interdepartmental committee had already decided to focus special projects at the school.

The LGO further contributed to the project by sourcing sponsors to give puncture-free "perma tubes" to the beneficiaries. A number of children who attend Naastedrift live on farms in the rural areas outside Vredendal. It is a challenge for many learners to get to school on time, since not all the areas have bus transport and therefore some of the learners previously had to walk far to get to school.

The beneficiaries expressed their sincere gratitude. One of them, fourteen-year-old Donovan Arries, a Grade 7 learner at the school, said he was very happy to receive the bicycle. "Previously I had to walk to school in the mornings and back home in the afternoons. Now I am less tired when I get to school, so I am able to concentrate better. I feel safer and can attend school even when it rains. I also have more time to spend on my homework."

In addition, 20 bicycles were delivered to

»

Boontjieskraal Primary School near Caledon and 14 bicycles to VRT Pitt Primary School in Swellendam. These two schools were selected since they are part of the Junior LandCare initiative, which is implemented by the Sustainable Resource Management (SRM) programme of the department. Learners in the Swartland, Cape Winelands, West Coast and Central Karoo were also handed bicycles.

Through another partnership (this time with the Western Cape Department of Transport and Public Works), youth from the West Coast are now able to pedal to their place of learning. This project ties in with the Rural Youth Intervention (RYI) initiative, a strategic project of the Rural Development Programme of the Department of Agriculture, which seeks to contribute meaningfully to the overall well-being of youth in rural communities.

This collaborative initiative has identified potential students in the Swartland area as beneficiaries of the rural youth bicycle project. The students are currently studying at the West Coast College and are reliant on public transport, which is often erratic and unreliable, given the context of COVID-19. These students are also from low-income families. Through this initiative, they now have access to a bicycle: a personal empowerment tool to assist them to get to the College, while pursuing their tertiary education. A hand-over ceremony was held at the Chatsworth Path Onto Prosperity (POP) centre in September. POP centres function as a developmental hub for various community groups such as service centres for senior citizens, disability groups, dance groups, and community meetings.

In the words of the deputy director-general of the department, Mr Darryl Jacobs: "You ride a bicycle forward, not backwards." This statement symbolises government's efforts to assist and support stakeholders with enabling tools to contribute to their development and to ultimately become better citizens. AP

World Food Day and food security for rural communities


Mathews Fieland

by Mary James, maryj@elsenburg.com

"*My hoenders maak my famous!*" shouted Mathews Fieland to his neighbour as he proudly grabbed a chicken to pose for a quick photo. Mathews is one of the 51 beneficiaries from the small village of Rietpoort in the West Coast District who received support from the Western Cape Department of Agriculture (WCDoA) during the World Food Day outreach in October. Mathews, like others living in rural parts of the province, struggles to get access to fresh agricultural produce. This lack of access hinders food security and contributes towards deficient nutrition.

Agriculture offers a huge relief when it comes to the development of these areas and the food security of its citizens.

The WCDoA has invested extensively in the development of these communities through the introduction, bolstering and establishment of agricultural interventions. There are 16 rural development nodes that have been identified as part of the Comprehensive Rural Development Programme (CRDP). The CRDP epitomises the philosophy: "Better Together", where civil society and government work together to improve the lives of our rural communities.

The World Food Day activities aim to establish solid roots in rural communities and the WCDoA annually rotates the nodes where support is offered. This ensures even distribution of resources and impact. The Rietpoort and Bitterfontein communities are not new to the World Food Day interventions. Food security intervention received 10 years ago are still visible and running successfully.

The department established 42 household gardens, three school gardens, seven chicken coups and installed close to 40 water tanks. These beneficiaries were mainly sourced through the indigent register of the municipality.

Additionally, Minister of Agriculture, Dr Ivan Meyer, and Dr Mogale Sebopetsa, Head of the Department, handed over a food mountain to four needy organisations in the communities, namely Môreson Dienssentrum: old age home in Nuwerus; Protea Dienssentrum: old age home in Rietpoort; the Bitterfontein soup kitchen; and the Kliprand soup kitchen.

"They are taking care of the things they are receiving and we support them through regular follow-ups at project sites", said Hansie Owies, extension officer from the department's programme for farmer support and development.

There is interest from more people in the community to start up their own gardens because of the success of others from their own community.

There is still a great deal to be done but for someone like Mathews this is certainly a step in the right direction. He has had to travel nearly 150 km to the nearest town for fresh vegetables. Now he is reaping what has been sown through this sustainable solution to rural development. AP

Agricultural youth development contributes to employment

by Gladys Langa, gladysl@elsenburg.com

Agriculture has been regarded as a career field not appealing to young people. It is often not the first choice of study due to certain perceptions about the agricultural sector. Young people are leaving the agricultural sector for better remuneration in other sectors. In most rural communities when children complete their education, they do not like to stay in their home communities to make an effective contribution to agricultural development there. This is because they face various obstacles such as lack of employment in the rural areas, poor infrastructure and lack of prospects for their further career development. In some instances, young people find it difficult to pursue mathematics and science due to wrong perceptions and lack of support and career guidance. To solve this problem and to make agriculture attractive and a career of choice to young people, commitment, support and motivation of young people are required. Only then can they make their maximum contribution to the agricultural sector. Therefore, investing in skills development is an essential element in improving labour productivity of the youth and can be an important tool for agricultural development.

The Western Cape Department of Agriculture is committed to transform agriculture and make it attractive to young people. Youth development programmes in the department build confidence, motivate young people and promote agriculture as a career of choice, focusing on skills

development, job creation and youth empowerment. The youth development programmes in the Western Cape Department of Agriculture include bursaries, scholarships, the Young Professional Persons Programme (YPP) and internships.

The department awards bursaries to students studying full time at a higher educational institution towards obtaining a South African Qualifications Authority (SAQA) registered qualification in critical and specialised fields. The fields of study include but are not limited to soil science, irrigation engineering, resource economics, plant pathology, agronomy, and many other agricultural studies. The scholarships are for high school learners, offering them the opportunity to complete their matric with mathematics and science and giving them the opportunity for further studies in scarce and critical agricultural skills.

The YPP is a development programme to empower previously disadvantaged individuals from designated groups as defined in terms of the Employment Equity Act. This programme includes white females and people with disabilities. Applicants must have been accepted by a recognised higher education institution for honours, master's or doctorate studies.

Thus far, the department has awarded 164 bursaries to youth from predominantly rural areas. This includes 84 external bursaries, 10 YPP bursaries, 6 scholarships, and 64 internal bursaries.

In addressing youth unemployment, in particular during the COVID-19 pandemic, the department provided opportunities for unemployed matriculants, students and graduates through an internship programme.

The Western Cape Department of Agriculture together with the National Department of Agriculture initiated a project for the placement of unemployed graduates through the Comprehensive Agriculture Support Programme (CASP). This programme placed 120 unemployed graduates with agriculture-related qualifications on relevant farms and enterprises within the agricultural value chain to reduce the unemployment rate among youth and further provide them with the required practical hands-on experience.

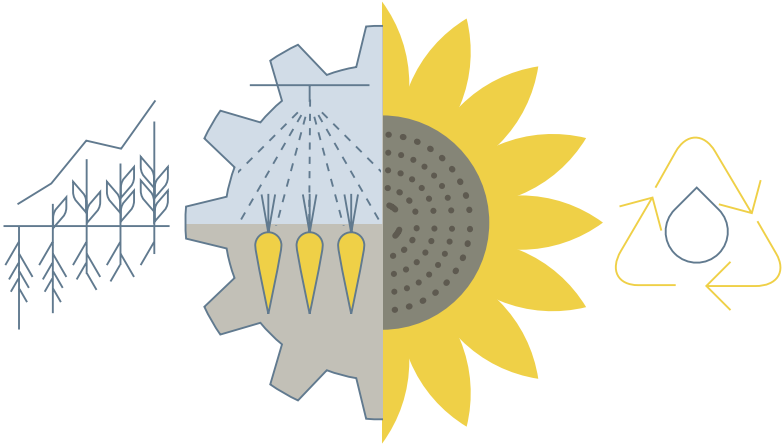
Benri Saul was awarded a bursary for a diploma in agriculture at Elsenburg College and an advanced diploma in agricultural extension at the Central University of Technology (CUT). He was subsequently appointed as a CASP graduate intern for 24 months. He is currently permanently employed in the department as an agricultural advisor in Clanwilliam.

Bongiwe Peter was awarded a bursary for a diploma in agriculture at the Cape Peninsula University of Technology (CPUT). She is permanently employed as Admin Clerk: Quality Control at the departmental vet lab.

»

Adriano Jacobs started as a Premier's Advancement of Youth (PAY) intern and was awarded a bursary to study BCom in economics at the University of the Western Cape. He was appointed as a CASP graduate intern. He is currently permanently employed as an accounting clerk in the department.

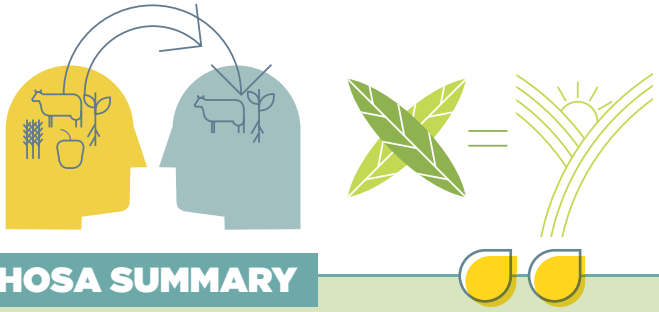
Ayabonga Sibulali was appointed as a CASP graduate intern placed within the department. He is currently employed as Agricultural Economist: Macro and Resource Economics.



Scan this QR Code to explore agri-career opportunities

Gavlin Darries was a PAY intern. On completion of his internship he was awarded a bursary to study BAgric at Elsenburg College. He furthered his studies and completed a Master's in Sustainable Agriculture at the University of the Free State. He is currently employed as agricultural advisor within the department.

Herman Nkoyana was awarded a bursary to study BAgric at Elsenburg College. He was appointed as a CASP graduate intern and is currently permanently employed at Record and Enterprise Content Management.



XHOSA SUMMARY

Ezolimo zisoloko zithathwa njengomsebenzi onganiki mdla kulutsha. Kwananjalo, kumaxesha amaninzi zithathwa njengezifundo zokuncamela ngenxa yoluvo lwabanye abantu ngezolimo. Ulutsha oluninzi luyazishiya ezolimo kuba lujonge imisebenzi ehlawula ngcono okanye imisebenzi esezi-ofisini. Kumaphandle amaninzi abantwana xa begqiba izifundo zabo eziphantsi baye bangathandi ukuhlala emakhayeni abo bafake igalelo kwezolimo nokuphuhlisa indawo abakhulele kuzo. Unobangela woku zingxaki abaye bajongane nazo nentswela msenbenzi emaphandleni, ukungabikho kwempucuko nophuhliso.

Ngamanye amaxesha ulutsha luye lujongane nomngeni kwizifundo zezibalo nezobunzululwazi ngenxa yokuswela inkxaso. namathuba emfundo nemisebenzi. Le ngxaki ingasombululeka xa ulutsha lungafumana inkxaso nenkuthazo kunye namathuba engqesho ukuze bazinikele kwezolimo.

Urhulumente weZolimo eNtshona Koloni uzinikele ekutshintsheni nasekwenzeni ezolimo zinike umdla kulutsha. Uphuhliso lolutsha luyanceda ekukhuliseni izakhono. Urhulumente ukwanikezela ngenkxaso-mali kulutsha olufuna ukuqhubekela phambili ngemfundo ephakamileyo kwezolimo. AP

COVID-19-stories van ons **plaaswerkers**

Die Wes-Kaapse Departement van Landbou bied jaarliks die Wes-Kaapse Prestige Landbou-toekennings aan om erkenning aan plaaswerkers te gee vir hulle waardevolle bydrae tot die landbousektor. As gevolg van die COVID-19-pandemie is die formaat van die 2020-toekennings verander en plaaswerkers en produsente van die 16 streke is gevra om hulle ervarings tydens hierdie tyd in die vorm van 'n storie en/of foto's te deel.

