

October 2022

Volume 22

Number 3

**Cape Town is letting  
the flowers grow**

***Congress 57 Edition:  
All you want to know***

***Research-farmer partnerships  
could improve agricultural  
productivity***

***SA must reinvigorate sorghum***

Advancing Rangeland Ecology and Pasture Management in Southern Africa

Newsletter of the Grassland Society of Southern Africa

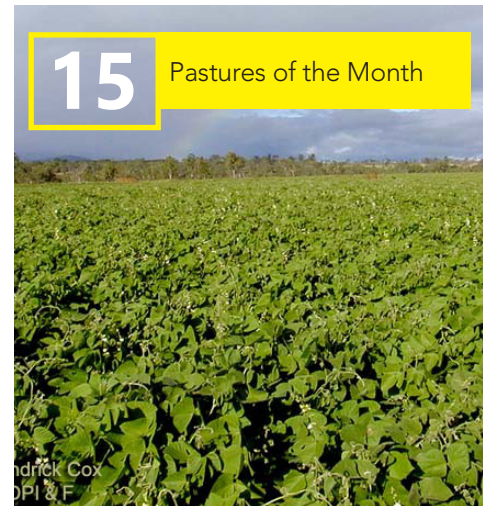
**Grassroots**



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# In this issue



- 02** From our Editor
- 03** Feedback from Congress 57's OC
- 05** GSSA Congress 57 Presidential Address
- 07** Congress 57: The Award Winners
- 09** GSSA Council Memebers 2022/2023
- 13** Karoo Plant of the Month
- 21** Putting a Price on Nature
- 26** Mob Grazing Debunked: Is it the 'Golden Ticket' to Grazing Efficiency and Soil Health?
- 27** The versatility of grasses
- 32** Life without Animal Pollinators: Why Grasses Embraced the Wind
- 34** Research-farmer partnerships could improve agricultural productivity
- 36** Zimbabwe moving animals in the wild
- 38** Cape Town is letting the flowers grow
- 40** In Memory of Richard Dean
- 41** Websites, Webinars & Podcasts
- 43** Upcoming events
- 45** New Editor-in-Chief for AJRFS



# From our editor

Dear reader,

Welcome to the third issue of Grassroots for 2022 where we bring you all the news from the Grassland Society of Southern Africa's 57<sup>th</sup> Congress and so much more.

## About GSSAC57

The first in-person congress since the outbreak of the COVID-19 pandemic was held at the Aldam Holiday Resort near Ventersburg in the Free State on 25 to 29 July 2022. Read all about it on page 3. The new president of the Society is Charné Viljoen and she will be taking over from Igshaan Samuels. Read all about Dr Urs Kreuter on page 45 who has accepted the position of Scientific Editor of the African Journal of Rangeland and Forage Science as Prof Pieter Swanepoel has stepped down. The congress delivered many great talks and learnings. Congrats to all the award winners!

## Other Highlights

We are continuing the conversation on the *Prosopis* invasion with a feature article written by Dr Graham Harding and his team who has been doing a lifetime worth of research on the effect and management of this invasive species. A new "Guide for the Control of Problem Plants South Africa 2022" has also been released.

Check out page 41 if you are interested in purchasing it.

Aife Kearns has an interesting perspective on "Putting a price on nature" in an article where he explains this concept by comparing it to blood donations. On the topic of putting a price on nature, the Opperheimer Research and Conservation awarded a South African ecologist with \$150 000 to research new "Cattle with nature" solutions.

Lastly, our sincere sympathies go out to Sue Milton and her family with the passing of her husband, Richard Dean.

Are you interested in becoming part of Grassroots Editorial Team? Let us know by sending us an email along with your CV and a short motivation.

Enjoy the read!

*Malissa*



## Editorial Committee

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Marnus Smit

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*Despite the care and attention that we devote to the structure of this newsletter and the information it contains, the Grassroots Editorial Team cannot guarantee the completeness and accuracy of the data. The opinion expressed in each article is the opinion of its author and does not necessarily reflect the opinion of the editorial team.*



# Feedback from Congress 57's Organisation Committee

**Francois Deacon**

Current Address: University of the Free State

Missing our annual in-person congress during the previous two years made people excited to attend our 57<sup>th</sup> congress. We need to remember that the Grassland Society of Southern Africa (GSSA) was established in 1966 to advance rangeland ecology and pasture management in Africa. The GSSA is one of the premier and respected professional societies in southern Africa and represents the interests of a diverse, multi-national cross-section of rangeland practitioners, scientists, researchers, ecologists, policymakers, emerging scholars, farmers, and other interested parties.

After the chaos created by the COVID-19 pandemic, we decided to have a hybrid congress and hosted it at the Aldam Resort, Ventersburg in the Free State Province from 25 to 29 July. We realised the importance of making this event as interactive as possible and yet we understood the valuable contribution brought by the virtual attendees. Thus, maintaining online participation in the congress helped the Society to meet its objectives of growing its southern African and off-continent contributions with other rangeland groups and help to profile the GSSA beyond its current membership. Given the travel challenges in Africa even

in normal times, this hybrid congress allowed for a much greater intra-African connectivity and reach a much wider and very important audience with the great expertise and help of Clive Pringe (Trilogy Audio), the audio-visual technician.

Planning for each year's Congress already starts the year before at the Annual General Meeting of the Society, which is normally held in conjunction with the Congress. By February 2022, planning was well underway to host our conference in the Free State. The venue and funding were secured, Congress tours were being planned, and our scientific





programme development was underway. We know that a popular part of a physical congress has always been the conference tours. However, lacking interest in the tours on offer and perhaps the long distances to visit those venues brought many challenges and it meant that tours had to be cancelled, unfortunately.

Having all meetings online, the organising team worked under exceptionally challenging conditions to put the Congress together. Yet, we functioned well, and everyone played their part. We succeeded in having no parallel sessions, making it possible for delegates to attend all the sessions. This aspect received many positive comments. Congress topics ranged from rangeland management, nature conservation and tourism, latest research and information on grazing and rangeland practices, bush encroachment, climate change, communal and commercial pasture management, conservation and restoration, feed and nutrition and its latest research, fire ecology and practices, livestock and wildlife management, planted pastures, regenerative agriculture and the latest research and findings on high-pressure and ultra-high-pressure grazing. One of the great successes would also be Plaas Media, who came on board as the Congress' official media sponsor, promoting our event on social media and in the mainstream media.

The five keynote plenaries sparked lively discussions and engagement and I can only applaud the keynote speakers for doing a superb job. Delegates appreciated the wide range of topics covered and considered them to be of high quality and relevance to the congress theme. There were three special sessions, an informal meeting of the newly formed Locust Working Group and two workshops. The Research Skills Workshop covered topics in Remote Sensing, Policies, recent Locust outbreaks and regenerative agriculture discussions etc. In total, 190 delegates attended the congress.

The prestigious awards presented at the gala dinner showed the high level of professionalism and growth of the GSSA. They included awards for the best presentation - Portia Phohlo, best presentation by a young scientist - Likhona Cele, the Norman Rethman planted pastures award - Charné Viljoen, the best research proposal poster - Jamie Paulse and the best poster - Lisa Matthews.

We also acknowledged the best paper in the AJRFS in 2021 by authors Zander Venter, Heidi-Jayne Hawkins and Michael Cramer. The GSSA Prestige Award went to Prof Nico Smit and Prof Tim O'Connor whilst Dr Ed Granger received the GSSA Honorary Membership Award.

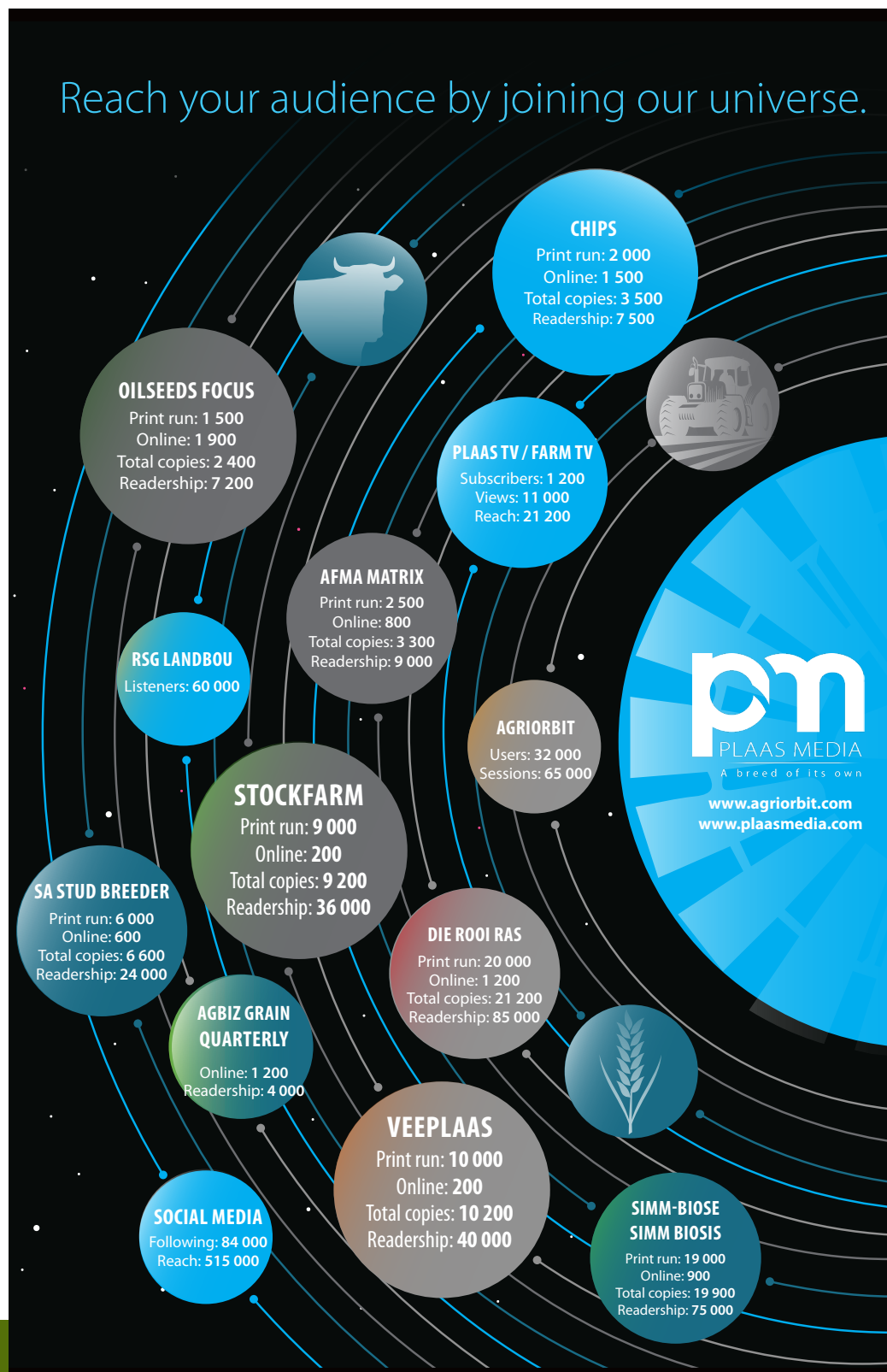
Going forward, the Society will most probably consider keeping the hybrid format. We generally received very good feedback, with overall satisfaction being 4.5 out of 5. Therefore, we can applaud the hard work done by Erica Joubert behind the curtains. Delegates were especially satisfied with the invited Keynotes, the Zoom platform, the programme and the fact that the information was available via the website and email. The programme was packed with very insightful and thought-provoking talks. The Zoom chat box, monitored by Linda and Debbie, was very busy and it was wonderful to see the presenters interacting with

the delegates. The presenters were able to answer more questions than would have been possible in the question-and-answer session.