Die onderstaande bydrae is deur Jacques Klaaste van Olifantsrivier ontvang.

Tussen die wingerdblare en -lote en in die vars lug

Die koue byt en ál hoe my hande 'n bietjie hitte kan geniet, is om te begin snoei.

Almal is gegroet, hande is "gesanitise" en my masker is gemaklik op my gesig.

En so begin die reis vir ekstra geld.

Stukwerk is nie kinderspeletjies nie.

'n Man en vrou moet werk vir sy/haar geld om daardie inkopielys van volgende week aan te pas. Spontaan neem my dominerende hand die vlymskerp Felco en binne minute is my eerste vak "done and dusted". Perfek!

Nes Andree my geleer het.

Vernuwing is belangrik sodat vanjaar se oes goed kan wees, maar vernuwing by my as vriend, kollega en pa is nóg belangriker.

"Vader, U liefde waai elke dag seën in my lewe. Maak my 'n wuif-vir-ander-mense, asseblief." Dis my gebed vanoggend.

Met die Coronavirus-pandemie het ek opnuut besef dat niks as vanselfsprekend aanvaar moet word nie. Daarom is ek baie dankbaar om nie net 'n werk te hê nie, maar 'n werk in die landboubedryf. Dis nie net nog 'n dag gewerk nie, maar nog 'n dag nader aan my droom, wat eens op 'n tyd soos 'n hopelose taak gevoel het.

As seuntjie het ek gedroom om my eie handelsbesigheid te kan besit, maar die "universe" het ander planne met my gehad. Daardie droom is glad nie vergete nie; ek benader dit net met 'n ompad.

Vandag het ek voorlopig my eie huiswinkel. Nelson Mandela se woorde motiveer my om my droom te verwesenlik: "It always seems impossible, until it's done."

Hier op Dessie Plaas is ons toegewy aan ons werk en ons dra ons oorpakke met trots en respek. Andree is meer as net ons werkgewer. Hy is ook ons vriend. Ons persoonlike welstand is vir hom belangrik.

Hy sien ons potensiaal raak en spoor ons aan om net ons beste te gee.

Landbouwerk is soveel meer as net wingerde aanplant, draad span en wynstokke snoei.

Dit is 'n wêreld vol geleenthede.

Dit is 'n ensiklopedie op sy eie met 'n woordeskat wat my soms laat voel asof ek in 'n landbouklas is. Effe verward met al die vreemde terme, maar dan is dit huiswerk.

Ek onthou dan: "Reading takes you places", en woorde open wêrelde.

Landboukunde is 'n baie belangrike beroep en daarom moedig ek matrikulante aan om in die bedryf te studeer. Ons as landbouwerkers maak saak, nes die boer, wynmaker ...

Die Coronavirus-pandemie het ons weer eens bewus gemaak daarvan. Om deel te wees van die noodsaaklike dienste is voorwaar 'n riem onder die hart. Ondanks sommige mense se negatiewe opinies oor landbouwerkers, is daar die seën in ons daaglikse taak om te kan voorsien vir 'n ieder en 'n elk wat in die land woon.

Landbouwerk het sy eie uitdagings, soos die onvoorspelbare weerstoestande, maar soos 'n sonneblom staan ek met my gesig na die son, want die Here is nog goed vir my.

Om in die natuur te kan werk is 'n herinnering daaraan hoe groot ons Skepper is. AP

MARKET ANALYSIS OF **fruit jams, jellies, marmalades and purées**

by Ziyanda Hadebe, ziyandah@elsenburg.com, and Masego Moobi, masegom@elsenburg.com

The preparation of fruit jams, jellies, marmalades and purées is one of the ancient traditional methods of preserving fruits and vegetables. It is one of the most important aspects of home-scale preservation as well as industrial-level processing of fruits. Making jellies and marmalade was considered a household art but now it is considered one of the more important industrial processes (Bhardwaj, 2000). According to Bhardwaj (2000), during World War II, these products were imported to meet military and civilian requirements. Today they are manufactured extensively to meet the growing and changing taste preferences of the global market.

South Africa is one of the countries with the potential to expand its fruit jam, jelly, marmalade and purée market by using the surplus production of fruits and fruit waste. At farm level, such a product is common in making additional profits for farmers in South Africa. According to ITC (2019), South African exports represent 1,2% of world exports for fruit jams, jellies, marmalades and purées. Most of these products from South Africa are exported to Russia, the Netherlands, Israel, Namibia, Germany, Mozambique, and Botswana (ITC, 2019). South Africa's imports of these products represent 0,5% of world imports.

The value chain for fruit jams, jellies, marmalades and purées is relatively straightforward and easy to understand. The ingredients and tools for making these

products can be found in a basic kitchen. However, this serves as a threat to most small and medium producers because it increases the rivalry in the market and forces existing producers to constantly innovate their products to remain competitive. In the Western Cape, there are several small and medium producers of these products and most face similar challenges and threats in their businesses.

Conclusion

The market of fruit jams, jellies, marmalades and purées in South Africa is dynamic and broad. It enables small and medium producers to explore different flavours that can capture their target market. There are several fruit-based spread producers in South Africa, especially in the Western Cape, with differentiated or unique recipes keeping them competitive while satisfying their target markets. Each year in South Africa, imports of fruit jams, jellies, marmalades and purées are increasing, showing that the demand for these products is growing. However, the identified threats remain a challenge, especially for smaller producers.

SWOT analysis

Strengths	Threats
• Differentiated and unique fruit jams, jellies and other preserves. • Endorsements and certificates received by manufacturers/producers. • Consumer preferences of convenient and ready-to-eat products. • Low operational costs and accessible raw inputs. • Long and stable shelf life.	• Stringent food safety regulations associated with processed fruits. • Expensive packaging and strict labelling requirements. • Increased concern about added sugar content and other food additives. • Major brands and private labelled brands are direct competitors of small producers. • Competition from other food spread substitutes such as cheese and chocolate spreads. • Low barriers to entry.
Opportunities	**Weaknesses**
• Increased local and international demand for jams, jellies and other preserves. • Increased consumption of complimentary products such as bread. • Extended product range. • Emergence of new trends, e.g. healthy lifestyle, which will demand new products.	• Limited innovation among small producers. • Limited target markets.

REFERENCES

Bhardwaj, J.C. 2000. Postharvest technology of fruits and vegetables: An overview. (*In* Verma, L. & Joshi, V., eds. Postharvest technology of fruits and vegetables: General concepts and principles. New Delhi: Indus Publishing company. p. 1–1229).

ITC. 2019. Trade Map. Retrieved November 20, 2019, from International Trade Centre website: https://marketanalysis.intracen.org/en/home.

Full report available from **masegom@elsenburg.com**. AP

Agricultural boom in the second quarter of 2020

by Andrew Partridge, andrewp@elsenburg.com

Statistics South Africa's latest figures on Gross Domestic Product (GDP), the most popular measure of economic performance, show how the coronavirus pandemic has impacted the country's economy. Using the standard seasonally adjusted and annualised basis, South Africa's GDP for the second quarter of 2020 was 51% lower than the previous year. This level of decline has never been seen since the country started recording GDP statistics in 1960. Over this entire period the lowest quarterly net decline reported was an 8,3% drop in the fourth quarter of 1982.

The numbers are even more striking when looking at sector-level GDP performance for this quarter. Sectors such as construction, mining and manufacturing experienced declines of 77%, 75% and 73% respectively. Across the board there were net declines in GDP for all sectors except agriculture, forestry and fisheries. Benefiting from exemption from the country's lockdown regulations as an essential service and the continued demand for food as a necessity, the sector experienced positive GDP growth of more than 15%.

The strong performance of the agricultural sector comes off a relatively low base with the sector still in recovery from the recent drought. However, it reflects a very strong performance from the sector in the midst of a very challenging economic environment. The strong performance was underpinned by favourable weather conditions culminating in increased yields. The past year saw the second largest grain harvest ever recorded in South Africa, driven by particularly strong growth in maize, sunflower seed and soya bean production. The value of horticultural production grew by 30% for the second quarter after improved harvests of citrus and deciduous fruits. Agricultural growth was stifled somewhat as a result of the initial lockdown regulations in South Africa, particularly the ban on alcohol sales and the restaurant industry.

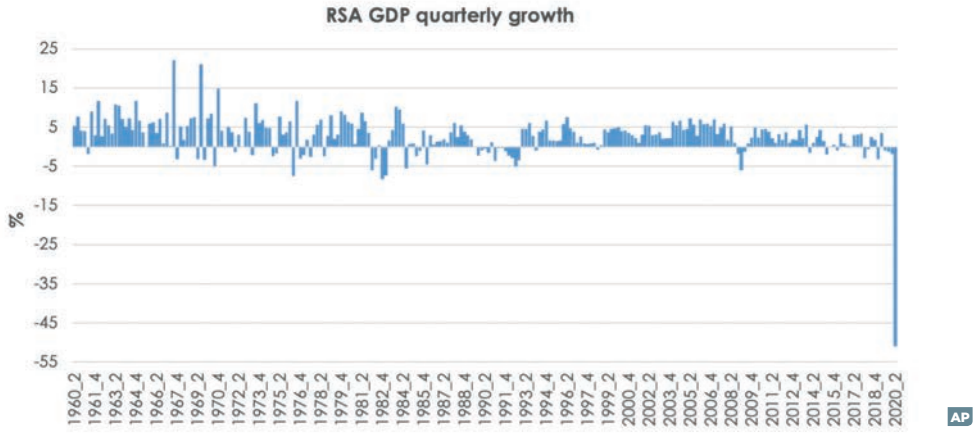
The implications for trading of agricultural

products in global markets varied across different agricultural commodities. Horticultural exports are particularly important for the Western Cape and generally more dependent on global markets than other commodity groups. Exports of the year to date for naartjies and lemons have been far higher in 2020 than in previous years. Stronger than average performance was also observed for peaches and nectarines, table grapes and apples. On the other hand, exports of wine were far lower than in previous years even though the restriction on the movement of wine was eased early into lockdown to allow exporting. There were also unusually low levels of exports of pears, plums and prunes.

The average prices of all goods and services, as measured through the headline consumer price index, decreased by 0,7% over the second quarter, when there is usually a 1% increase. Price increases prior to this resulted in an annual price increase of 2,4%. The average prices of oils and fats increased by 4,2% over the quarter, and 9,5% over the past year. The prices of eggs and dairy, and sugar and sweets both experienced unusually high quarterly increases and stood at 5,8% and 8,8% higher than a year prior respectively. Fruit prices decreased over the quarter by 5,6% – a very normal change due to seasonal changes. However, fruit prices increased extremely sharply in the first quarter of 2020 and so the average price of fruit at the end of the second quarter was 31% higher than a year before. Vegetable prices declined over a quarter where they have historically increased. This has resulted in a relatively low annual growth rate in the average vegetable price.

The pandemic is not over and the recovery from it will likely continue for a long time. Agriculture, being dependent on consumption demand, will be impacted by the loss in household incomes as a result of all the job losses over this time. There may also be new difficulties arising with regard to the supply of foreign manufactured inputs into production like machinery and fertilisers. Delays in logistical arrangements, support services and infrastructure developments as a result of government regulations could also cause additional disruptions along agricultural value chains.

The road ahead will not be easy but issues of food security are more important now than ever before. South African agriculture has proven its resilience in recent years, coming through very difficult times. Early evidence now gives reason for optimism for the sector going forward.



AGRICULTURE: THE SUNRISE SECTOR

by Dr Dirk Troskie, dirkt@elsenburg.com

When you hear the word "farming", what is the first image that comes to mind? Perhaps it is "Oumaoupa plaas", or a herd of cows munching in a green meadow, a koppie, a windmill, or the wide open plains of the Karoo? Perhaps a massive, high-tech tractor or a modern "vertical farm"? All these images are correct and are informed by personal experience; after all, the majority of South Africans (of all races) are still first or second generation urbanites.