I also would like to acknowledge and thank all our generous sponsors for their support. Without them, our event would not have been possible. THANK YOU from all of us!

In conclusion, I am very happy and extremely grateful for the way the congress turned out. Overall, a great success. I am looking forward to the 58<sup>th</sup> annual congress in 2023.

## Reach your audience by joining our universe.





# GSSA Congress 57 Presidential Address

## Igshaan Samuels

Current Address: Agricultural Research Council

It is an honour for me to address you as the outgoing president of the society. During the past year, we as GSSA, under the challenging circumstances, largely driven by the Covid-19 pandemic, had to dig deep and not just keep the society running but literally keep us afloat. The dedication shown by council members and our administration was amazing as we not only survived, but we thrived. We have shown, that we as a society are "anti-fragile", we don't only absorb shocks but we bounce back even stronger than before.

Let me outline some of the achievements that council made during the previous year.

The African Journal of Range and Forage Sciences, the GSSA's journal has improved its Impact Factor to almost 2. This is amazing, given that not so long ago, we did not even have an impact rating. I am sure this will attract more researchers to submit to our journal. And to reiterate, it is still free to publish for GSSA members.

The current Editor-in-Chief (EiC), Prof. Pieter Swanepoel has stepped down, and we have to thank him for his service to the society and the journal has grown so much under him. He was also able to maintain the identity and basically the role of the journal within the larger GSSA context. These include opportunities for young scientists to publish in the journal to gain that value publishing confidence and make the journal the home for their publishing career.

Proactively, the council have appointed a new EiC. Thank you to the council members who participated in the interview process and their important knowledge and experience allowed us to select the best candidate for the job. On 01 Sept. 2022, Prof. Urs Kreuter from Texas A&M in the U.S. is the new EiC for the AJRFS. We wish him well and he will have full support from the council.

We as a society, also have dug ourselves out of a financial hole where the GSSA trust had to bail us out. The diminished income due to the pandemic has left huge holes within the GSSA budget. The leadership shown by the GSSA council and administration allowed us to make informed decisions and that included keeping the GSSA congress at Aldam Resort in the Free State. Financial recovery played an important role when deciding on the venue for the 2022 congress, and from the look of things, it has paid off. We can breathe again.

The readership of our social media platforms is steadily growing. The Facebook page remains active and humorous, other social media pages have also shown improvement. Our website needs an overhaul to attract more visitors and there is a plan to do that. At the AGM, funds were set aside to improve our website.

Grassroots, our newsletter has improved so much recently, and we thank Malissa Murphy who will be stepping down. This creates a wonderful opportunity for some of the young members to fill that position and continue improving the newsletter while also having the space to be creative. Thus, we need more young people to join the council.

This congress attendance has improved compared to the few years before the pandemic. We had about 190 participants at the congress this year, in-person and virtually. Our research skills workshop highlighted the need to have continued capacity and skills development not only for younger members but also for those who seek to learn new skills. Thank you to Linda Kleyn and Tony Palmer for facilitating the workshop on Google Earth Engine.

Well, as all societies and institutions, particularly in South Africa, are having challenges, a concerning challenge is a decline in GSSA membership, and we

all know the importance of our membership. There are various reasons for this decline and we have taken note of it. We hope to increase our membership in the near future.

In addition to these challenges, the demographics of the society have changed considerably. One noticeable change is that there are much younger people participating and fewer older attendees compared to 10-15 years ago. We thus need to adapt our operational and marketing strategies accordingly.

Change has also happened beyond the society. We had Covid-19, and problems in our country such as the energy crisis have increased due to poor management, corruption, etc. and all have impacted us. For example, due to the pandemic and corruption, funding has been taken away from research and post-graduates at universities. This will impact the ability to conduct research.

To tackle these challenges and others, the council embarked on an adaptive strategic planning process and held a planning workshop. We thank Harry Biggs and Rina Grant for assisting us in rediscovering ourselves, and critically looking at who we are, what we want to do, and who should accompany us on this journey. With being empowered now with a different lens, a complex systems thinking lens, we have identified numerous opportunities to improve the society while also tackling a key issue that we have been experiencing. This is the increasing divide between pasture science and veld-related research. We are not two societies, we are one, and we have identified options to address this.

We also established the locust research group under the umbrella of the GSSA, and the group met at the congress to plan how they can, not only fill the knowledge gaps, but provide tangible, practical options to reduce locust impacts, and also provide more ecologi-



cally friendly and cheaper control methods. You may ask what we as rangelands scientists have to do with locusts, we are not entomologists. Well, I would say, more than you think. There is a direct link between rangeland conditions and locust outbreaks.

Well, not all the changes have been negative. The United Nations General Assembly declared 2026, the International Year of Rangelands and Pastoralists (IYRP) and more than 100 countries formally supported the resolution from Mongolia. It is not surprising given that rangelands cover 54% of the global land surface.

Rangelands and pastoralists are now on the lips of global decision-makers and hopefully, evidence-based decisions will be taken from now on, particularly where rangelands are concerned.

With the support of GSSA, I have been elected as global co-chair of the IYRP. An alliance and collaboration between about 308 organizations, including GSSA who will work towards common goals that include the sustainable use of natural resources found in rangelands such as biodiversity and water, and also protecting the rights and livelihoods of hundreds of millions of pastoralists worldwide.

I also thank the GSSA who supported

me in becoming a member of the International Rangeland Congress Continuing Committee representing Africa South of the Sahara. This is a position I will serve for eight years and will undoubtedly give it my all.

This means that GSSA members now have global platforms to showcase their research, and give an expert opinion but also affect change, particularly at a policy level. As the IYRP, we interact with global players such as the UN conventions, FAO, WWF-International, ILRI, etc. Basically, everyone who has a stake and interest in rangelands. We aim to have a presence at all UN COPs incl. the forthcoming CBD COP in December 2022 in Montreal, Canada.

Through my experience thus far on these international committees, is that it has become apparent that GSSA has got a huge role to play, particularly in Africa. Our interactions with the African Union recently highlighted the need for GSSA to partner with other countries in the region, transfer and exchange skills, build and expand knowledge bases, affect policy decisions, and help to improve rangeland and pastoral livelihoods at a continental level. The opportunities are endless. We as GSSA have good knowledge bases but we can also learn from the East African IGAD regional block, about implementation. So, benefits are both ways.

Covid-19 has provided us with new opportunities through the virtual world, and we should capitalize on it. The IYRP is a platform to expand our membership and improve the scientific standing of our scientists. Land reform is providing us with opportunities for extension-related work as well.

So, in ending I want to thank all of you who supported me during my presidency, the support from Erica Joubert, Robyn Nicolay, Linka Kleyn, Freyni Du Toit, Sindiso Nkuna and Charné Viljoen was amazing. Erica, our administrator, is the best, she made my work easy. Linda, our treasurer, guided us through the financial difficulty. Freyni, the engine behind the journal and her support and guidance in producing the IYRP special issue is very much appreciated. Sindi, the new scientific director of the congress has hit the ground running, is always willing to learn and she is hands-on. Robyn, our secretary, continues to keep the council updated even through many difficulties. These incredible ladies made the work of the president easy.

Charné Viljoen, our incoming president, is a visionary and a hard worker. I wish you well as president for 2022-2023 and I think the society will become even stronger under her leadership.

Thank you.

**Figure 1.** Outgoing president of the GSSA, Igshaan Samuels.





# The Award Winners



**Best Presentation: Portia Phohlo**  
 "Excessive nitrogen fertilization is a limitation to herbage yield and nitrogen use efficiency of dairy pastures in South Africa"



**Best Presentation by a Young Scientist: Likhona Cele**  
 "The use of interseeded cover crop species to improve the yield and nutritional quality of natural veld and planted pastures for ruminant livestock production"



**Norman Rethman Planted Pastures Award: Charné Viljoen**  
 "More benefits in kikuyu-ryegrass pastures from using lower nitrogen fertiliser rates"



**Best Research Proposal Poster: Jamie Paule**  
 "The comparative effects of short duration, high-density grazing and conventional, rotational grazing on different soil and vegetation parameters in the dry and mesic grasslands of South Africa"



**Best Poster: Lisa Matthews**  
 "Carbon sequestration and greenhouse gas emissions in crop systems containing a pasture-livestock phase vs cash crop only rotation systems."



**Faux Pas: "Every village has its own idiot...every circus has its own clown...but this trophy is dedicated to our very own star..."** The winner is Clint Carbutt for arriving a day early for Congress...



# The Award Winners

## PRESTIGE AWARD

This award is made to the scientist whose work has made a significant impact on range and forage science and/or practice. The primary aim of this award is to encourage the scientific advancement of the discipline of range and forage science in Africa. It is aimed at all research fields that influence the development of science and applies to research work that breaks new ground in the discipline.

- Prof Nico Smit (right)
- Prof Tim O'Connor (Below - picture provided)



**Best Paper in the AJRFS in 2021:**  
Zander Venter, Heidi-Jayne Hawkins and Michael Cramer

"Does defoliation frequency and severity influence plant productivity? The role of grazing management and soil nutrients"

### Most prolific online adjudicator:

Awarded for the first time in 2019. Thanks to the online-delegates who participated using the adjudication on the Dryfta website and the attending delegates who had to do it the old-school style (paper format). The winner is Donna Berjak

### HONORARY MEMBERSHIP AWARD

This award is made to a person whom the Society wishes to honour by reason of meritorious services rendered for the realisation of the objects of the Society or by reason of his/her eminence in science. Dr Granger lives in New Zealand and he's the vice-chair of the Scientific Committee.

- Dr Ed Granger – Honorary Membership Award



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## Grassland Society of Southern Africa – Council Members 2022/2023

PORTFOLIO	NAME	ORGANISATION
President	Charné Viljoen	Stellenbosch University
Vice-President	Susi Vetter	Rhodes University
Immediate Past President	Igshaan Samuels	Agricultural Research Council / University of the Western Cape
Honorary Secretary	Robyn Nicolay	University of KwaZulu-Natal
Honorary Treasurer	Linda Kleyn	Martial Computing
Scientific Editor	Urs Kreuter	Texas A&M University
Publications Editor	TBC	
Website Editor	Yvette Brits	North West Department of Agriculture and Rural Development
Public Relations Officer	Jamie Paulse	University of the Free State
Additional Member (Grassroots)	Francois Muller	Agricultural Research Council
Additional Member (Grassroots)	Marnus Smit	Northern Cape Department of Environment and Nature Conservation
Additional Member	Andiswa Finca	Agricultural Research Council
Additional Member	Ngoako Lucas Letsoalo	Agricultural Research Council
Additional Member	Florence Nherera-Chokuda	National Emerging Red Meat Producers Organisation (NERPO)
Chairperson of Trust	Nicky Allsopp	
Chairperson of the 58th Congress Organising Committee	TBC	



**NATIONAL CONVENTION BUREAU**





Figure 2. Congress 57 Organising Committee



Figure 5. New President Charne Viljoen with Igshaan Samuels



Figure 3. Keynotes: Paul Avenant, Sigrun Ammann, Carolyn Palmer and opening speaker, Nico Smit. Keynote speakers not present: Michiel Scholtz and Nkabeng Mzileni.