A significant section of our society has less flattering things to say. Agriculture is a "dying sector" and is not worth any further attention. It conjures up images of failing land reform, farm murders, exploited farmworkers and natural resources.

In the end, nothing in South Africa is ever simple or viewed through a single lens. Recently, things became even more complicated. Towards the end of March 2020, most South Africans had a first-time encounter with empty shelves in supermarkets. Fortunately, the empty shelves turned out to be short-lived. They were the result of panic buying rather than anything else, but COVID-19 brought its own series of challenges to agriculture and food supply. These challenges included:

- disruptions in value chains (e.g. bottlenecks in ports and limited space for air cargo);
- disrupted markets (bans on wine, tobacco and flower sales, and closure of restaurants);
- loss of market share (the export ban and port/airfreight inefficiencies handed shelf space to our competitors on a golden platter);
- increased cost of compliance (e.g. induced production inefficiencies due to social distancing; cost of personal protection equipment, etc.);
- changing consumption patterns (domestic and abroad); and
- a weakening exchange rate.

The list could go on, but the main distinguishing factor between COVID-19 and other disasters is that the production base of farming remained intact. During a drought, trees die and the veld deteriorates. A flood washes away orchards, roads and other infrastructure. An outbreak of avian influenza leads to the culling of ostriches and chickens. None of these happened during COVID-19. On the positive side, COVID-19 did underline the importance of farming and the vulnerability of food supply to the average consumer.

»

Nevertheless, we believe that "COVID-19" will carry the same value as a dividing line commonly associated with terms such as "WWII" and "9/11". At the same time, we still need to address other challenges such as climate change and social disruptions. How do we, in the agricultural sector of the Western Cape Province, proceed in this post-COVID-19 period?

We believe that the agricultural sector is ideally placed to lead the regeneration of the provincial economy and to create jobs. Furthermore, it is important that transformation should not be seen as a challenge, but rather as a mechanism to achieve economic growth and job creation targets. In other words, we need to grow the cake rather than cutting it into increasingly smaller pieces. The Western Cape has established an excellent track record of successfully supporting land reform projects, and the key to this approach is the partnerships established with commercial agriculture.

In 2014, we commissioned an external and independent evaluation to determine the success of the 246 land reform farms that we were supporting at the time. Based on 39 criteria covering the triple bottom line, the assessment found that 62% of the farms could be classified as successful. During 2018 we conducted another external and independent evaluation covering the 243 farms we supported in the intervening years and, using the same criteria, a success rate of 72% was recorded. Given the negative press that land reform often receives, I am convinced that these figures would come as quite a surprise to many people. The global rule of thumb is that 90% of new businesses fail within the first three years. The provincial department is very proud of the success of our support to our new farmers.

Let us return to economic growth and job creation. Despite perceptions to the contrary, there are certain areas in the Western Cape where irrigation farming can be expanded. For instance, if the wall

of the Clanwilliam Dam were to be raised, the height of the inlet canal to the Brandvlei Dam increased, and the latent potential of the Buffeljags Dam unlocked, this would be possible. By harnessing the strengths within the agricultural sector, we believe that these projects could create 22 200 direct jobs and add more than R7 billion to farming income over the next decade.

At the same time, the sector needs to question the underlying fundamentals and principles of the way we farm. Some arid parts of the province are experiencing the sixth consecutive year of drought, and the question can be raised whether the drought is an aberration or a new normal. At the same time, entrepreneurs producing plant-based or vat-grown protein are increasingly confident that their product will replace 60% of meat by 2040, while lamb is an iconic product of the Karoo. What does this mean for the future of farming in our arid areas? There is indeed a whole range of innovative options available for farmers in the Karoo, of which one is to cherish and embed the uniqueness of Karoo meat before it becomes generic. The Western Cape is commissioning a diagnostic and design evaluation of the future of farming in the arid areas of the province. The process will open new and creative opportunities for all role players.

The role and function of the countryside in our society needs to be re-evaluated. One thing COVID-19 has demonstrated is that a person does not have to be in the office to have a productive day at work. What type of environment should we create in the countryside to attract those individuals who do not want to waste two hours commuting to work every day?

Of course, all of this means that we, as government as well as a sector, need to embrace new technology. The Western Cape Department of Agriculture has, with the aid of the University of Stellenbosch Business School (USB), conducted a diagnostic and design evaluation of the impact of the Fourth Industrial Revolution (4IR) on the agricultural sector of the province. What emerged very clearly is that new technologies need to be embraced and used to achieve our objectives. Although the department has already internalised a whole range of opportunities, COVID-19 has accelerated this process. Indeed, the department has identified 11 innovations that will improve its internal operations in addition to the 21 changes, which will enhance its external services in the post COVID-19 era.

Finally, it is crucial to build new relationships post-COVID-19. On the one hand, these relationships will have to foster trust between local producers and consumers. Modern developments, such as the immersive technologies that we are experimenting with as part of product marketing, may be one avenue to be followed to this end. On the other hand, interactions outside the immediate environment need to receive attention. Africa should be a core focus for the development of further synergies.

Nobody can predict what will happen in the future. However, what we are sure of is that agriculture is the space where growth, innovation and creativity will blossom over the next couple of decades. Agriculture is the space to be in for those who are young in body and at heart. AP

The promotion of Western Cape **agricultural products goes virtual**

by Londiwe Thabethe, londiwet@elsenburg.com

It has been noted in various strategic documents that market access is a provincial and ministerial priority for the current term of office in the Western Cape. The aim is to increase market access and international opportunities for agricultural exports from the Western Cape so that the agricultural sector maintains its export position for the next five years. Market access is a critical variable in the growth of the agricultural sector and the Western Cape economy.

The Western Cape Department of Agriculture (WCDoA) has committed to support the sector to ensure its continued dominance in traditional markets, while developing and growing markets elsewhere, particularly in Africa and China. It is for this reason that since 2014, the Programme: Agricultural Economic Services of the WCDoA has provided support for companies to participate in the Food and Hospitality China (FHC) event. This takes place in Shanghai, China on an annual basis. Over the years, an average of 20 food, beverage and cosmetics companies participated on this platform.

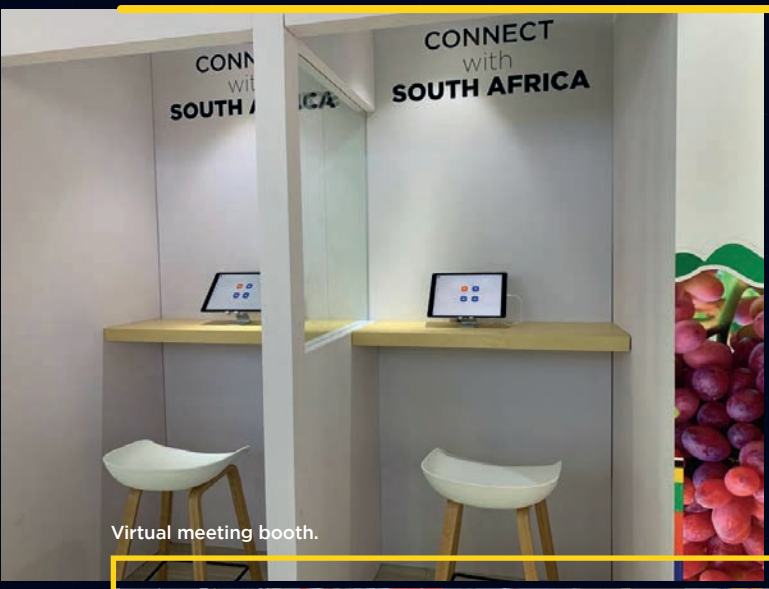
The COVID-19 pandemic compelled the organisers of the FHC 2020 to consider a hybrid kind of an event. This event involved a physical pavilion at the exhibition venue and company owners connecting virtually from their home countries via platforms like WeChat and Zoom Chat.

To make use of this opportunity, which took place from 10 to 12 November 2020, the department participated in its first ever FHC virtual exhibition, where 16 companies were supported. This included the physical

showcasing of their products at the event, digital content and a 12-month online subscription on three e-commerce platforms (Saladplate, Jgle and ezbuy). A range of processed agricultural products from the province was showcased at the event and for the next 12 months on the three buyer-and-seller e-commerce platforms. The aim is to increase the coverage and impact of the support provided to these companies, given the tough times brought on by the COVID-19 pandemic.

Since the department officials were not able to attend the exhibition event in person, the South African (SA) consulate in Shanghai managed activities in China. Ms Mpho Hlahla, the consul-general, attended the event to monitor the proceedings. Also in attendance was Mr Rirhandzu Mahlale, consul (economic) from the SA consulate and Mr Mashudu Silimela, agricultural attaché from the SA Embassy in Beijing.

Even though the exhibition was virtual, it proved to be an exciting and productive event for all of the participating companies. Various companies managed to clinch deals from new and existing importers, which will benefit the Western Cape economy. AP



Virtual meeting booth.

Western Cape pavilion at the FHC 2020.


Officials from the South African Consulate viewing local products displayed in the pavilion.

Prevent eating **unsafe meat** during the festive season

by the Veterinary Public Health team, marthinusw@elsenburg.com

Many look forward to enjoying hearty meals with family and friends at the end of the year. In South Africa this time of the year is braai time after all!

The question is, will you survive it?

During fun times, the last thing that comes to mind is that the food we eat might be unsafe and cause us harm. This is unfortunately a real possibility. Meat produced under unsavoury circumstances may be to our detriment.

To put the minds of consumers at rest as far as the consumption of meat goes, the very capable team of veterinarians and veterinary public health officers at the Western Cape Department of Agriculture is working hard behind the scenes to ensure that only safe meat is produced at all the approved abattoirs in the Western Cape.

All animals and poultry slaughtered are subjected to stringent health controls and meat inspection.

Once approved, the meat receives a legally prescribed approval stamp or mark, either on carcasses or its packaging. The approval mark serves as confirmation to the consumer that the meat was slaughtered at a regulated abattoir, under official control, and was found to be fit for human consumption.

Once legally produced meat is cut up or prepared further on retail level or in a butchery, it inevitably loses the abattoir mark of approval. However, it still remains

traceable to the abattoir of origin via the address of the retailer, processer or butcher that is attached to pre-packaged meat, as per legal requirement of the Department of Health.

Unfortunately, not all meat is slaughtered and inspected at approved abattoirs.

The presence of a stamp of approval distinguishes between carcasses or packaged meat that were produced at registered abattoirs, and meat produced illegally. Unscrupulous vendors may buy sick, infected and moribund animals. Even if the animals are not sickly, they are slaughtered in unapproved and unhygienic places without any health or meat inspection controls. Unmarked meat, without any traceability to abattoir or processor of origin, is sold at "very reasonable" prices directly to the public.

Illegally produced meat may contain harmful bacteria that can cause food poisoning, transfer zoonotic parasites to consumers or have high residues of veterinary medicines. Because of being produced in an unhygienic environment, the meat may also have a poor keeping quality, which means that it may go off very quickly.

How to make sure that you are not duped into buying unsafe meat?

Distributors of illegally slaughtered meat often advertise on social media or in small local newspapers. Advertisements only contain a name and telephone number. Meat is usually delivered at a home address. There is no information on the packaging as to where the meat was slaughtered, cut up or prepared, in other words, it cannot be traced back to the seller or an abattoir. Where whole carcasses are involved, there are no approval marks on the meat either, in contrast to meat that was sourced from a legitimate abattoir.

VETERINARY PUBLIC HEALTH OFFICERS HAVE THE FOLLOWING ADVICE:

- **Do not hesitate to ask your butcher if his meat is sourced from approved abattoirs. You may even ask him to show you the approval stamps on the carcasses that he uses to produce his meat cuts or preparations. There are usually four marks, containing the unique abattoir number and the word "PASSED" on each quarter of the carcass.**
- **If you buy pre-packed cuts of meat at a retailer, always make sure that the address of the producer or abattoir is indicated on the packaging. This will enable you to lodge a complaint if the meat is in any way unsatisfactory. Since the retailers are required to maintain a record of carcasses purchased, they are able to trace meat back to the abattoir of origin.**
- **If you buy meat through small advertisements or by means of social media, it would be prudent to know the address of the distributor (rather than only a name and telephone number). Ask at which abattoir the meat was slaughtered and confirm that the meat bears an official inspection approval mark, either on the carcass or on the packaging. If not, you are probably enticed to buy illegally slaughtered meat.**

By following these suggestions, you can make sure that the meat you braai at the end of this year has been subjected to official meat inspection and is safe, nutritious and healthy. Wishing you a good braai and good health! AP

NEW MACHINES TO BOLSTER RESEARCH

by Dr Ilse Trautmann, ilset@elsenburg.com

Jannie Draai and Moos Snell with their new tractor at Elsenburg research farm.

To maintain and expand the research portfolio of the department, the Programme Research and Technology Development procured a number of new tractors, a small plot harvester, and several other smaller pieces of equipment during the past few months.

The highlight was the delivery of a brand new small plot harvester that was imported from Germany for R3 million and which will be pivotal to the small-grain research trials.

However, as Louis V Gerstner Jr said, "No machine can replace the human spark: spirit, compassion, love and understanding".

We salute the research team for their hard work, dedication, and enthusiasm to support the farmers of the Western Cape and wish them safe “tractoring” and harvesting.

1. Kobus Afrikaner with the new tractor at Langgewens research farm.

2. The new small plot harvester after delivery at Elsenburg. From left to right: Gilles Beaufils (Haldrup France: technical manager for northern countries and Africa), Dr Johann Strauss (scientist in sustainable cropping systems), Lisa Smorenburg (research technician in cropping systems at Tygerhoek), Annelene Swanepoel (scientific manager in Plant Sciences), Eric Moscoso (area sales manager at Haldrup Germany), Riaan Bruwer (local service agent for Haldrup), and Piet Lombard (research technician in cultivar evaluation) (at the back).

3. Lisa Smorenburg behind the wheel of the small plot harvester, with Gilles Beaufils during a training session with the new machine. AP

The Nortier team and their new tractor. At the back: Edmund Bredenkamp. Front from left to right: Tshepo Lerotha, Shaun Philand en Desmond Adams.

R25 million drought relief

by Jody Wentzel, jodyw@elsenburg.com

A drought is a slow-onset natural hazard with effects that often accumulate slowly over a considerable period of time and may linger for years after the termination of the drought event. These effects are non-structural and are typically spread over a larger geographical area. The Western Cape has been experiencing a continuous drought that has affected many farmers by decelerating agricultural production, distressing farmers financially, and subsequently affecting job security for agri-workers.

The Sustainable Resource Management Sub-Programme: Disaster Risk Management (DRM) has been supporting farmers across the province with drought relief through the distribution of fodder vouchers. Biannual veld assessments are facilitated by DRM in conjunction with the department's Plant Science directorate to assess the conditions of the veld and regulate the areas in need of drought relief support.

Farms categorised as extremely critical receive monthly drought relief support while critical areas receive bimonthly support. Veld areas declared to be in a good condition do not receive support. Fodder vouchers are generated based on the number of large stock units (LSUs) on the farm, provided all the qualifying criteria checks are passed.

Although recent rains and snowfall have brought relief to farmers across the province, the impact of the severe drought is far from over. In some areas,

such as the Central Karoo, Little Karoo and Matzikama regions, farmers are still battling the catastrophic effects of the ongoing drought. The agricultural sector remains particularly vulnerable to water risks and a changing climate.

DRM has received a R25 million drought relief allocation from the Provincial Disaster Management Centre (PDMC) in July 2020. One of the Sub-Programme's objectives is to distribute fodder vouchers, due to the national state of disaster declared by the president and the subsequent national lockdown from 23 March 2020. However, the normal operating procedures needed to be amended to accommodate the restrictions in terms of movement, contact and communication.

When fodder vouchers were distributed in April 2020, Level 5 restrictions were in

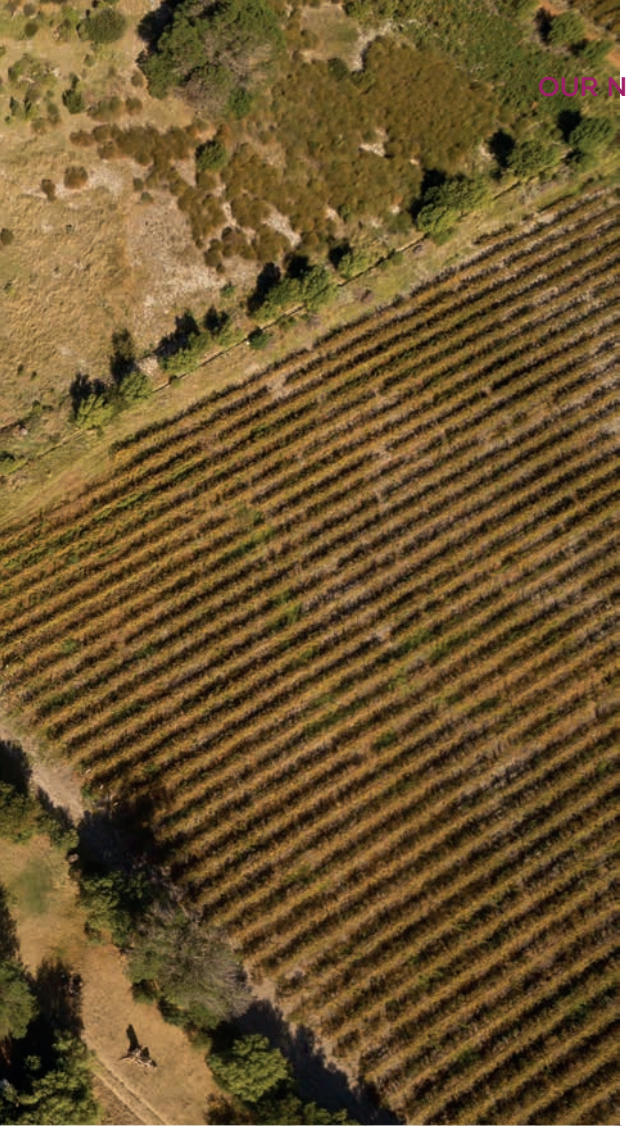
place and permits were required by all citizens in order to move around legally, while only essential shopping was deemed acceptable. Farmers were then required to collect the fodder for which they qualified directly from the cooperatives as DRM avoided the distribution of vouchers to each farmer individually to restrict contact and adhere to social distancing regulations.

With the ease in restrictions to lockdown Level 3 from 17 June, the August 2020 vouchers from the R25 million relief fund were distributed to 1 172 farmers as per normal operating procedure.

The department remains committed to support farmers as we acknowledge the difficulties they face and the impact that drought and a pandemic has had on the agricultural sector. AP

Removing alien vegetation, **restoring nature**

Extract from the Abundant Harvest series – caring for people and the planet



The presence of alien vegetation undoubtedly counts as one of the biggest headaches for farmers. Adding to the challenge of water already being a scarce resource, these water guzzlers can reduce water run-off by as much as 30% in heavily infested areas. Moreover, it impacts the functioning of the ecosystem and its health, which influences biodiversity and water availability significantly.

Invasive alien plants pose a major threat to biodiversity in catchment areas, potentially disrupting the delicate natural balance in ecosystems. As we depend on biodiversity for water, food, wood, clean air, medicine and much more, it is vitally important that we protect this resource.

A united front

Fighting alien vegetation, however, needs a united front by various organisations sharing the same objective. As far back as 1995, the severity of the impact of invasive plants was recognised and has led to the establishment of the Working for Water initiative by the national Department of Environmental Affairs (now the Department of Environment, Forestry and Fisheries – DEFF). This initiative is also supported by Sustainable Resource Management (SRM): LandCare and many other stakeholders.

The impact of SRM: LandCare over the past 21 years speaks volumes. This programme has been able to clear no less than 3 000 hectares per year and an impressive 750 people have found employment each year, representing 25 000 person-days of work per annum.

The other instrumental partner is the impacted community and/or landowner or farmer. One of the six principles of LandCare is that any project must be community-led with strong input and participation from the affected parties. For this reason, before LandCare officials start a project, they lobby for total support and commitment from the landowners – in most cases

»

several landowners in an area – to ensure a bigger impact. "In this way the landowner includes alien-clearing activities in his normal farming activities and landowners would rarely allow something that they have invested in to return to the original state of degradation," says Francis Steyn, manager of the LandCare sub-programme.

Alien clearing and restoration

"While we do talk about alien-clearing projects, the overarching objective of these initiatives is building resilience," says Francis Steyn. "SmartAgri, the department's response strategy to climate change, has listed a number of interventions towards becoming climate change-resilient. LandCare's objective to provide defence against degradation of natural resources and thus ensuring clean and sufficient water, gives effect to one of these interventions."

Community involvement – the key to success

Community involvement offers ensured successes, the creation of jobs being one of them. Several community members have tapped into this secondary industry of alien clearing and restoring natural vegetation and have been given a new lease on life.

Fifty-year-old Linda Jansen can attest to this. Linda oversees three alien-clearing teams in the Winelands, providing employment to 39 people. She is full of praise for the work of LandCare. "LandCare has helped to provide us with work almost without interruption and as a result, my dreams have come true," she says. "I have been able to buy a house; I can employ people. People are proud of the work they do."

Providing clean water to the general public is one of the other rewarding feats for LandCare. Working hand-in-hand with farmers in achieving the goal of restoring ecosystem health, forms a major part of the success story. Over the past seven years, close to 750 hectares of the Nekkies wetland have been cleared. The impact of this project in terms of water supply to the public and the agricultural sector is quite astounding.

ALIEN VEGETATION - THE REALITY

Invasive alien plants are plants brought to South Africa from other countries – intentionally and unintentionally.

- **Cause human, environmental or economic harm.**
- **No natural enemies; reproduce and spread rapidly.**
- **Dense infestation intensifies veld fires, damaging the burnt area's soil structure.**
- **Can change flow patterns of river systems during floods, causing soil erosion of valuable agricultural land, wetlands and river banks, and higher turbidity levels in the water.**

The impact of SRM: LandCare over the past 21 years speaks volumes. Through partnerships and co-funding, this programme has been able to clear no less than 3 000 hectares per year and an impressive 750 people have found employment each year, representing 25 000 person-days of work per annum. AP

Prevent pandemics by **supporting healthy ecosystems**

by Dr Lesley van Helden, lesleyvh@elsenburg.com

Studies of new diseases that appeared during the past century show that approximately 43% originated in wild animals (e.g. Ebola virus, SARS), 40% evolved from pre-existing human diseases (e.g. new strains of seasonal influenza or drug-resistant tuberculosis), and the remaining 17% came from domestic animals or were of unknown animal origin.

Most human diseases, therefore, originate from other species of animals. The likelihood of them spilling over to infect people increases as opportunities for contact between people and animals increase on a large scale. Areas that are at high risk for this happening are those in which:

- diverse wildlife occurs naturally;

»

- human activity is disrupting natural habitats, for instance when natural vegetation is removed for mining or agricultural purposes; and
- wild animals are hunted, traded, or kept for food production in unnatural conditions.

As in other parts of the world, several of these risk factors currently exist in South Africa, which means that our people have as important a role to play as those anywhere else in preventing the next pandemic.

Preventing close contact between people and animal species that are potential hosts of new diseases, is possibly the most important step in preventing the emergence of a new disease. However, how this is achieved is equally important. Attempting to remove or kill wildlife species perceived as threats will have the opposite effect, because functioning natural environments are stable systems that provide protection against the emergence of disease. Maintaining a balance of biodiversity as close as possible to a natural habitat generally has a synergistic effect on health for animals and people. This is because, among other factors, changes in the availability of resources in habitats lead to changes in the population and behaviour of the species living there. This can cause more interaction between species than would have occurred before, including increased contact with people, which can provide opportunities for diseases to spread from one species to another. Furthermore, when animals are experiencing stress, their immune systems suffer, and they are more likely to be infected by and shed dangerous pathogens into the environment.