Figure 6. Pieter Swanepoel



Figure 7. Sindiso Nkuna, Chair of Scientific Committee



Figure 4. Representatives of the Plaas Media team, official media sponsor of Congress 57

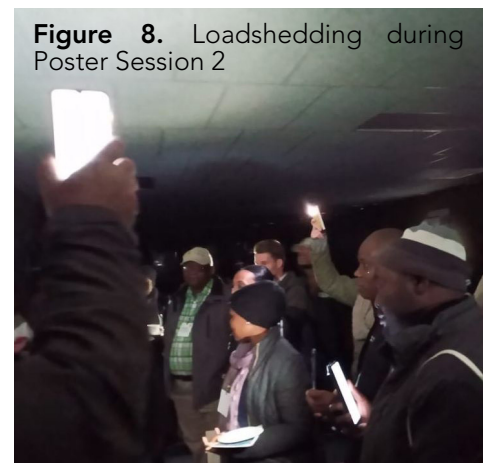


Figure 8. Loadshedding during Poster Session 2



# TREE

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## OF THE MONTH

### *Pappea capensis*

#### Jacket-plum / Doppruim (RSA Tree No. 433)

Author: Marnus Smit | [zmsmit.denc@gmail.com](mailto:zmsmit.denc@gmail.com)

Northern Cape Department of Agriculture, Environmental affairs, Land reform and Rural development.

Figure 1. A jacket-plum tree from Namaqualand. Image: ZM Smit



Figure 2: The jacket-plum is a good option for planting in gardens.  
[witkoppenswildflower.co.za](http://witkoppenswildflower.co.za)



The jacket-plum is a hardy medium-sized tree that can grow over 9 m high. Trees from the western, drier parts of its distribution tend to grow much smaller. This hardy, evergreen tree is widespread in Southern Africa occurring from the western part of the Northern Cape, Western Cape, Eastern Cape, Kwazulu-Natal, Limpopo and further north through Mozambique and Zimbabwe into tropical eastern Africa. It grows in a variety of habitat types such as grasslands, bushveld, scrub veld and dry drainage lines and is often found growing on termite mounds.

The common name “jacket-plum” refers to the green capsules encasing the fruit giving it the appearance of wearing a jacket.

## Diagnostic features

- Trees are multi-branched with a dense crown.
- The simple leaves are greenish, tough, and have a hairy underside. Leaves of trees from arid regions are much smaller.
- The individual yellowish to greenish flowers are tiny and carried in racemes (a simple elongated inflorescence) of up to 15 cm long.
- The fruit (pods) is oval and covered in a green capsule that turns brown and hard as the fruit matures.
- The inner flesh of the fruit is bright red and revealed when the capsule splits open when the fruit matures.
- The greyish to brown bark of the tree is relatively smooth.



Figure 3. The green leaves are simple and hairy underneath. treesa.org

## Ecological value and uses

The leaves are readily consumed by livestock and a large number of game species. The fruit is favoured by birds and mammals, which are also the dispersers of the seed through their droppings. The tree is also the larval food plant to the caterpillars of a number of butterfly species of Southern Africa.



Figure 4. Example of mature fruit revealing bright red flesh. treesa.org

The tasty and juicy fruits are edible and are often used to make jam, jelly, vinegar and alcoholic drink. A fragrant yellow oil can be extracted from the roasted seeds and used as a lubricant or for making soap. The stem of trees does not yield a lot of usable wood but can be used to make sticks, poles, cattle yokes, and kitchen utensils.

The jacket-plum is an excellent garden plant due to its hardiness and beauty and is often the focal tree of gardens. Nursery-grown plants adapt well to cultivation but saplings are slow-growing.

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# KAROO OF THE MONTH PLANT

## *Exomis microphylla* Hondebos

Author: Rudi Swart | Rudi.Swart@westerncape.gov.za  
Western Cape Department of Agriculture, Veld Reserve N1, Worcester

Hondebos is a blueish-grey, succulent shrub, usually around 30 cm tall, but growing up to 90 cm in height under favourable conditions. This widespread species can be found from southern Namibia throughout the Karoo and along the south-western and southern coast of South Africa. Hondebos can tolerate brackish and saline soils and are often found along old kraals, though it is also found on rocky hillsides and sandy coastal areas. Its succulent nature and preference for brackish or saline soils allow hondebos to survive where many other plants of the Karoo would not.



Figure 1. A hondebos shrub growing in coastal sand.



## Diagnostic features

- The leaves are oval or oblong, with a prominent midrib.
- Hondebos leaves are blueish-grey, with the edges a pale pink to red.
- The minute yellow flowers are borne in clusters at the tip of shoots.
- Hondebos shoots tend to grow upwards from the base of the shrub and have few branches. Each shoot is densely covered in leaves of varying sizes.
- Hondebos appear blueish-grey overall, with older leaves turning red before dropping.



Figure 2. The succulent leaves of hondebos



Figure 3. Hondebos flowers are tiny and easy to overlook.



Figure 4. Older hondebos leaves turn red before dropping.

## Ecological value and uses:

Hondebos is palatable and a valuable fodder plant for game and livestock. In the winter rainfall region, it is one of the few plant species that retains its leaves throughout the harsh, dry summer months. This leads to it often being over-utilised if a good rotational grazing system is not followed. Its tiny seeds can colonize trampled and degraded soils where other species may struggle to establish. This makes the hondebos a good option for restoration projects. Due to its high palatability, its presence in large numbers can be used as an indicator of a well-managed Karoo veld.

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# PASTURE OF THE MONTH

Author: Amahle Sogoni | amahlesogoni@gmail.com

Eastern Cape Department of Rural Development and Agrarian Reform, Dohne ADI, South Africa



Figure 2. *Lablab* intercropped with maize

Figure 1. *Lablab* sole planting

*Lablab purpureus* subsp. *bengalensis* (Jacq.) and *Lablab purpureus* subsp. *Uncinatus* are some of the recommended and registered cultivars available for farmers to choose from.

## *Lablab purpureus*

### The use of *Lablab* as a climate-smart fodder legume for small-scale farming systems under dryland production

*Lablab* (*Lablab purpureus*) is cultivated for human food, livestock fodder or as a green manure cover crop. The qualities of this tropical forage include drought tolerance, high palatability, high-nutritive value, excellent forage yields, and it can adapt to diverse environmental conditions.

### Plant description

- *Lablab* (*Lablab purpureus* (L.) Sweet) is a summer-growing annual or occasionally short-lived perennial forage legume.
- It is a twining, climbing, trailing or upright herbaceous plant that can grow to a length of 3-6 m.
- It has a deep taproot and vigorous, glabrous or pubescent trailing stems.
- *Lablab* leaves are alternate and trifoliate.
- Inflorescences are many-flowered racemes borne on elongated peduncles. The colours of the flowers are white to blue or purple.



# Ways of growing *Lablab*

*Lablab* can be planted either as pure-stand or intercropped with annual grasses such as maize and also perennial grasses.

## Sole Planting

- Sow *lablab* at 15 to 20 kg/ha under dryland conditions (40,000 to 60,000 plants/ha) (4 to 6 plants/square metre).
- 30 kg/ha in irrigated or high rainfall areas (95,000 plants/ha).
- Row spacings should range from 18 to 90 cm.

## Planting time and Moisture requirements

- Sow during summer months in the sub-tropics and elevated tropics.
- For the tropical coastal areas, sow during the autumn, spring and summer months.
- Adapted to warm, humid climates with a minimum rainfall of about 450 mm per annum.
- Plants will often establish from previously dormant seeds over the summer growing period (AVCD Extension brief, 2016).

## Intercropping

- Sow *lablab* at 7 to 10 kg/ha under dryland conditions (20,000 to 30,000 plants/ha).
- 15 kg/ha in irrigated or high rainfall areas (45,000 plants/ha).
- Row spacing should range from 9 to 45 cm.

## Soil Fertility Management

While it is common to grow *Lablab* without fertilizer applications, sowings in sandy soils often require applications of phosphorus and sulphur and benefit from applications of lime in very acid soils.



Figure 2. *Lablab* seed



Figure 3. *Lablab* pods

## Harvest and Utilization

- *Lablab* is usually grazed but can be harvested for hay or silage.
- It can re-grow for a second grazing if not grazed or cut too close to the ground. Take note that feed quality is reduced with leaf loss.
- The leaf-to-stem ratio is 50:50 at 6 weeks, but as the plant matures, shading leads to leaf drop and the leaf-to-stem ratio becomes 20:80.
- *Lablab* has heavy stems which lignify and become indigestible as the plant matures, affecting feed quality.
- Cows may reject the stems if fed to them as hay but will eat them in precision-chopped silage.

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# Prosopis management in South Africa: can the calamity of further invasion be avoided by concerted farmer-led effort and better biological control?

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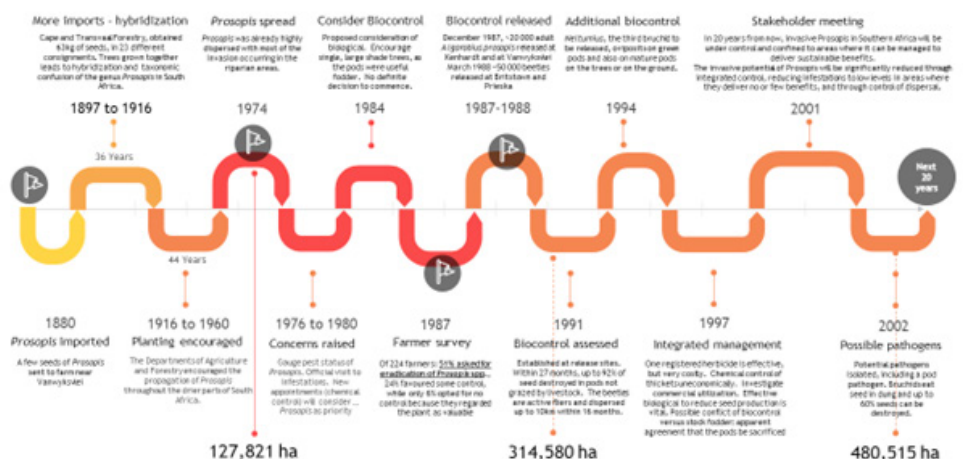
**P**rosopis is a complex genus with complex issues. On one hand, it is seen as a source of feed, shade and fuel, on the other, it is seen as a pest that destroys natural grazing. *Prosopis* is well adapted to the Northern Cape. It has a deep taproot that can reach depths of 50 m or greater as well as a network of surface roots. This means that it can easily utilize light showers that only wet the topsoil but also tap deeper groundwater. As a result, the favoured habitat of *Prosopis* is the dry riverbeds or "leegtes". Unfortunately, these are the areas that produce the best natural grazing in the arid Northern Cape. Many of these beds are overtaken by extensive and dense stands of *Prosopis*. *Prosopis* does move gradually away from the deep soils, but it is unlikely that these areas will become as infested as the deep soils.

To better understand the history of the *Prosopis* invasion and its management in South Africa, we took a look at the archives. This led to the development of the timeline illustrated in Figure 1. The first introduction of *Prosopis* into South Africa was as early as 1880 in the Van Wyksvlei region. It is therefore not surprising that Van Wyksvlei continues to be one of the worst invaded regions in the Northern Cape. The introduction of *Prosopis* into South Africa was coordinated and supported by the government with records of both Cape and Transvaal Forestry Departments importing consignments of *Prosopis*

seeds from the late 1890s up to 1916. Landowners themselves made additional introductions over time. In many instances, we got it right by planting either *Prosopis glandulosa* var *glandulosa* or *P. chilensis* at homesteads, in towns and at picnic sites. As these are the less invasive group, we still have fine examples of trees that have not spread and provide a valuable service in the arid Karoo. Unfortunately, we also imported *P. glandulosa* var. *torreyana* and *P. velutina* which are highly invasive and produce copious amounts of long-lived seeds annually. To add to the problem, it is now evident that *Prosopis* species are capable of hybridising with each other, leaving us with an invasion of

a complex of plants that may be best called *Prosopis*.

By the early 1970's researchers at the weeds division of the Department of Agriculture were already concerned about the spread of *Prosopis*, particularly in the riparian areas of the arid Northern Cape. In the early 1980s biological control of *Prosopis* was mooted. During his doctoral studies on the chemical control of *Prosopis* in 1987, Graham Harding undertook a postal survey of landowners' opinions towards the management of *Prosopis*. This survey revealed that at the time 51% of the farmers who responded wanted *Prosopis* eradicated and 24%



**Figure 1.** Timeline for *Prosopis* introduction, spread and management in South Africa



were in favour of some control of the plant.

Unfortunately, *Prosopis* is not an easy plant to kill. Cut it down and it will grow from the base of the stem, chemical control is difficult with many herbicides having only a narrow application window and mechanical control is costly and damaging to the environment. Private companies have developed, and continue to research to develop new, more suitable, and more effective chemicals. Methods of application have also been researched with progress being made on stem, stump, and aerial treatments.

The future of *Prosopis* management does not lie with one method of control but rather with integrated management and an awareness campaign.

Biological control researchers are necessarily cautious when investigating and developing a suitable biological control agent that targets the species of concern. As the pods of *Prosopis* are valued for their sugar content and as a fodder supplement, the biological control researchers focused their attention on natural enemies that only targeted the seed of *Prosopis* and left the pod and plants intact. Between 1987 and 1994, researchers released three species of seed-feeding weevils that eat mature seeds of *Prosopis* into South Africa. They released over 70,000 adults of *Algarobius prosopis* in 1987 and 1988 across the Northern Cape. An assessment of the impact of this seed-feeding weevils in 1991 revealed that under optimal conditions the weevils destroy up to 92% of seeds. The assessment also revealed that the weevils actively disperses, establishing satellite populations up to 10 km from the release sites within 27 months of release. Despite the successful establishment and spread of *Algarobius prosopis*, this seed-feeding weevil was unable to stem the spread and increased density of *Prosopis* plants across the Northern Cape.

The spread of *Prosopis* is not under control as Van den Berg et al. (2013) estimated the total area infested by *Prosopis* to be as follows:

- In 2002, 480,515 hectares in just over 400,000 patches,
- In 2004, 711,285 hectares in just under 498,000 patches and
- By 2007, 1,473,953 hectares in just over 640,000 patches.

Van Wilgen et al. (2012) concluded that "despite the expenditure of R435 million, (on *Prosopis* control between 1995 and 2008) the control was only applied to a very small portion (4%) of the estimated invaded area. It also appears that *Prosopis* invasions are increasing at an exponential rate despite clearing



Figure 2. A simple charcoal Kiln.



Figure 3. The idea behind *Prosopis*'s introduction – shade and fodder at a water-point.



efforts." Zachariades et al. (2011) state that the two seed-feeding weevils released as biological control agents and established on *Prosopis* are inadequate to restrict the spread of *Prosopis*. They suggest that the conflict of interest around the potential benefits of *Prosopis* meant that biological control researchers had been reluctant to embark on work to release natural enemies that would damage whole plants of *Prosopis*. Investigation into a weevil (*Coeloccephalopion gandolfoi*) that destroyed green seeds of *Prosopis* was underway.

Researchers investigated the impact of *Prosopis* on grazing, groundwater availability and rural economy, to make the case for more efficient management and the introduction of biological control agents that would kill *Prosopis* plants and not just damage seeds. Ndhlovu, Milton-Dean, and Esler (2011) reported that as little as 15% canopy cover of *Prosopis* invasion could reduce grazing availability by 34%. Dziki et al. (2013) found that clearing of dense stands of *Prosopis* could result in groundwater savings "of up to 70 m<sup>3</sup>/month could be achieved in spring for each hectare of *Prosopis* cleared." Wise et al. (2012) concluded the following about *Prosopis* management, "Our findings strongly suggest that maintenance of the status

quo will lead to substantial economic losses to the region... and that a new approach needs to be developed and implemented. Our findings suggest, based on a 3% discount rate, that control efforts should be focused on clearing existing infestations in the floodplains, while at the same time preventing the spread into currently un-invaded highly productive areas and investigating the possibility of significantly more effective biological control agents. The control costs would be justified by the additional water made available for meeting the social and economic activities that depend on water and the ecological reserve to sustain the integrity of ecosystems."

Shackleton et al. (2017) worked with stakeholders in the Northern Cape and identified four possible scenarios for *Prosopis* management:

1. The current approach with manual labour and no new biological control agents - would lead to both an increase in the spread of *Prosopis* and an increase in the cost of management.
2. Increased mechanisation of *Prosopis* management with the utilisation of biomass would lead to a reduction in the spread of the invasion and a moderate increase in the cost

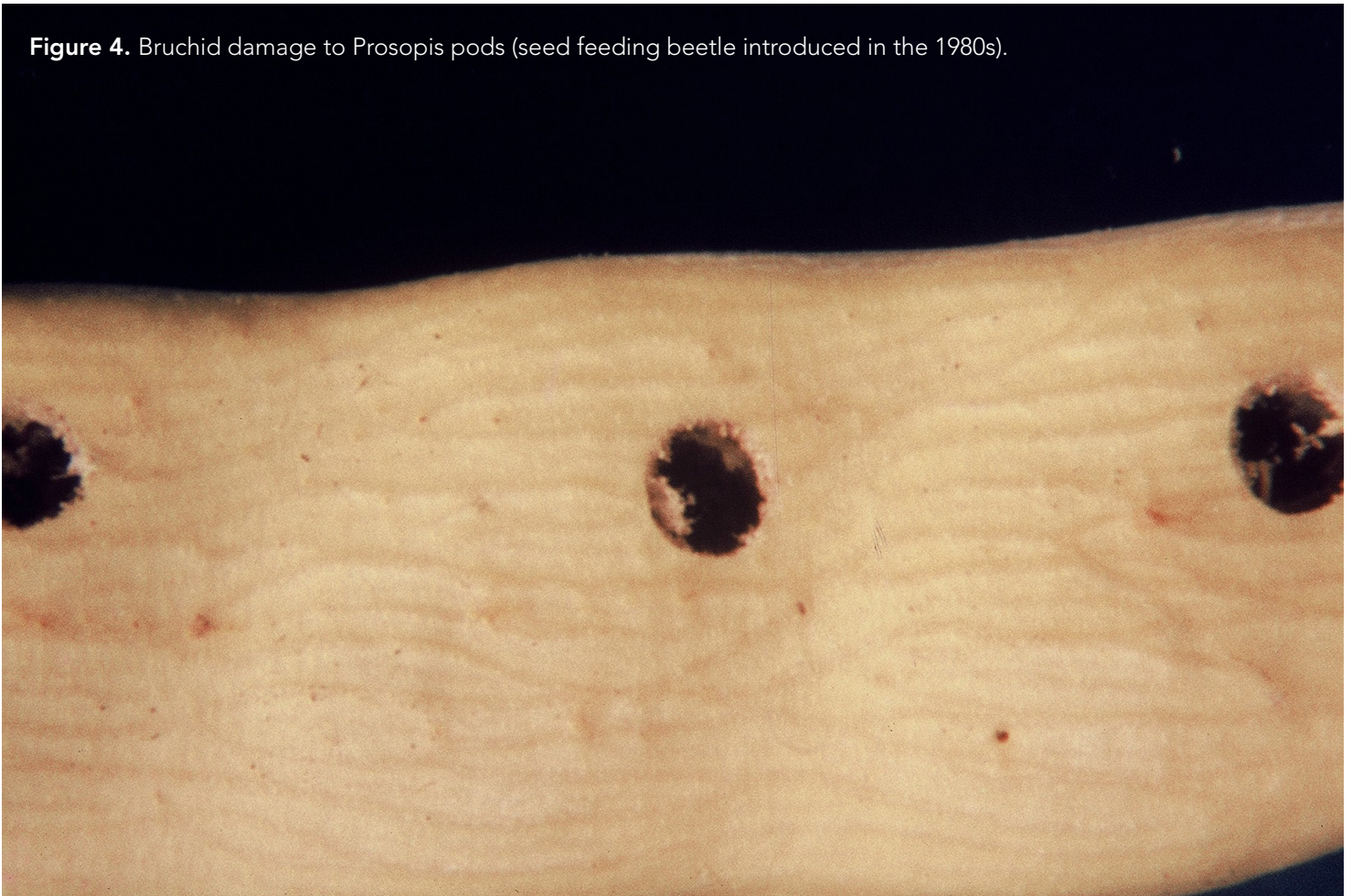
of management.

3. Improved biological control of *Prosopis* (introduction of biological control agents that were more damaging to the whole plant) and the continued manual labour may lead to maintenance of the existing extent of the invasion and the costs of management not remaining relatively stable.
4. The only option to both manage the invasion and reduce management costs would be to increase mechanised control and release biological control agents that were more damaging.

Since 2014, researchers had a culture of the *Prosopis* leaf-tying moth, *Evippe* sp. #1, in culture in South Africa for safety testing (Kleinjan et al., 2021). Although the Australians had tested and released *Evippe* sp. #1 in Australia, it was important to ensure that this potential agent for *Prosopis* was safe for release in Africa and would not damage species from the continent.

After extensive testing, researchers were satisfied that *Evippe* sp. #1 posed no danger to African species. In September 2020, researchers completed an application to release this agent. The Department of Agriculture, Land Re-

**Figure 4.** Bruchid damage to *Prosopis* pods (seed feeding beetle introduced in the 1980s).





form and Rural Development granted permission to release *Evippe* sp. #1 into South Africa (Kleinjan et al., 2021).

*Coelocephalopion gandolfoi* is a small weevil that attacks the green seeds of *Prosopis* but does not prevent pod development, researchers believe that if established it will reduce seed production (Kleinjan et al., 2021).

The Centre for Biological Control at Rhodes University working with the Agricultural Research Council, University of Cape Town and Association of and for Persons with Disabilities in Upington is working on improving the effectiveness of the four biological control agents that

are in South Africa for the management of *Prosopis*.

Agri Noord-Kaap and the Centre for Biological Control at Rhodes University are investigating ways to defray expenses of mechanical management of *Prosopis*. Proposals for funding to make fodder from *Prosopis* to investigate the use of *Prosopis* biomass in cement construction and production of biochar from *Prosopis* as a material to improve soil water retention and effective use of fertilizers in orchards have been submitted to various sources.