As humans, we often regard ourselves as separate from nature. However, as the current pandemic has made clear, we are very much a part of and subject to forces of nature just like every other living thing that shares our planet. The degradation of ecosystems through human activity results in the degradation of our own quality of life. Let us think carefully about the choices we make every day and their impact on other species because eventually, these choices may come to affect us in a similar way.

> Functioning natural environments are stable systems that provide protection against disease emergence."

Practical steps for protecting the health of ecosystems should therefore consist of measures to protect the well-being of not only animals, but also people and the environment around them. These include the following:

- **The value of conservation:** We need to look critically at how natural land and wild animals are valued in society. If the perceived value of conserved land is not high enough, this land is likely to be converted into something that will be considered more valuable, such as a farm, a housing complex, or a golf course. This type of land use change is the biggest disrupter of natural ecosystems.
- **Good agricultural practice in farming:** Farmers are on the front line of land stewardship and many farmers across South Africa are preserving natural ecosystems by practising conservation agriculture and regenerative agriculture, and setting aside land for the preservation of wild ecosystems. Producers should also follow the animal welfare standards set by the World Organisation for Animal Health (OIE) and the good agricultural practices recommended by the Food and Agricultural Organization of the United Nations (FAO).
- **Environmental impact assessments:** These should be done for all development projects and should thoroughly examine the potential effects on the ecosystem in that area.
- **Food security:** All people should have access to fresh and nutritious food. This will help reduce the need for unregulated animal slaughter and hunting of wildlife.
- **Controlling illegal wildlife trade:** This can be achieved through a combination of law enforcement and education to reduce demand.
- **Public health:** Measures should be put in place to ensure safe and sanitary living conditions for all communities to reduce contact with rodents and water-borne pathogens.
- **Consumer choices:** The more educated we are as consumers about the impact of what we buy, the more of a positive impact we can have on ensuring minimal harm.

AP

ELSENBURG JOURNAL

Vol 17 | No 4 | 2020

What is the **green status** of our research farms?

Alternative crops: opportunities in raspberry production

Plant–grond–mikrobe interaksies – **Wes-Kaapse gewasse en 'n onkruid**

What is the **green status** of our research farms?

by Vanessa Barends-Jones, vanessab@elsenburg.com

South Africa is committed to becoming a low-carbon economy. In so doing, the Carbon Tax Act (No. 15 of 2019) was implemented and came into effect on 1 June 2019. The Act will be implemented in two phases, with Phase 1 already being implemented in most sectors, except the agricultural and waste sectors. The agricultural sector will be directly implicated in Phase 2, to be implemented from 2023.

The Western Cape Department of Agriculture (WCDoA) supports the low-carbon economy strategy and is proactive in terms of measuring and monitoring its research farms' carbon footprint (CF) to assist and advise farmers in terms of carbon emissions. The Carbon Footprint Project, established in 2011/2012, measures the WCDoA's research farms' CF annually, identifying hotspots and suggesting emission-reducing strategies. This initiative on the research farms serves both as an opportunity to lead by example and to gain knowledge in order to better serve the agricultural sector in the Western Cape towards increased sustainability.

As the carbon tax becomes the new norm, more local studies are being conducted to determine emissions for sectors in South Africa, coupled with guidelines to assist with implementation. The agricultural sector is a complex sector, and a standardised emission source list is not readily available, especially for livestock. When a livestock footprint was conducted in the past, assumptions and comparisons were made and emissions factors based on IPCC[1], DEFRA[2], and other country-specific data. With time, researchers realised the importance of emission data that is more country-specific and this has been reflected in the last four years of measurement.

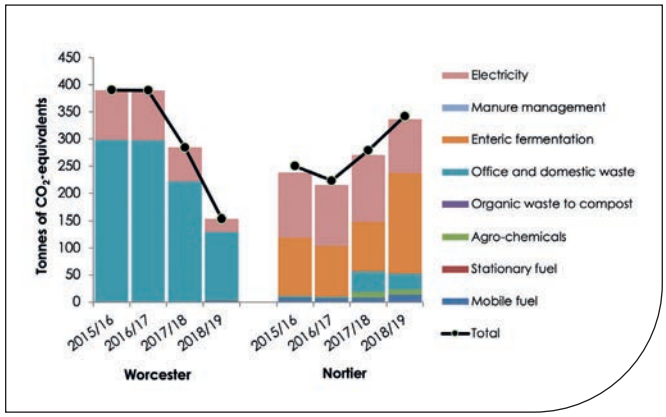
Figures 1, 2, and 3 give a summary of the seven research farms' carbon emission activities (2015 – 2019). These figures also indicate whether the reduction measures that were put in place have affected each farm's emissions. When looking at the results, it suggests that the farm size is not necessarily linked to larger emissions, but emissions are determined more by the farming activities and their intensity. For instance, Nortier research farm is 2 800 ha with around 342 tonnes of CO_2-equivalent (tCO_2e) emission, whereas Elsenburg is 674 hectares in size but had 12 170 tCO_2e.

Worcester and Nortier research farms had the lowest carbon emissions for the period under review and it is summarised in Figure 1 below. Apart from showing

[1] IPCC - Intergovernmental panel on climate change

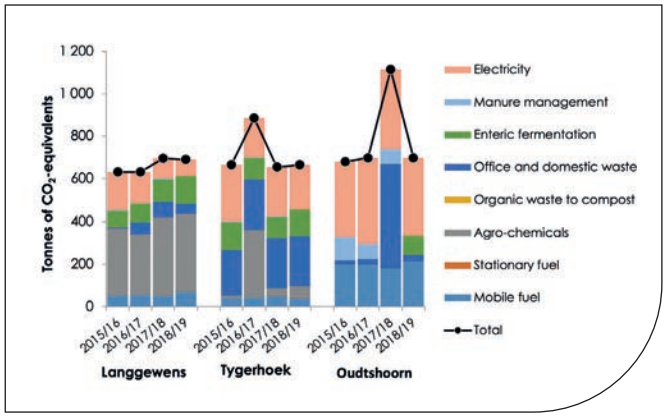
[2] DEFRA – Department for Environment Food & Rural Affairs

Figure 1: Measured carbon emission activities for Worcester and Nortier research farms – 2015/16 to 2018/19.



Source: Own compilation

Figure 2: Measured carbon emission activities for Langgewens, Tygerhoek and Oudtshoorn research farms – 2015/16 to 2018/19.



Source: Own compilation

the different categories of emissions, Worcester showed a satisfactory decline in its total emissions for the past five years by improved waste management.[3] In contrast, Nortier's increased emissions after 2016/17 for enteric fermentation[4] and mobile fuels had the opposite effect.

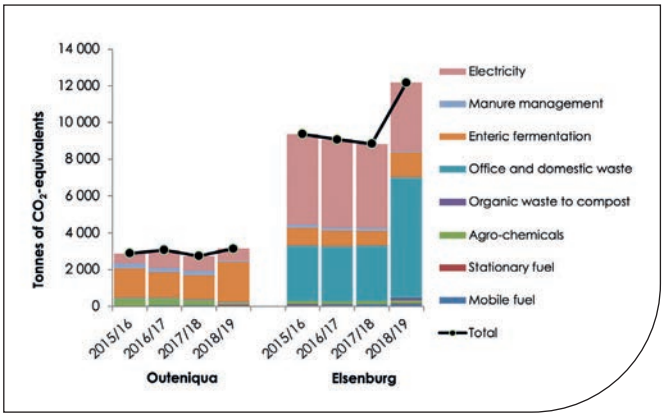
Moving to the middle emission group of farms, Figure 2, Langgewens research farm shows a relatively stable pattern with a slight increase since 2016/17. This is attributed to an increase in emissions for mobile fuels and enteric fermentation. Tygerhoek research farm had a similar trend overall with a spike of 220 tCO_2e for 2016/17 before declining to normal levels. Oudtshoorn's spike in emissions for 2017/18 was due to an increase in waste being burnt instead of being recycled.

The highest emitters in all of the department's research farms are shown in Figure 3, namely Outeniqua and Elsenburg. Despite not being as large as Nortier and Tygerhoek, the research and activities conducted on these farms are more intensive, with a stronger livestock focus. This results in comparatively higher overall emissions, while showing a relatively constant trend.

[3] The WCDoA had a recycling system that was in operation from October 2013 until 2018. This project had a major impact on the amount of waste that went to the landfill but was discontinued in 2018, due to a lack of cooperation. The farms that wanted to continue were encouraged to do so.

[4] Enteric fermentation refers to the "natural part of the digestive process in ruminant animals. Microbes in the digestive tract, or rumen, decompose and ferment food, producing methane as a by-product" (Morris, 2019).

Figure 3: Measured carbon emission activities for Outeniqua and Elsenburg research farms – 2015/16 to 2018/19.



Source: Own compilation

Elsenburg initially had a three-year declining trend[5] with a subsequent large increase of 3 343 tCO_2e for 2018/19. Emission increases occurred for various activities, like mobile and stationary fuel, waste, and enteric fermentation. The main reason for the increase was the increase in livestock numbers, with resulting increased enteric fermentation. However, the phasing out of the recycling system led to more waste being diverted to the landfills.

To summarise, it is clear that enteric fermentation, electricity, manure management and waste are the main emission hotspots. Focusing only on the 2018/19 footprint cycle, the total CO_2e emissions for the research farms increased by 3 268 tCO_2e. This increase was due to increases in the waste categories and the enteric fermentation activity for Elsenburg. The high electricity emissions can be attributed to the combined electricity bill for the college and the main building, which does not reflect the actual farming system. The spike in waste emissions, on the other hand, is due to the discontinuation of the recycling systems on these farms in 2018. The reinstatement of a fully operating recycling system will have a major impact on emissions. Implementing a renewable energy system could further support sustainability on research farms. Elsenburg has already started installing solar panels on the roof of the main building. This is all being done to prepare the agricultural industry for the indirect and direct effects of the carbon tax. For the full report contact the author at vanessab@elsenburg.com.

References

Morris, J. (2019). *Enteric fermentation*. Retrieved from Climate & Clean Air Coalition: https://www.ccacoalition.org/en/activity/enteric-fermentation.

[5] This decrease in emissions is due to the drought that occurred in that period. Livestock numbers decreased as well as the planted feed areas.

Alternative crops: opportunities in raspberry production

by Nicole Wagner nicolew@elsenburg.com

The global berry industry is one of the fastest growing agricultural industries in the world. The value of world imports has grown from R65 billion in 2014 to R150 billion in 2019 – an annual increase of 20% (ITC, 2018). In recent years, South Africa has seen an expansion in raspberry production, both in terms of volumes and area planted, albeit not to the extent and success of the blueberry industry. Demand has been driven by health benefits as well as increased convenience and versatility, with berries offering convenience in terms of no peeling, easy storage and consumption by hand. Berries are versatile products that can be consumed fresh, frozen, dried as extracts, in juices, pulps and in beverages. Raspberry production is moving towards year-round availability with improved varieties that can be cropped twice a year, while technologies such as using temperature and light treatments can extend the growing season and improve overall yields (Mann, 2015). Seasonality offers further opportunities for local production as countries in the northern hemisphere pay a premium for raspberries in their off-season and even more so for the consistent quality that South Africa can supply. Having said that, South African production is still relatively small due to the high start-up capital and intensive management required for production, among others, but as with the successful rise of the blueberry industry, raspberry production in South Africa shows promise.

Figure 1 shows global raspberry production's significant growth over the past few decades from approximately 65 000 hectares in 1985 to about 118 000 hectares in 2017.