Integrated management approaches, biological control, and biomass use are best delivered if individual farmers have

a clear management plan for the *Prosopis* invasions on their land. To this end, the Centre for Biological Control has allocated some funding to Dr Graham Harding to assist with the development of a small number of plans with farmers. These could serve as demonstrations for other farmers to follow, setting the groundwork for the ownership of the problem and gaining momentum in the fight against this invasive plant.

Great interest was paid to the use of management plans at a workshop hosted by the Centre for Biological Control, Rhodes University and various researchers on 15 June 2022 in Groblershoop, Northern Cape.

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# Putting a Price on Nature

Aife Kearns

Current Address: Ecology for the Masses

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## How do we motivate people to protect ecosystems?

At this stage in the climate crisis, many of us are very aware that ecosystem destruction and biodiversity loss are huge problems, bringing about everything from rapidly expanding deserts to global pandemics. We are acutely conscious that something incredibly valuable is being destroyed, and we want to protect it.

However, there are also people who aren't very aware of the scale of ecosystem destruction, and therefore don't seem to be doing anything about it. Motivating these people to protect ecosystems – or at least stop destroying them – is a huge problem. A problem so big, some people have even tried to throw money at it.

Throwing money at it, in this case, means payments for ecosystem services. Ecosystem services are a broad term for the vast benefits we gain from functioning ecosystems, and encompass everything from recreational activities (think environmental tourism) to the very food we eat (through healthy pollinator populations and stable climates). Payments for these services have become increasingly popular<sup>1</sup>, and unfortunately, they probably don't work.

To explain why I'm going to tell you a story about blood.

### The Gift of Life

Blood donations save lives. Lots of lives, in fact. According to the WHO, over 118 million units of blood are transfused globally, each year<sup>2</sup>. In the USA alone, someone needs a blood transfusion every 2 seconds.<sup>3</sup>

However, for the sick and dying to receive blood, healthy people have to give it. How do you convince a healthy, normal person to give you one-ninth of their body's blood supply? Well, thankfully we have about a hundred years of research on the topic to consult.

The world's first blood donation service was founded in the 1920s. Before that, family members donated blood to rela-

tives undergoing surgery, and soldiers donated blood to one another in military hospitals. These early donors were motivated by a desire to help close friends and family. It was during World War Two that blood donation became something civilians volunteered to do, for strangers, and for free! Wars and other disasters are great for blood donation. After 9/11, the American Red Cross received so many donations, they had to throw nearly half of it away.<sup>4</sup>

People like to be helpful, when in crisis. It helps give us a sense of control. During World War Two, donating blood was an intense and direct way to feel involved. It was intimate, too – in Russia, each bottle of donated blood was labelled with the name and address of the donor. Injured soldiers would write letters of thanks to those who had saved their lives – and this system reportedly resulted in quite a few marriages.

This period also shows us huge numbers of people donating blood as a public, performative display of their own goodness (the blood equivalent of 'greenwashing', maybe). In the UK, morally righteous women wrote to newspapers about how they were willing to shed blood for their country – at the same time as publicly shaming young men who had not signed up to be soldiers.

Wars end, however. In the immediate aftermath of WW2, donation numbers

remained high. Altruism and moral righteousness remained motivating – but so did habit. While people may have needed a good reason to start donating blood, maintaining the habit required little investment more than free biscuits and regular reminder letters. People who began donating during WW2 continued to donate long after it. Their children, too, were likely to keep up the habit.

But this effect is fading, and in the Global North, the average age of blood donors is increasing, as younger generations are not in the habit of donating. To fill the gap, some blood transfusion services began paying donors for their blood. It was a disaster.

Comparisons are often made between the UK, where it is illegal to receive payment for any tissue or organ donations, and the USA, where payments for blood and plasma donations are common. Most famously, Richard Titmuss compared these two systems in *The Gift Relationship* in 1970. In the 50 years since, these systems have been examined again and again, and the reliable conclusions are these:

Healthy, financially comfortable people will donate their blood, but they won't sell it. People who sell their blood are people in poverty, with poor nutrition, or addiction issues. These low-income donors are more likely to have health



Credit: Baz2121, CC BY-SA 4.0, Image Cropped



Types of Ecosystem Services

	Forests	Oceans	Cultivated / Agricultural Lands
<b>Environmental Goods</b>	<ul style="list-style-type: none"> <li>• Food</li> <li>• Fresh water</li> <li>• Fuel</li> <li>• Fiber</li> </ul>	<ul style="list-style-type: none"> <li>• Food</li> </ul>	<ul style="list-style-type: none"> <li>• Food</li> <li>• Fuel</li> <li>• Fiber</li> </ul>
<b>Regulating Services</b>	<ul style="list-style-type: none"> <li>• Climate regulation</li> <li>• Flood regulation</li> <li>• Disease regulation</li> <li>• Water purification</li> </ul>	<ul style="list-style-type: none"> <li>• Climate regulation</li> <li>• Disease regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Climate regulation</li> <li>• Water purification</li> </ul>
<b>Supporting Services</b>	<ul style="list-style-type: none"> <li>• Nutrient cycling</li> <li>• Soil formation</li> </ul>	<ul style="list-style-type: none"> <li>• Nutrient cycling</li> <li>• Primary production</li> </ul>	<ul style="list-style-type: none"> <li>• Nutrient cycling</li> <li>• Soil formation</li> </ul>
<b>Cultural Services</b>	<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Spiritual</li> <li>• Educational</li> <li>• Recreational</li> </ul>	<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Spiritual</li> <li>• Educational</li> <li>• Recreational</li> </ul>	<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Educational</li> </ul>

Figure 1. Types of Ecosystem Services (Image Credit: Forest Trends, The Katoomba Group, and UNEP)

conditions which means they shouldn't donate blood, and more likely to lie about this on income forms. When payments for blood stop, these people stop donating.

And when payments stop, the healthy, financially comfortable people don't start donating again. The image of blood donation as something only desperate people do sticks around. Blood donation is no longer the sacred gift of life, it's sordid and shameful. It's something desperate people do. It's the trade of bodily fluids for cash. Transfusion services are worse off than they were when they started.

A thought experiment: someone wants to buy your blood. A stranger. How much would they have to pay you for it? For 1/9th of the blood in your veins right now? You have to go to a community centre, or some other boring room full of strangers. It takes a whole afternoon. You have to fill out forms and sit in a beige waiting room for hours, before and after. It's boring.

I donate my blood for free, but if you were paying me, you'd have to pay me quite a lot. If you stopped paying me again? I don't know if I'd donate it again. Brains are dumb.

It's pretty simple, really. People can't really feel altruistic when they're paid to do something. They can't feel morally superior for it. These *intrinsic* rewards (i.e. rewards coming from within the person) are crowded out by money – a cold, calculated *extrinsic* reward.

People almost never do things for only one reason. Except when that reason is money. Money is the one measure of value which kills all other values just by being on a playing board.

NB: To find out more about the histo-

ry and sociology of blood transfusion, check out *Nine Pints* by Rose George. More information about the history and behavioural science of blood donation can be found there.

Money Can't Buy You...

But hey, maybe this doesn't tell us anything about payments for ecosystem services. Maybe it's just a blood thing. People are a bit weird about blood, after all. It comes up in a lot of metaphors.

However, it seems like something similar happens every time something people valued intrinsically is given a value measured in money (i.e. commodification).

One study in Brazil attempted to improve school attendance in children from poor families by paying the kids to go to school. The kids in the study *did* end up going to school slightly more often – but overall attendance in the school dropped. The siblings of the children in the study were more likely

Don't wait until disaster strikes

**GIVE BLOOD  
GIVE NOW  
GIVE OFTEN**



World Blood Donor Day  
Give blood. Give now. Give often. 14 JUNE 2017



Figure 2. A World Blood Donor Day poster, motivating people to donate before "Disaster Strikes". (Image Credit: World Health Organisation)

than kids from other families to drop out over the course of the scheme. Why send both your kids to school if only one is getting paid to be there? The other kid could be making money for the family somewhere else!

Before the study happened, school just wasn't a money thing in these parents' minds. Once money entered the equation, the intrinsic rewards parents got from sending their kids to school (e.g. free childcare, an inherent sense that education was good, feeling like a good parent, a hope that they were improving their children's future job prospects) were crowded out by money considerations – these were not wealthy people. Even before the scheme ended, paying people to send their kids to school actually reduced the number of kids in attendance.

NB: To find out more about Brazil's failed experiment with paying parents for their kids' school attendance, check out *Doughnut Economics* by Kate Raw-



Figure 3. Yellow wagtail population declines have been linked to the growth of farmland. Yet paying farmers to maintain biodiversity on their land is not the answer (Image Credit: Pete Beard, CC BY 2.0, Image Cropped)



orth. This book is a great resource on behavioural economics and the economics of sustainability.

And so, to ecosystem protections. Payments for ecosystem services (PES) are a relatively new phenomenon, but they are expanding rapidly. PES programmes are anywhere anyone is paid for land management practices which protect ecosystems and the 'ecosystem services' they provide. These programmes might include payments for carbon sequestration, water quality improvements, or habitat creation.

A 2018 literature review<sup>1</sup> estimated US\$36-42 billion was spent annually on PES. Very few of these programmes

are evidence-based. No one has really checked if they improve ecosystem protections or change human behaviour.

The evidence from psychology implies they might cause people to value ecosystems *less* than they would if they weren't being paid to do so. PES programmes are variable, but all rely on a mechanism of motivating behavioural change which has been shown to backfire spectacularly. Paying people to do things they were previously intrinsically motivated to do makes them think of that thing as financially valuable, instead of as inherently valuable. These people stop doing the thing when you stop paying them, even though they may have previously done the thing for

free. Even more worryingly, payments may decrease the desired behaviour in people who aren't included in the PES programme. If your neighbour is getting paid to maintain hedgerow habitats on his farmland, why would you waste your time doing the same thing for free?

So, how *should* we be encouraging people to protect and conserve fragile ecosystems? The short answer is: it's complicated. The long answer could fill several books.

We do know that intrinsic motivations are more robust than extrinsic ones. Internal, mental rewards like knowing you've saved a life by donating blood, or believing that your kid is getting a good education because of your support – these things motivate people even when external rewards like money are taken away.

The best way to motivate people to protect ecosystems is to tell them how and to tell them why. People like to protect the things they value. People like to help during a crisis. People like to feel important, effective, and helpful. There are things money can't buy.

*Aife Kearns is a writer, researcher, and educator, focusing on sustainability in agriculture and rural living. She recently completed an MSc in Sustainable Agriculture and Rural Development at University College Dublin. Aife is currently a Climate Ambassador with An Taisce and the co-host of too many podcasts. You can find out more about Aife and her (too) many projects by following her on Twitter at @aifekearns.*

Any information on blood donation not otherwise attributed is taken from *Nine Pints* by Rose George. More information about the history and behavioural science on blood donation can be found there.

The case study on Brazilian school attendance was taken from *Doughnut Economics* by Kate Raworth. This book is a great resource on behavioural economics and the economics of sustainability, for anyone interested in such things.

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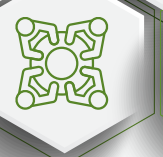
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# Africa's shrinking wild spaces: South African ecologist wins \$150,000 research grant to explore new "cattle with nature" solutions

**Tony Carnie**

Current Address: Oppenheimer Research and Conservation

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**L**arge herds of hungry domesticated cattle are often seen as a threat to the future of Africa's shrinking wildlife conservation areas. But, could it be that cattle and pastoral communities are actually part of the solution?

That's the big question South African-born ecologist Dr Liza (Elizabeth) Le Roux hopes to find answers to during a major research programme that will explore the complex interactions between plants, animals, cattle dung and people. It's a critical question in the Anthropocene Era, a human-dominated epoch in which the remaining fragments of undisturbed nature face relentless pressure from economic development and changing climate patterns.

Le Roux's love for wild spaces was sparked as a girl during bushveld holidays north of her home in Pretoria – later strengthened as an ecology student who spent two years living in a caravan in the Kruger National Park.

Then she spent a further two years living out in the bush while studying for her PhD in the Hluhluwe-iMfolozi game reserve in Zululand. Through experience and interaction with scientists from across the world, she gained a deeper understanding of the many complexities and values of the natural world.

Over time, Le Roux and fellow ecologists have become increasingly worried about the long-term future of Africa's isolated protected areas, many of which are now seen as conservation "islands" stranded in vastly altered landscapes.

"There will always be people in nature. So if we are to save a significant amount of viable wild spaces, our focus should not be on wildlife, but also on people. Otherwise, it's just a matter of time before these areas shrink and eventually disappear," says Le Roux, the 2022 recipient of the US \$150 000 Jennifer Ward Oppenheimer (JWO) Research Grant that was established four years ago to assist early-career scientists to develop scientific solutions aimed at addressing African problems.

Her winning research proposal, entitled "Cattle corridors: Aligning ecological processes and local livelihoods" was among 332 applications, from young African scientists that impressed the JWO Research Grant expert panellists, made up of representatives from Oppenheimer Generations Research and Conservation and Philanthropies, as well as external experts representing various scientific disciplines.

In very simple terms, her three-year research programme will examine whether the movement of cattle and pastoral communities in Africa should be viewed not as a problem, but rather as a possible solution towards reconnecting and integrating fragmented conservation areas.

## How does that work?

As things stand, African protected areas are becoming isolated with wildlife populations increasingly confined and fragmented. This means that many species – including plants and insects –

have limited opportunity for movement and reduced genetic diversity resulting in genetic bottlenecks.

To address the risk of genetic in-breeding, some wildlife managers have intervened by shifting certain endangered animal species to other reserves using a meta-population strategy.

For example, individual cheetahs are captured and moved between reserves on a regular basis to guard against genetic inbreeding.

Le Roux notes that genetic variation is essential if species are to retain their long-term potential to survive, especially in an era of changing climate patterns.

While it is possible to move cheetahs and even elephants on a regular basis – how do you move thousands and thousands of species of insects, plants, grasses and trees that all make up the complex tapestry of nature?

This is where the cattle come in.

In many parts of Africa, there are still many 'semi-natural' cattle rangelands inside or amongst protected areas.

Though they are not formally protected and are often heavily impacted by high cattle densities and human influence, Le Roux still believes they have the potential to make very meaningful contributions to conservation by creating connectivity "corridors" between protected areas.



It is these rangelands that provide large landscapes for movement and dispersal. The cattle themselves also play a role, by trampling the earth and moving large amounts of biological materials over relatively long distances by consuming, transporting, and redistributing nutrients and plant material.

In doing so, the cattle corridors maintain stepping stones or bridges for certain wildlife species, plants and insects to move between the conservation islands.

However, as traditional practices change, more fences are going up in many of the old rangeland areas of the Maasai Mara in Tanzania and elsewhere.

“There is a tendency to say ‘This side for animals. That side for cattle and people’, because there is a lot of conflict over grazing rights,” says Le Roux.

The outcome is that traditional pastoralist societies are increasingly being pushed to intensify or diversify their income, leading to unsustainable cattle densities, a shift towards farming crops or putting up fences for exclusive access to grazing resources.

This means that the capacity of traditional rangelands to provide ecological

connectivity is deteriorating fast and cannot be reversed without significant legal, institutional and policy support to maintain rangelands in a semi-natural state.

“I believe we must relinquish the ‘either-or’ proposition of wilderness vs rangelands and work towards the protection of both, for the benefit of people and wildlife,” she says.

“Personally, I think there are certain benefits of traditional ways that we have not appreciated . . . We have to think harder about integrating people and nature and look towards a gradation of landscapes. African communities have a lot to teach the world about ways of living with wildlife.”

To test the hypothesis, Le Roux hopes to set up a large interdisciplinary and highly collaborative science programme to answer questions such as:

- Under which conditions do the presence of pastoralists and the movement of cattle through rangelands help to connect isolated wilderness ecosystems?
- Is there a sweet spot where the mix of wildlife and livestock is compatible with biological diversity,

ecological resilience and cultural integrity?

This will involve using camera traps to identify which species of wildlife make use of the cattle corridors or measuring the movement of nutrients and mineral elements (such as carbon, calcium or potassium in the soils) using portable X-ray fluorescent (XRF) analysers.

Though Le Roux is still mulling possible study sites in East Africa, Zimbabwe, Botswana and South Africa, she will employ three African PhD students, all of whom will spend at least two months at Aarhus University to write up their theses.

The students will also attend at least one international conference to broaden their experience and build new networks with senior scientists from Africa and across the world.

The five other finalists short-listed for the research grant were Dr Alice Karanja (Kenya), Dr Peta Brom (South Africa), Dr Bridget Bobadoye (Nigeria), Dr Sivuyisiwe Situngu (South Africa) and Dr Tiwonge Mzumara-Gawa (Malawi). More details about their research are available [here](#).



**Figure 1.** Rather than being seen as a conservation challenge, the movement of cattle and pastoral communities in Africa could provide ways to help reconnect and integrate fragmented conservation areas.



# Mob Grazing Debunked: Is it the 'Golden Ticket' to Grazing Efficiency and Soil Health?

Paige Carlson

Current Address: Drovers – Driving the Beef Market

Reprinted from: <https://bit.ly/3z296Ue>

As the amount of available grazing lands continues to decrease, while the population and demand for beef continue to rise, ranchers face the question: How do we produce more with less?

The idea of 'mob grazing' has been around since the 1980s, as a way to increase stocking density while increasing nutrient cycling as cattle trample standing plants and ultimately yield healthier soils and biodiversity.

This practice includes cycling dense herds through multiple pastures a day, and then giving pastures extra time to recover, with the idea that this intense grazing would increase soil health and livestock production.

However, a recently concluded, eight-year study by the University of Nebraska-Lincoln (UNL), found alternate information.

The study included three cattle groups, 36 steers rotating twice per day through a total of 120 sub-irrigated pastures in the Nebraska Sandhills over a 60-day grazing period, nine steers on a four-pasture rotation system with one grazing cycle of 15 days per paddock (4PR1) over a 60-day grazing period and 10 steers on a four-pasture rotation system with two grazing cycles of 10 days per paddock (4PR2) over an 80-day grazing period.

Researchers Bianca Andrade, Walter Schacht and colleagues found that mob

grazing led to the trampling of nearly 50% of the standing plants, and twice that of the conventional four-pasture rotations, yet the researchers found no meaningful difference in the subsequent production, composition or root growth of pasture plants, a *UNL article* says.

The team concluded that the benefits of trampling are, if anything, limited. Additionally, the added labour of mob grazing might far outweigh the benefits, for many operations.

Other results from the study include:

- Ground cover measured as 'litter' was consistently above 90% on all three treatments.
- The frequency of occurrence of native and exotic species did not vary in response to grazing treatments; however, it did vary in response to year (wet versus dry).
- The proportion of perennial versus annual species was not affected by any of the factors evaluated.
- Harvest efficiency was greater for 4PR1 (58.8%) than mob (45.3%) and 4PR2 (51.6%).
- By the end of the experiment, the percentage of crude protein was on average 2.2 percentage units greater in 4PR2 pastures than in 4PR1 or mob pastures.
- Average daily gain of steers in the 4PR2 pastures was greater than steers in the mob pastures in all years and greater than steers in the 4PR1 pastures in all years except for 2014.

Researchers suggest, "Ranchers might consider initiating mob grazing earlier in the growing season— when plants are leafier and more likely to be eaten— and introducing a second grazing cycle in the summer," the article explains.



**Figure 1.** Intensive or 'mob' grazing allows for higher stocking densities, but does it provide benefits to soil health and biodiversity? UNL researchers share their findings after an eight-year study.(University of Nebraska-Lincoln Mob Grazing)



# The versatility of grasses: from major food source to handy indicators of past environmental change

Lloyd Rossouw

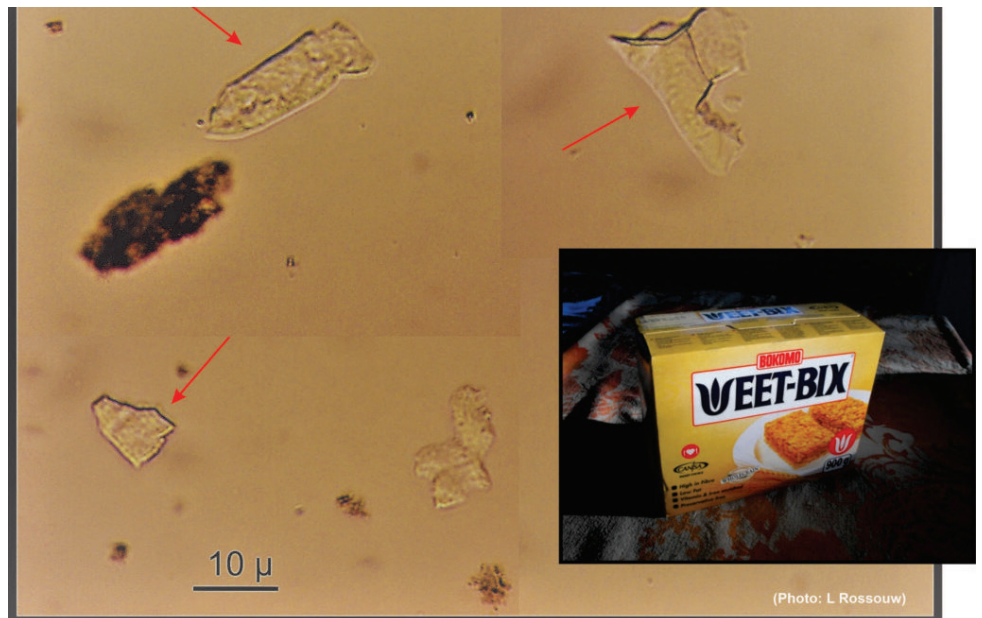
Current Address: National Museum Publications  
Reprinted from: <https://bit.ly/3DkFvb9>

When it comes to nutritional value, grasses are probably the world's most important plant family. All our cereals, including maize, wheat, sorghum, rye, millet, rice, barley and sugarcane are grasses. Grasses also provide fodder for animals that supply us with meat, leather and milk. Within the South African agricultural sector, cereal accounted for about 30% of the total gross agricultural production in the country in 2017, with a total output of 18.6 million tonnes for wheat and maize in 2020-21 (Agriseta 2019; Lyddon 2021). Besides food, grasses are also cultivated for lawns, landscaping, erosion control, scaffolding and furniture (e.g. bamboo) and the production of biofuel (Gibbs Russell 1988; Clark & Poll 1996).