Over the same period, the yields grew from around 4,8 to 6,7 tonnes per hectare, putting total global output at about 791 000 tonnes in 2017. Growth in global production is expected to continue to increase going forward. In terms of world trade, global imports for fresh raspberries (including blackberries, which make up a much smaller proportion) have grown from R998 million in 2001 to R38 billion in 2018, averaging a 37% annual growth rate (ITC, 2019). As expected, world exports show a very similar trend.

Figure 2 shows that the growth noted above is as a result of both higher prices and higher volumes traded. The volumes traded expanded from 49 000 tonnes in 2001 to 423 000 tonnes in 2018, showing steady year-on-year growth in value since the end of the financial crisis in 2009. The growth in raspberries traded on world markets was not limited to fresh fruit only; frozen world imports also grew significantly from R2,2 billion in 2001 to R13,1 billion in 2018 (ITC, 2019). The growth noted above is mainly driven by increased consumption of

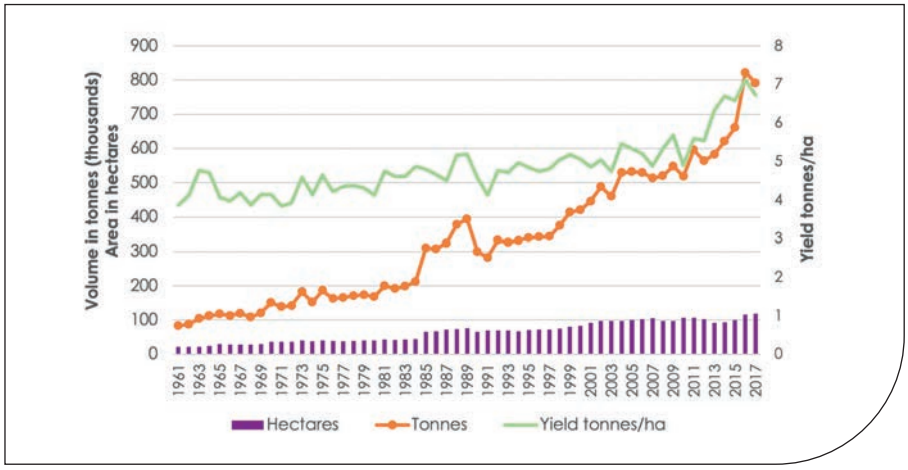
[1] Industry statistics suggest a substantially higher amount at around 205 hectares in 2017 (Hortgro, 2017).

raspberries around the world, which means that prices have also increased steadily, especially since 2012 as shown in Figure 3.

Raspberry production is labour-intensive and with the potential for high returns, there are opportunities for growth and job creation for the Western Cape (WC). Producers can expect yields ranging from a conservative 5 t/ha up to more than 12 t/ha over a production lifetime of 10 to 15 years. There are also various production systems chosen among growers in the use of farming under cover, such as tunnels and shade nets and planting raspberries either in the ground or in pots using substrate as a growing medium.

The South African berry industry has experienced notable growth in recent years. The Flyover Project of the Western Cape Department of Agriculture shows that there

Figure 1: Global raspberry production, area planted and yields.

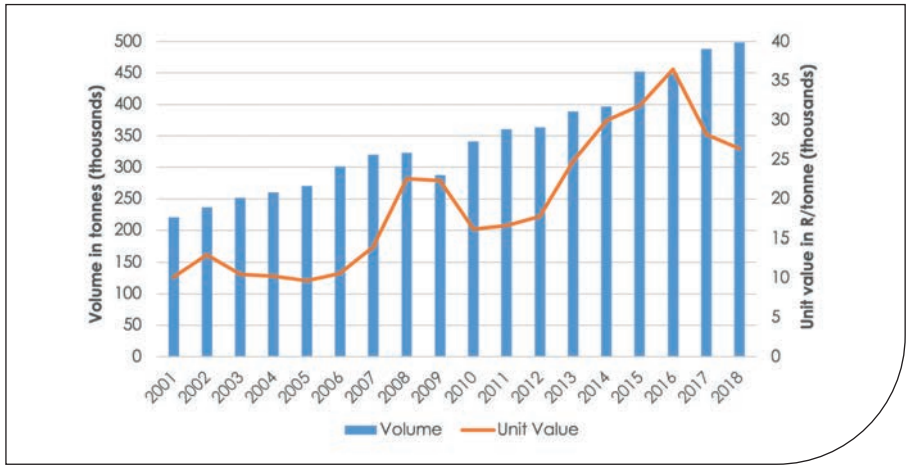


Source: FAO (2018)

Figure 2: World imports of fresh raspberries, volumes and prices, 2001 to 2018.

Source: ITC (2019)

Figure 3: World imports of frozen raspberries, volumes and prices, 2001 to 2018.



Source: ITC (2019)

were at least 111 hectares of raspberries planted in the WC in 2013 and up to 121 hectares in 2017 (Figure 4). As expected, around 52% of all South African raspberries are destined for the export market and the estimated total production for the 2017/18 season was 1 679 tonnes. Around 30% of the harvest goes into the local fresh market (up from 24% in 2015/16), while the remainder is processed downstream in agricultural value chains (Hortgro, 2018). The preferred production systems to grow raspberries is under tunnels (47%), followed by shade netting (35%) and open field (18%) (WCDOA, 2017).

Figure 5 shows the export performance of South African raspberries, with notable increases in the past decade, which can be attributed to an increased demand for product and currency performance.

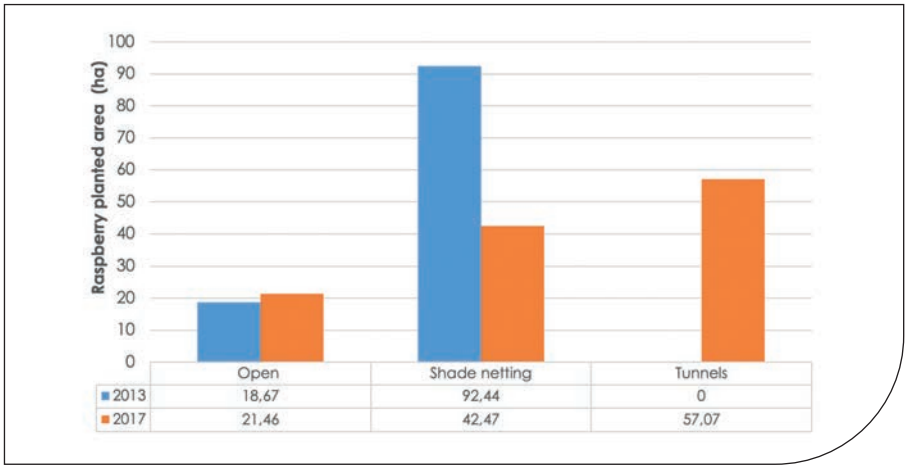
South Africa's main markets for fresh raspberry exports are shown in Figure 6 with the United Kingdom (UK) as South Africa's biggest importer by value (R/tonne) at R185 842 and R154 453 in 2017 and 2018 respectively. Other notable and growing markets are Germany, Saudi Arabia and the United Arab Emirates. South Africa is well positioned to supply these markets due to seasonality, but also competes with Chile and Peru.

Following the Market Attractiveness Index developed for raspberries (Wagner, 2020), South Africa has grown its share in the world market from 0,3% in 2001 to 0,8% in 2018 and has shown potential in markets such as Hong Kong, Singapore, Malaysia, Ireland, Japan, Indonesia, Saudi Arabia and the United Arab Emirates (ITC, 2019). This will enable the industry to diversify markets and will limit the risks if certain markets suddenly become saturated or less accessible.

The expanding frozen raspberry market may also present opportunities to boost exports to countries in close proximity and with favourable market access conditions.

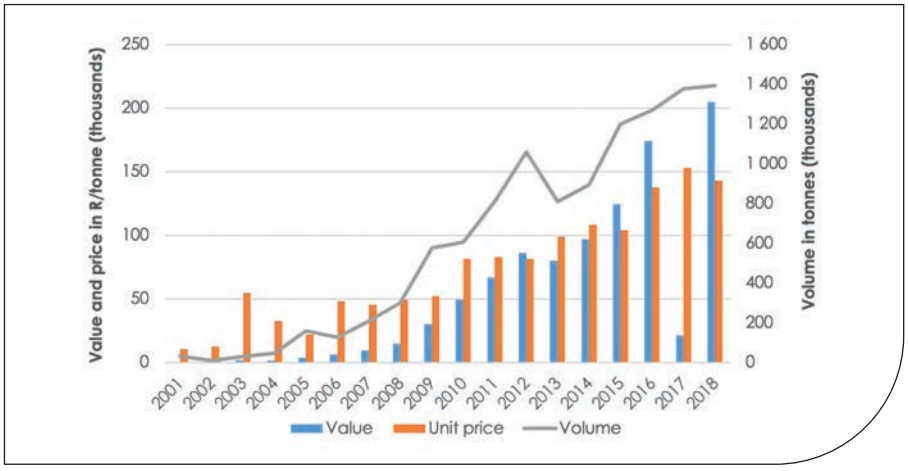
For frozen raspberry exports, Figure 7 shows how the market has changed over time, looking at the export value in 2008 and 2018. In 2008, the UK was South Africa's main market in terms of value, followed by Zimbabwe and Mozambique. South Africa has a geographical advantage for

Figure 4: Raspberry planted area in WC, 2013 and 2017.



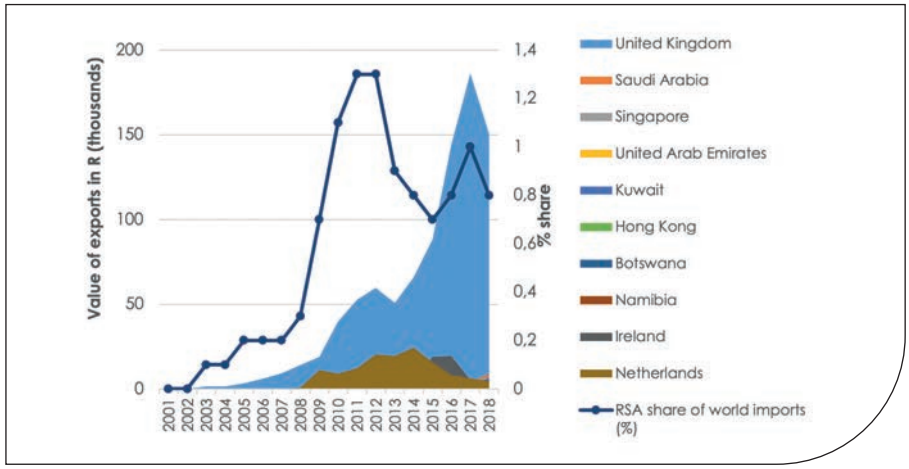
Source: WCDOA (2019)

Figure 5: SA raspberry exports in value, volume and unit price, 2001 to 2018.



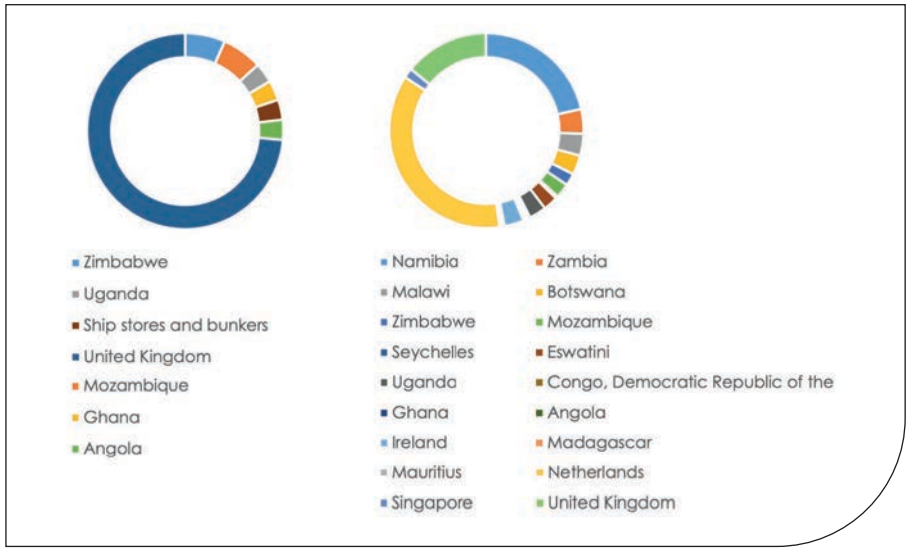
Source: ITC (2019)

Figure 6: SA fresh raspberry importers by value.