Grasses also produce a peculiar-looking microscopic plant particle in the form of mineralized silicon dioxide (Metcalf 1960; Piperno 2006) (Figure. 1).

Known as phytoliths (Gr. phyto = plant & lithos = stone) these silica bodies are very tough and hardy and can remain intact in soils and sediments for hundreds of thousands, or even millions of years, long after their grassy host has died and disappeared. Not only do they preserve well, but grass phytoliths are also very diagnostic and identifiable (Rossouw 2009; Rossouw and Scott 2011). These oddly-shaped silica bodies occur primarily in leaves and stems of grasses and are so small that a microscope is required to study them. They are formed in grass silica short cells, which are specialized silica cells or idioblasts, found in both C3 – and C4 – type grasses. It is located in the costal and intercostal zones of the leaf epidermis, overlying the vascular bundles and their associated *sclerenchyma* (Metcalf 1960; Kok 1968) (Figure. 2).

Their size generally varies between 5 and 40 microns in length (1 micron = 1 thousandth of a millimetre) and their shape can tell us something about the ecologi-



**Figure 1.** Amorphous silica bodies are produced by the genus *Triticum*, a staple grain also found in your favourite breakfast cereal.

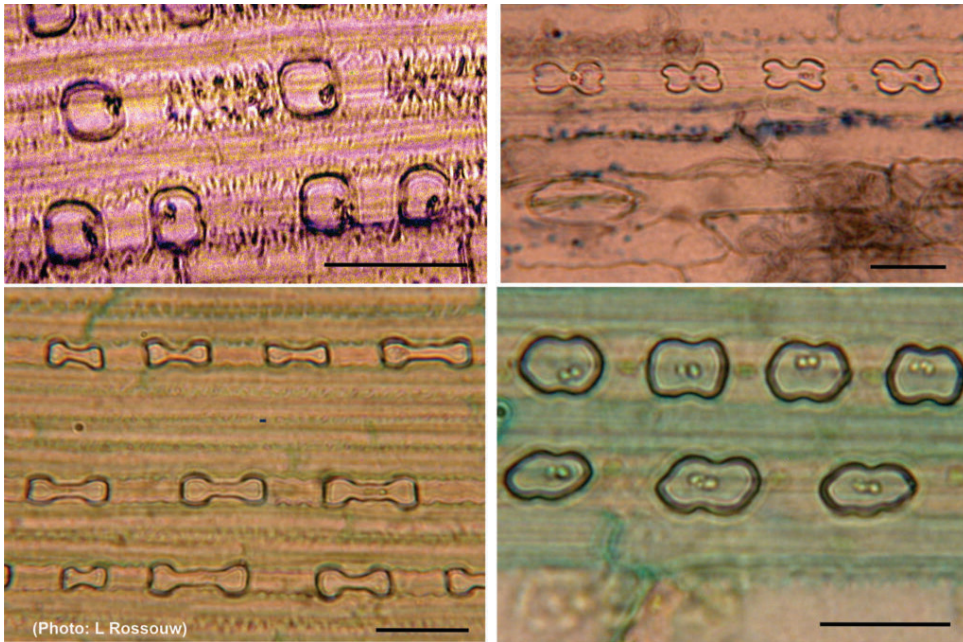
cal niche of the grass that produces it; for example, whether it is from a water-loving or arid-adapted species, or a species that prefers to grow in winter-rainfall or summer-rainfall regions (Rossouw 2016). This is because the distribution of grasses is primarily linked to growing season temperature, which seems to account for the geographic distribution of C3 and C4 grasses (Vogel et al. 1978; Ellis et al. 1980; Cerling et al. 1997; Ehleringer et al. 1991, Ehleringer et al. 1997; Sage 2004). C3 and C4 respectively refer to three-carbon and four-carbon molecules being the first products in photosynthesis (Ehleringer and Monson 1993). They represent two photosynthetic pathways that exist among grasses – the ancestral C3 (Calvin-Benson) photosynthetic pathway, which is utilized by grasses generally thriving under cool, dry to mesic winter-rainfall conditions, and the C4 (Hatch-Slack) photosynthetic path-

way, which favour elevated temperatures during the growing season (Vogel et al. 1978; Ellis et al. 1980).

Although grass silica short cells comprise only a portion of the total siliceous residue and have restricted distributions within grasses, they provide the most taxonomically useful types of grass phytoliths (Twiss et al. 1969, Mulholland 1989; Fredlund and Tieszen 1997; Rossouw and Scott 2011; Rossouw 2016) (Figure. 3).

When fossil phytoliths are successfully extracted from ancient cave sediments and soils, carnivore dung or even fossilized teeth, they can provide valuable information about past environmental conditions by offering a wider perspective on the extent of climate variability (Foster et al. 1990; Henry et al. 2012; Scott et al. 2016; Ecker et al. 2018).



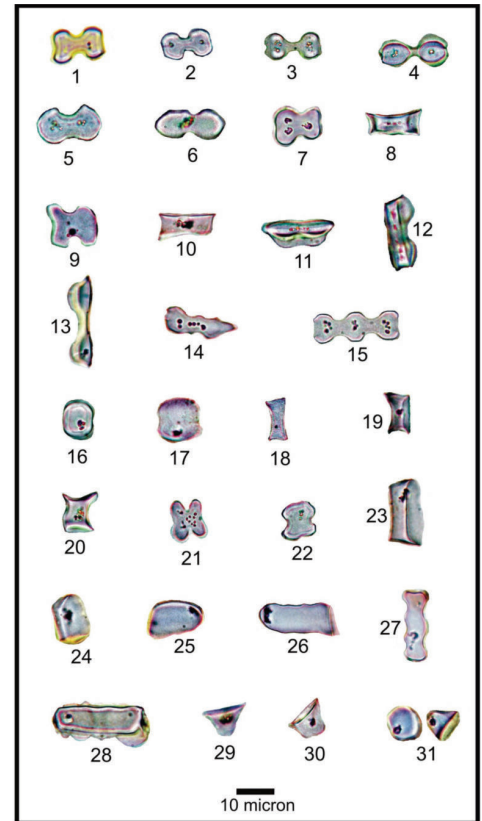


**Figure 2.** Photomicrographs of prepared grass leaf epidermis. Planar view of in situ short cell silica bodies within the leaf epidermis.



**Figure 4.** The fossilised bone beds buried near Senekal (top left & right). Photomicrograph of “saddle-shaped” phytolith morphotypes primarily produced by arid-adapted grass species not prevalent in the Senekal region today (below).

For example, a mass death site made up of four fossilised bone beds was discovered buried near Senekal in the eastern Free State in 2003 (Backwell et al. 2018). The



**Figure 3.** Abaxial and adaxial aspects of different short cell phytolith morphotypes found in grasses (after Rossouw & Scott 2011).

site contained the densely packed and articulated skeletons of red hartebeest, black wildebeest, leopard, jackal and warhog, suggesting that these animals must have perished together under catastrophic conditions. Grass phytoliths extracted from the ancient soils associated with the bone bed yielded a proportionately high number of morphotypes that are primarily produced by arid-adapted grass species not prevalent in the area today (Figure. 4), indicating a trend towards severe desertification and drought in the eastern FS between 3840 and 3500 years ago. Thus, whereas ecologists generally study organisms on a time scale of less than 100 years, palaeontological analyses focussing on fossil grass phytoliths can provide an expanded temporal perspective on community and organism responses going back for thousands of years. More importantly, with modern global warming trends seen as the result of mainly human-induced activities, the bone bed study shows that grass phytoliths can be helpful when comparing long-term patterns in climate change during periods before extensive anthropogenic influences.

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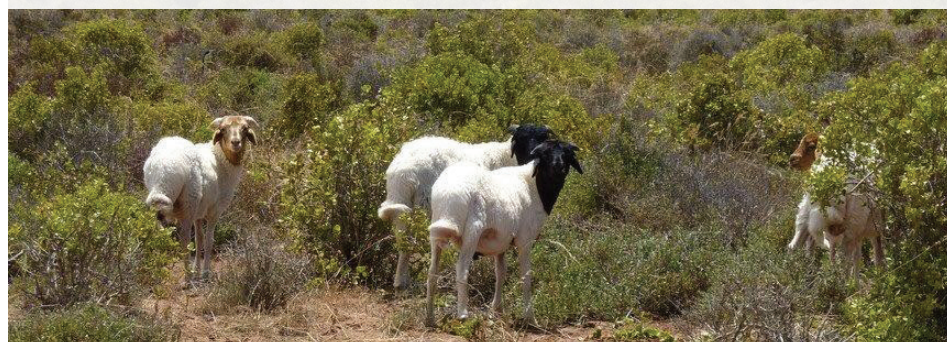
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# Amazing ting: South Africa must reinvigorate sorghum as a key food before it's lost

Laura Pereira

Current Address: Global Change Institute, University of the Witwatersrand  
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The world's food systems have developed in a way that is not serving health and sustainability.

People are increasingly eating industrially produced foods that are low in nutrients and high in fats and sugars. For example, in South Africa between 2005 and 2010, sales of snack bars, ready meals and noodles all rose by more than 40%. These are associated with increasing levels of obesity and diet-related non-communicable diseases like diabetes.

The diets of people living in poverty are typically monotonous, dominated by refined cereals with impacts on nutrition, especially for children. Healthy diets remain unaffordable for most South Africans.

The way food is produced, processed and transported also has environmental impacts. Among these are loss of biodiversity, high levels of water extraction and greenhouse gas emissions.

At the heart of the food system's problems is a lack of diversity. Power is consolidated in the hands of a few mega-corporations. Growing single crops in a big area makes them susceptible to shocks. And the world relies on four main staple crops – wheat, rice, maize and soybean – to meet most food needs.

There have been widespread calls for the food system to change. The question is how.

In our research project on sustainable and healthy food systems, we set out to explore some options. We looked at the South African, English and Indian food systems and how they could become more sustainable, healthy and fair. In particular, we explored how to make

these systems more diverse by growing local and indigenous foods.

We found that the benefits and value of indigenous foods in the African context have not been fully understood. Knowledge of how to use these foods is being lost from one generation to the next.

So we decided to do a deep dive into one specific crop indigenous to the African continent: sorghum. In South Africa, it's also known by names like *ting ya mabele* and *amazimba*.

## Following the ting

Sorghum is one of the most important cereal grains for food consumption in Africa. Africa is the world regional leader in total production of sorghum at 25.6 million tonnes, but it has the average lowest yield at 967 kilograms per hectare. It is indigenous to the continent's savannas and there is archaeological evidence in the Sahara of the use of sorghum dating back 8,000 years.

Sorghum is as nutritious as maize and has a high drought tolerance. This makes it a resilient option for farmers to plant under changing climatic conditions.

Sorghum also has traditional significance. *Umqombothi* or *utshwala* is a beer traditionally made from maize and sorghum by the family matriarch for special occasions. As well as traditional beer, the Tswana people of South Africa also make a fermented porridge (*ting ya mabele*) from sorghum.

Despite these benefits and traditional significance, production of sorghum in South Africa has declined, with a peak of around 700,000 tonnes in the 1980s to a low of 100,000 in the later 2010s.