Source: ITC (2019)

Figure 7: SA frozen raspberry export value, 2008 (left) and 2018 (right).



Source: ITC (2019)

African markets over southern hemisphere competitors, therefore nearby markets should also be targeted. Figure 7 also shows substantial market expansion for South African raspberry exports, particularly for African markets. It is also noted that the export value for the Netherlands and Namibia surpassed that of the UK by 2018.

In closing, the research conducted on the opportunities for raspberries in the Western Cape shows that this labour-intensive, well-performing export industry has much potential to boost economic growth. Raspberries are a highly perishable product and there are various challenges in supply, with high-quality requirements at competitive prices. However, there is still much opportunity and promise for South African exporters if consistent quality can be achieved to meet the requirements of larger markets. Kashiwagi (2017) suggests that the opportunity lies in product differentiation, be it in taste, technology, traceability, etc. Innovative solutions not based on price alone can put South African raspberries on the map, so to speak.

For the full report, contact the author at nicolew@elsenburg.com.

References

Hortgro, 2017. *Berry Industry Overview*. Paarl: South African Berry Association.

ITC, 2018. *Trademap: Trade Statistics for International Business Development*. [Online]

Available at: http://www.trademap.org/
[Accessed 15 January 2018].

ITC, 2019. *International Trade Centre*. [Online]
Available at: http://www.trademap.org/
[Accessed 31 August 2019].

Kashiwagi, A. 2017. The Japanese Processed Fruit Market-Opportunities and Challenges. Osaka: Global Agricultural Information Network.

Mann, N. 2015. Intensive Berry Production Using Greenhouses, Substrates and Hydroponics. Is this the way forward? New South Wales: Nuffield Austrailia.

Wagner, N. 2020. *Market Intelliengence Report*: Raspberries, Stellenbosch: Western Cape Department of Agriculture.

Plant–grond–mikrobe–interaksies – **Wes-Kaapse gewasse en 'n onkruid**

A. Marais[1*], M. Ferreira[1], M. van der Rijst[2], A. Botha[3]

[1] Direktoraat Plantwetenskappe, Departement van Landbou, Wes-Kaap, Privaatsak X1, Elsenburg, 7607, aneliam@elsenburg.com

[2] Landbounavorsingsraad, Biometrie, Privaatsak X5026, Stellenbosch 7559

[3] Departement Mikrobiologie, Universiteit van Stellenbosch, Privaatsak X1, Matieland 7602

Abstract

Living plant roots produce root exudates that may contain allelopathic features that may affect rhizosphere functions. In this greenhouse study, the effect of pot leachate from six different plants (wheat, barley, two lupine cultivars and two ryegrass species, one of which is a known weed) was tested on the soil microbial populations of the recipient pots in which wheat was grown. Recipient plants were grown in two sets of pots with soil from two different sites. Donor pot leachate was applied to the soil of the recipient pots weekly until plants reached maturity. Soil samples from recipient pots were used to inoculate Biolog Ecoplates™ as well as nutrient agar plates. These were compared to soil sampled before treatments. Different plants and different varieties of the same plant had different effects on the soil microbial communities of the recipient pots. Thus communities were shaped by the interactions between plants, the microbes as well as the specific soil.

Inleiding

Plantwortels vervul 'n verskeidenheid funksies waaronder die anker van plante, die opname van water en voedingstowwe en die uitskeiding van chemiese stowwe. Hierdie worteluitskeidings word deur biotiese sowel as abiotiese faktore beheer (Bertin *et al.*, 2003; Bashir *et al.*, 2016). Energieryke verbindings word uitgeskei, wat as belangrike voedselbronne vir grondmikrobes dien (Canarini *et al.*, 2019), maar vir die plant is hierdie oënskynlike energievermorsing beslis die moeite werd, want hierdie mikrobes dien as boodskappers tussen die plant en die veranderde omgewing (Bashir *et al.*, 2016). Sekere van hierdie uitskeidings kan allelochemies optree en interaksies tussen plante en ander organismes in die nabye grondomgewing, die risosfeer, bemiddel (Feng *et al.*, 2018). Die mikrobes is in staat om die plant se allelopatiese vermoëns te verhoog (Cipollini, 2012) of die uitskeidings kan die mikrobegemeenskap tot voordeel van die plant verander (Fernandez *et al.*, 2013).

Die hipotese van hierdie studie was dat die worteluitskeidings van verskillende plante 'n verandering in die grondmikrobesamestelling kan veroorsaak in die grond van potte waarin koringplante gekweek is.

Poteksperiment

Ses plantsoorte, naamlik koring, gars, twee lupienkultivars, nl. Tanjil en Quilinock, 'n raaigrassoort en 'n raaigrasonkruid is in hierdie glashuisproef gebruik. Die navorsingsmetode wat gevolg is, is gebaseer op die metode soos gevolg deur Ferreira *et al.* (2017). Twee aspekte van mikrobegemeenskappe is getoets, naamlik die koolstofsubstraatverbruik deur vinniggroeiende bakteriegemeenskappe, soos getoets deur middel van Biolog Ecoplates™, asook die kweekbare heterotrofe organismes (voedingsagar).

Grond vir die eksperiment is vanuit twee uiteenlopende gebiede versamel, naamlik Langgewens (-33.27638889 S, 18.70555556 O) en Tygerhoek (-34.14861111 S, 19.90277778 O). Die glashuis was teen 'n konstante temperatuur van 18 °C ingestel en het van natuurlike beligting gebruik gemaak tydens die normale gewasgroeitydperk van Mei tot November.

Die ses tipes plante is in "skenker"-potte gekweek en die koring in "ontvanger"-potte. Die grond van die twee afsonderlike gebiede is apart gemeng en 6 kg per pot is gebruik in die onderskeie ontvangerpotte. Ses gewassade is in elk van die potte geplant, wat later na drie plante van soortgelyke grootte per pot uitgedun is. Alle plante het basiese voeding (KAN en Multifeed®) ontvang. Drie maal per week is 200 ml kraanwater aan elke skenkerpot toegedien. Die loog van skenkerpotte van dieselfde plantsoort is versamel en twee maal per week is 150 ml-hoeveelhede hiervan gebruik om die ooreenstemmende ontvangerplantpot met koring in die grond van die onderskeie oorsprong, te benat. Kontrolepotte het geen plante gehad nie, maar benatting en versameling van loog is soos hierbo toegepas. Die eksperiment het drie herhalings gehad en is twee maal uitgevoer.

Mikrobiese analise

Ten einde verskille in die mikrobegemeenskap met verloop van tyd te bepaal, is die grond van beide lokaliteite voor aanvang van die eksperiment drievoudig getoets en weer na afloop daarvan in die grond van die onderskeie ontvangerpotte.

Heterotrofiese kweekbare mikrobes is bepaal volgens die metode van Atlas (1993). Die putte van die Biolog Ecoplate™ is ook voor en na die eksperiment met 10-1 mikroliter-hoeveelhede geïnokuleer (Garland & Mills, 1991). Elk van die 31 putte het 'n koolstofsubstraat bevat wat deur bakterieë gebruik is al dan nie. Kontroleputte het geen substraat bevat nie. Gebruik is deur 'n kleurverandering aangedui.

Statistiese analise

Die 31 koolstofbronne van die Biolog Ecoplate™ is in ses chemiese groepe onderskei ten einde analise te vereenvoudig. Die ANOVA-tegniek is toegepas op die persentasie benutting van elke groep om te toets vir hoofeffekte van oorspronggebied en potloogbehandelings asook interaksies. Fisher se kleinste betekenisvolle verskil is toegepas om gemiddeldes te vergelyk.

Resultate en bespreking

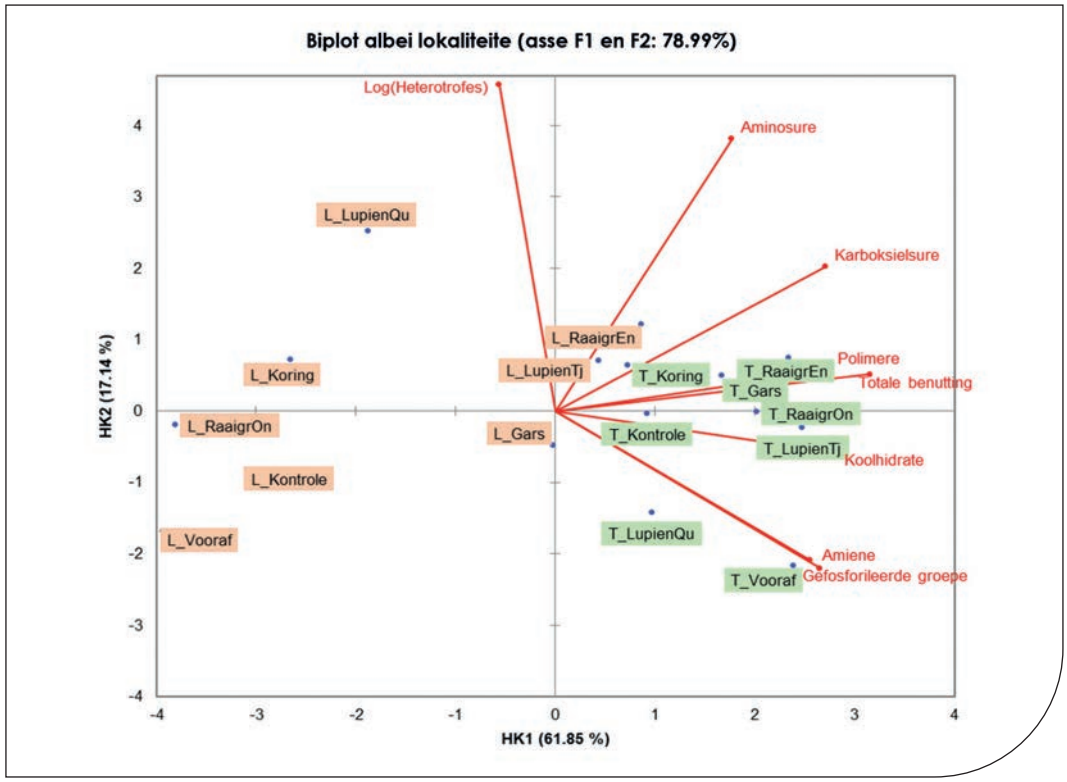
Dit is duidelik dat die grondmikrobiese bevolking by Langgewens anders was as dié by Tygerhoek en heeltemal verskillend gereageer het op die onderskeie behandelings.

Die invloed van oorspronggebied word duidelik weerspieël in die afsonderlike groeperings van onderskeidelik Tygerhoek (T hoofsaaklik aan regterkant) en Langgewens (L hoofsaaklik aan linkerkant).

Die eerste twee asse van die hoofkomponentanalise (Figuur 1) verklaar

»

Figuur 1: Hoofkomponentanalise. T = Tygerhoek en L = Langgewens. LupienQu = lupienkultivar Quilinock; LupienTj = lupienkultivar Tanjil; RaaigrasEn = raaigras variëteit Energa; RaaigrasOn = raaigrasonkruid.



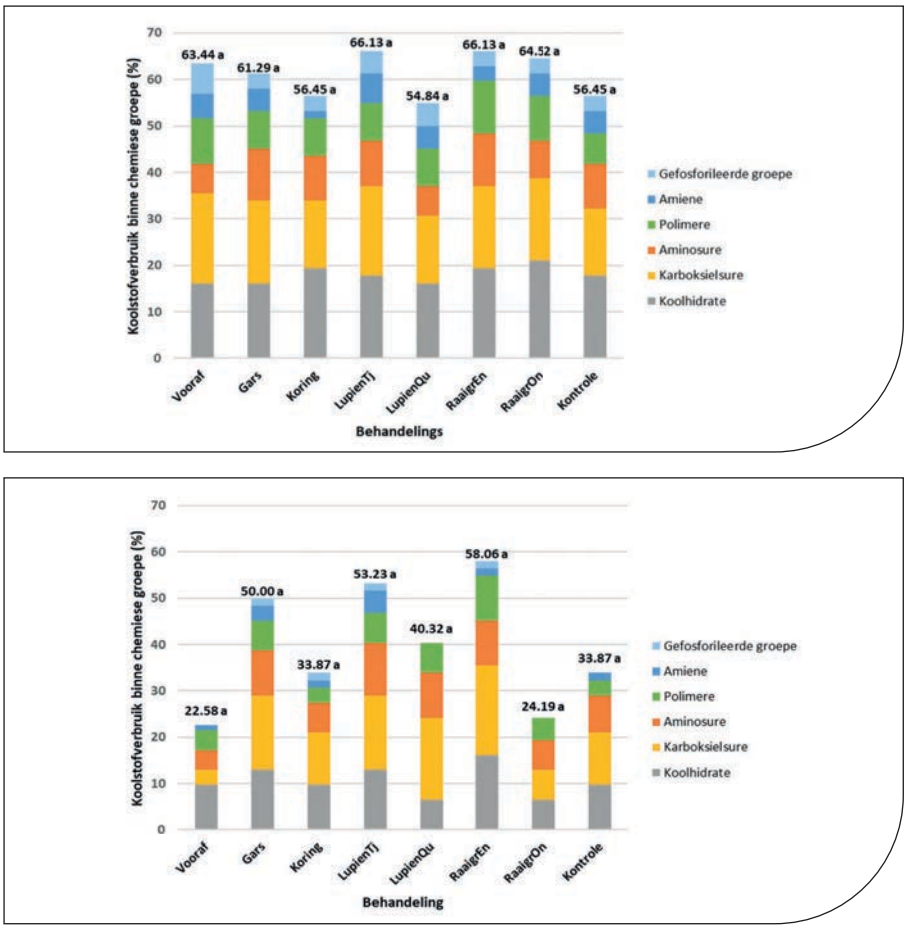
78,99% van die variasie in die data. Die eerste hoofkomponent (HK1, 61,85%) onderskei lokaliteite op grond van benutting van koolstofsubstrate en Tygerhoek assosieer positief met HK1, terwyl die meeste Langgewens-behandelings teenoorgesteld hiervan geposisioneer is. Die hoër koolstofsubstraatbenutting by Tygerhoek word ook weerspieël in Figuur 2. Die tweede hoofkomponent (HK2, 17,14%) assosieer grotendeels met heterotrofe organismes en onderskei lupien v. Quinilock van die onderskeie lokaliteite (vierkante kosinus > 0,5). Heterotrofe organismes was ietwat meer in potte met lupien v. Quilinock-loog op Langgewens se grond as dié van Tygerhoek.

Die twee gebiede se grond het heeltemal verskillend gereageer op die onderskeie behandelings, soos aangetoon deur die verskille in grootte en samestelling van die stawe.

By Tygerhoek (A) het die loog van gars, koring, lupien v. Quinilock asook die kontrole (geen plante), 'n afname in die totale verbruik van koolstofsubstrate tot gevolg gehad. Al die ander loog het 'n toename in verbuik tot gevolg gehad. Die verbruik van gefosforileerde groepe is deur alle loog onderdruk.

By Langgewens (B) het alle loog 'n verhoging in die verbruik van die totale aantal koolstofbronne gehad. Alhoewel geen verbruik van gefosforileerde groepe in die voorafbehandeling by Langgewens

Figuur 2: Die effek van verskillende potloog op die verbruikspatrone deur bakterieë van die groepe koolstofsubstrate soos gemeet deur Biolog Ecoplate™ in die grond van (A) Tygerhoek en (B) Langgewens. LupienQu = lupienkultivar Quilinock; LupienTj = lupienkultivar Tanjil; RaaigrasEn = raaigras variëteit Energa; RaaigrasOn = raaigrasonkruid.



aangetoon is nie, het die loog van gars, koring, lupien v. Tanjil en raaigras v. Energa die verbruik van gefosforileerde groepe gestimuleer. Die loog van lupien v. Quinilock en raaigrasonkruid het die verbruik van amiene 100% onderdruk.

Gevolgtrekkking

In hierdie studie is getoon dat die verskillende plantsoorte, selfs tot op variëteitsvlak, 'n groot invloed op die mikrobiese gemeenskap van die twee grondsoorte wat bestudeer is, gehad het. Dit is egter ook duidelik dat die inherente verskille in die grond ook 'n baie groot rol speel in die vorming van spesifieke grondmikrobegemeenskappe, soos ook deur Xue *et al.* (2018) bevind. Plante, grond en die mikrobes is ewe belangrik in die vorming van die grondgemeenskappe en dit het implikasies vir gewaskeuses vir spesifieke areas.

»

Bronnelys

Atlas, R.M. 1993. Alphabetical listing of Media. In: Handbook of Microbiological Media, L.C. Parks, (Uitg.) p. 666. CRC Press, London.

Bashir, O., Khan, K., Hakeem, K.R., Mir, N.A., Rather, G.H. & Mohiuddin, R. 2016. Soil microbe diversity and root exudates as important aspects of rhizosphere ecosystem. In: Hakeem, K.R. & Akhtar, M.S. (Uitg.), Plant, soil and microbes, Vol 2. Springer International Publishing Switzerland. DOI:10.1007/978-3-319-29573-2_15

Bertin, C., Yang, X. & Weston, L.A. 2003. The role of root exudates and allelochemicals in the rhizosphere. *Plant and Soil*, 256:67-83.

Canarini, A., Kaiser, C., Merchant, A., Richter, A. & Wanek, W. 2019. Root Exudation of Primary Metabolites: Mechanisms and Their Roles in Plant Responses to Environmental Stimuli. Frontiers of Plant Science. https://doi.org/10.3389/fpls.2019.00157

Cipollini, D., Barto, K. & Rigsby, C.M. 2012. Microbes as targets and mediators of allelopathy in plants. *Journal of Chemical Ecology*, 38:714-727.

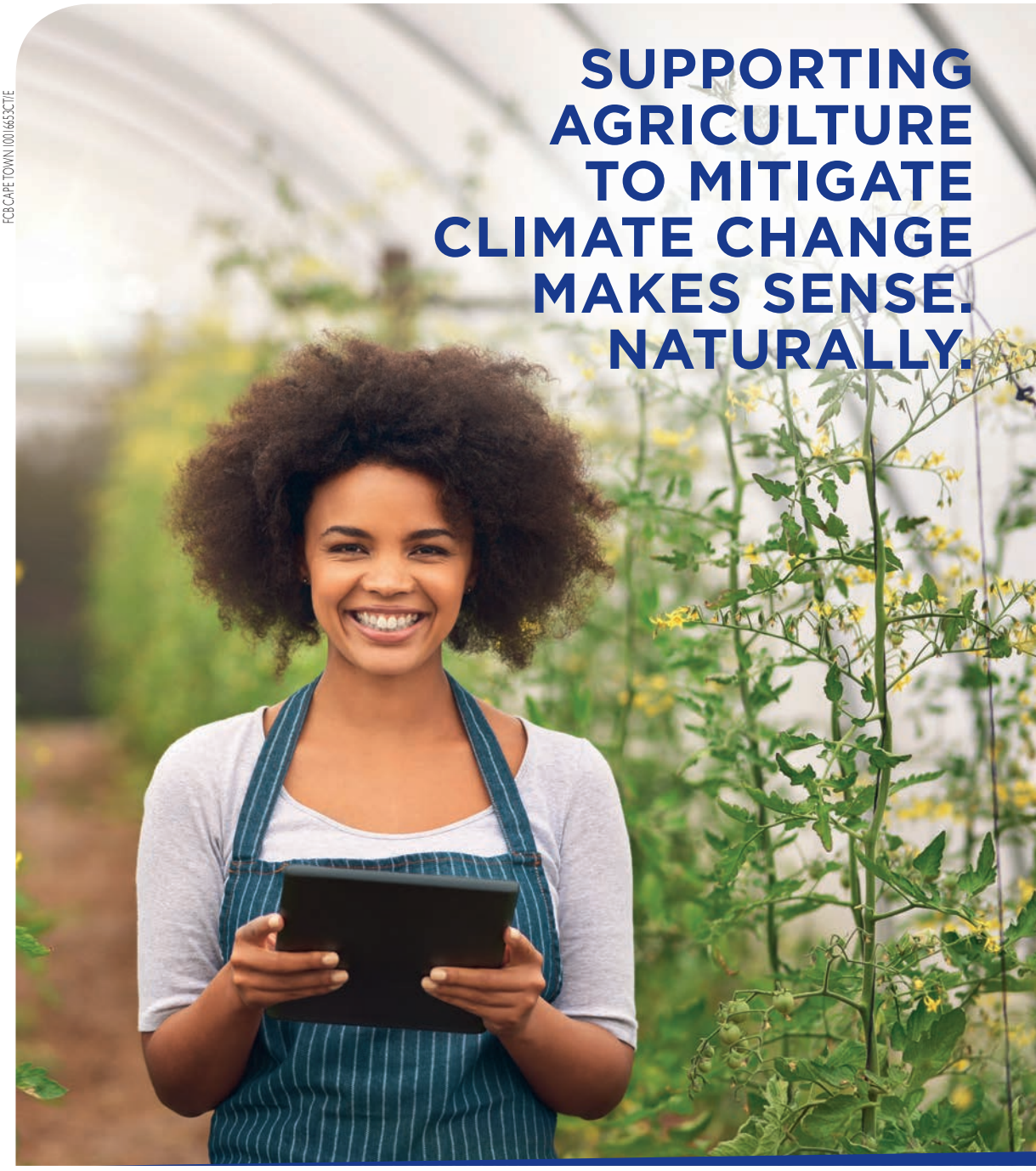
Ferreira, M.I., Reinhardt, C.F., Van der Rijst, M., Marais, A. & Botha, A. 2017. Allelopathic root leachate effects of Lolium multiflorum x L. perenne on crops and the concomitant changes in metabolic potential of the soil microbial community as indicated by the Biolog Ecoplate™. *International Journal of Plant and Soil Science*, 19(5):1-14.

Feng, H., Zhang, N., Du, W., Zhang, H., Liu, Y., Fu, R., Shao, J., Zhang, G., Shen, Q. & Zhang, R. 2018. Identification of chemotaxis compounds in root exudates and their sensing chemoreceptors in plant-growth-promoting rhizobacteria *Bacillus amyloliquefaciens* SQR9.

Fernandez, C., Santonja, M., Gros, R., Monnier, Y., Chomel, M., Baldy, V. & Bousquet-Mélou, A. 2013. Allelochemicals of *Pinus halepensis* as drivers of biodiversity in Mediterranean open mosaic habitats during the colonization stage of secondary succession. *Journal of Chemical Ecology*, 19(2):298-311. https://doi.org/10.1007/510886-013-0239-6

Garland, J.L. & Mills, A.L. 1991. Classification and characterization of heterotrophic microbial communities on the basis of patterns of community level sole-carbon-source utilization. *Applied and Environmental Microbiology*, 57:2351-2359.

Xue, D., Christenson, R., Genger, R., Gevens, A. & Lankau, R.A. 2018. *American Journal of Potato research*, 95:696. https://doi.org/10.007/s12230-018-9677-6



Farmers know more about the weather. They use innovation to fight drought and save water. This is why we support farmers and create an enabling environment. Visit **www.elsenburg.com/greenagri** 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

Western Cape Government

Agriculture

ISSN: 1810-9799