There is also a need to overcome its perception as a backward or "poor man's food" and its association with drunkenness, which was reinforced during apartheid to denigrate indigenous food and traditional practices.

From encounters with a range of South Africans connected through sorghum by either its consumption, processing or production, we learned of three key interventions that could be made to reinvigorate this food. They involve availability, affordability and appeal.

## New life for sorghum

There is a need to focus research on improving sorghum production in collaboration with small-scale farmers to allow them to adapt to new local conditions under climate change. This can also improve yields to be more competitive with maize, which has globally received a lot more research funding for crop improvement.

Making sorghum a zero-rated tax food-stuff so that it can compete with maize on the shelf could make it more competitive. As a rough comparison, the cheapest house brand mabele meal product in one retailer's online store is R26.99 (US\$1.58) for 2kg, whereas a brand of maizemeal is R22.49 (US\$1.32) for 2.5kg.

## Innovation meets tradition

Another important intervention is around product innovation and, through this, an increase in demand, to offer a more guaranteed market to farmers. Once local production can be increased, this should reduce dependence on sorghum imports. As a respondent in our research said:

*If sorghum can be bought at the same*



price as maize, then people will start to shift their consumption because of its health benefits and because its indigenous heritage has marketing potential.

Another respondent said:

*You need to create aspirational products. It shouldn't be considered poor man's food – if you ask many people in (South Africa) about sorghum, they come up with two associations: beer and the 'drunk uncle'; and poor man's food, 'porridge'.*

Sorghum products – newly developed ones and reconfigurations of traditional gastronomy – must meet modern consumers' need for convenience and aspirational preferences. Then there could

be a revolution in the sorghum market. Public procurement of sorghum, for example in schools, could not only teach children about these crops, but provide a more diversified and healthy diet – while enabling a market for farmers. As a third respondent told us:

*Most people have a positive story about sorghum – we need to tap into tradition and culture ... People remember things – what grandmother would eat. There is a lot of marketing in the stories – it's tradition. It's gogo (grandmother).*

*Ting ya mabele* is now registered on Slow Food's Ark of Taste. This features a collection of artisanal products steeped in culture, but also at risk of extinction as the traditional practices upon which they are based are lost or the species

from which they are made become endangered.

The potential loss of sorghum from the South African food system has implications not only for climate adaptation and agro-biodiversity, but for nutrition security, cultural practices and a sense of identity.

Our research highlights that a strong cultural link to sorghum remains in South Africa. If an enabling policy environment for research and innovation could be broadly interpreted, this might invigorate a richer engagement with sorghum. Not just as a commodity, but as a culturally significant food that could help build resilience in local food systems.



**Figure 1.** Sorghum. Dusty Pixel photography/GettyImages



# Life without Animal Pollinators: Why Grasses Embraced the Wind

## Sejarah Poaceae

Current Address: The Story of Grasses  
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Some people might be surprised to discover that grasses are flowering plants. That's because when they are compared to the large flowering structures sported by some other angiosperms such as orchids, grass flowers are minuscule indeed. They are not as large and showy as the flowers in some other plants because they are specialized for wind pollination, and thus have no colourful sepals or petals.

This reliance on wind for pollination is called anemophily, and it is in contrast with pollination via insects (entomophily) or vertebrates (zoophily). Around 10-12% of flowering plants are wind-pollinated (Ackerman, 2000), and such

plants seem to have evolved specific traits that together make up a "wind pollination syndrome".

Some of the traits in this syndrome are those which grasses exemplify, and include:

1. Having many pollen grains compared to animal-pollinated plants.
2. Pollen grains are usually unornamented.
3. Having many flowers compared to animal-pollinated plants.
4. Petals are usually small or absent..
5. Nectaries are absent.
6. Flowers are unscented.
7. Styles and stigma are feathery.
8. Anthers with pollen tend to have long filaments and are held away from the leafy structures to aid in wind dispersal.
9. Plants tend to occur in open habitats where the wind is plentiful.

At first look, people might think that wind pollination is less effective and more "primitive" than pollination by insects and other animals. Indeed, Charles Darwin himself expressed surprise that any plant should display this type of pollination, given how "wasteful" it seemed to him (Darwin, 1876).

But amazingly enough, not only is wind pollination the derived condition (that



**Figure 1.** *Phalaris arundinacea* grass inflorescence with white anthers and stigmas and foraging hoverfly.

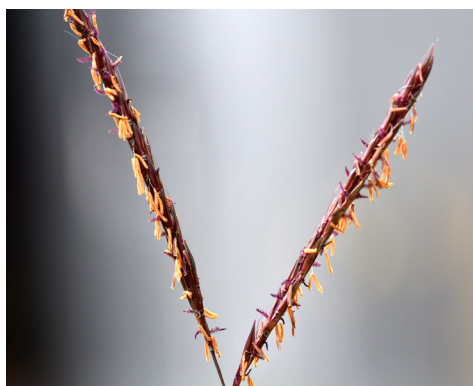




**Figure 2.** *Imperata cylindrica* inflorescence with purple anthers.



**Figure 3.** *Panicum virgatum* inflorescence with reddish-brown anthers and pink stigmas.



**Figure 4.** *Andropogon gerardii* inflorescence with yellow anthers and purple stigmas.

is, plants started out as being animal-pollinated, but then evolved wind pollination), but studies have shown that

anemophily is about as effective as animal pollination when it comes to the percent of pollen that manages to be captured by receptive stigmas! (Harder, 2000).

The impetus for the evolution of wind pollination in plants that used to have animals as pollinators has been hypothesized to be situations where animal pollinators become unreliable. For example, some areas that are newly colonized by a plant may have scarce or absent animal pollinators. In this case, this "pollen limitation" can result in the evolution of wind pollination in the species. Preliminary studies have supported this notion and have shown that pollen limitation is less of a problem in wind-pollinated plants than in animal-pollinated ones (Friedman and Barrett, 2009).



**Figure 5.** *Paspalum notatum* inflorescence with blackish purple stigmas and anthers.



**Figure 6.** *Cenchrus* spp inflorescence with yellow-orange anthers and purple stigmas.

*In the case of grasses, the very attributes that partly define the family - high-density populations that dominate and saturate the environment - may necessitate the use of wind for pollination. The lack of enough animal pollinators to assure reproduction in these relatively dense populations has pushed the Poaceae to use wind as the primary mechanism for the dispersal of their pollen.*

So the next time you get an allergy due to pollen, don't blame the plants. Blame the lack of animal pollinators! ;-)

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# Research-farmer partnerships could improve agricultural productivity for resource-poor livestock farmers

*The Ngaba farms experience*

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The Ngaba farms in Kwazulu-Natal started operating in 2017 using an extensive system for both cattle (Bonsmara) and sheep (Dorpers) on communal land in Umzimkulu. The main focus of the operation was breeding with the view of growing a productive herd where the steers were sold while retaining the heifers. A similar strategy was adopted for sheep.

In March 2020, farm management moved from an extensive system to an intensive system using a natural hay-feeding system and operations were moved to an urban area, Ashburton, in Pietermaritzburg. The main drivers for such change were stock theft and performance objectives that were not met primarily due to poor management on the communal land.

In September 2020, a partnership between the Agricultural Research Council's Animal Production team at Cedara and Ngaba farms was established. The main objective of establishing this partnership was to improve animal performance through feed generated on the farm in Ashburton and materials (fresh weight) collected from Cedara Research farm to reduce feed costs.

The two partners have different roles to ensure that the farming objectives are met. The ARC evaluates different forage grasses or other species including annual ryegrass, *Festololiums* and alternative perennials. All these forages are

tested for growth/yield performance and quality. Data is collected monthly and forages are grown throughout the year. After each harvest or grass cutting, forages left over from the research trial cutting are fed to livestock at Ngaba. The size of these trials ranges from 576 m<sup>2</sup> to 1080 m<sup>2</sup> and each week an average of two trials are harvested. This produces around one ton of wet matter yield per harvest, which is given to the Ngaba farm.

The role of Ngaba farm is to manage the forage and feeding effectively for livestock and detail the outcomes on livestock growth and performance patterns

which will be shared with other small-holder farmers during farmer days and training. This is one of the approaches in the agricultural sector that can address the lack of knowledge and skills of many small-holder farmers on forage management, utilization and increasing livestock production.

### Key achievement thus far

The previous feeding programme of the Ngaba farm on the communal area allowed for animals to have unrestricted access to natural grass-baled hay and they received supplementary feed of 0.5kg twice a day. Lambing occurred



**Figure 1.** The grass material offloading from the bakkie to be fed to the sheep at NGABA farm.





**Figure 2.** Old feeding system at NGABA farm.

every 2<sup>nd</sup> month (even though ewes were introduced to the ram at the same time, they did not all conceive at the same time) based on an 8 months cycle.

The average birth weight was 3 to 3,5 kg. The new feeding programme includes forage mixer grass and this increased the number of lambing to two full cycles (all ewes that were given the ram got pregnant at the same time and lambing

occurred once. This made management easier. Two lambings occur per year).

Following the use of this feed mixer, we noticed the following: birth weight of lambs in the last two lambing seasons increased to an average of 4 kg for twins and 5 kg singles, which had never been achieved in the farm; the ewes' udders were becoming larger and there was improved milk production, the aver-

age daily gain of lambs increased to 0,2 kg/day; there was improved weaning weight which was above 20 kg; weaning now occurred at 56 days; ewes were able to maintain a condition score of 3 at weaning; reduction in commercial feeding from 1 kg/day to 0,5 kg per day which did not result in any weight reduction in the animals.

Mr Baai, the farm owner said "We are now optimistic that these results will be sustained and will enable business growth by ensuring a balanced feed that does not break an arm and a leg. The partnership has been very valuable to the operation that aspires to grow".

This proves that if farmers and researchers work together, farmers could improve their agricultural outputs without additional input costs. In this case, the ARC are not only fulfilling its role of doing research but also the development of resource-poor farmers.

### Acknowledgements

The Agricultural Research Council (Cedara, Animal Production, Range and Forage) is gratefully acknowledged for funding the project and institutional support.



**Figure 3a-c.** New feeding system at NGABA farm.



# Climate change is forcing Zimbabwe to move thousands of animals in the wild

NPR

Current Address: Botanical Society of South Africa  
Reprinted from: <https://n.pr/3MV7CAP>

A helicopter herds thousands of impalas into an enclosure. A crane hoists sedated upside-down elephants into trailers. Hordes of rangers drive other animals into metal cages and a convoy of trucks starts a journey of about 700 kilometres (435 miles) to take the animals to their new home.

Zimbabwe has begun moving more than 2,500 wild animals from a southern reserve to one in the country's north to rescue them from drought, as the ravages of climate change replace poaching as the biggest threat to wildlife.

About 400 elephants, 2,000 impalas, 70 giraffes, 50 buffaloes, 50 wildebeest, 50 zebras, 50 elands, 10 lions and a pack of 10 wild dogs are among the animals being moved from Zimbabwe's Save Valley Conservancy to three conservancies in the north — Sapi, Matusadonha and Chizarira — in one of southern Africa's biggest live animal capture and translocation exercises.

"Project Rewild Zambezi," as the operation is called, is moving the animals to an area in the Zambezi River valley to rebuild the wildlife populations there.

It's the first time in 60 years that Zimbabwe has embarked on such a mass internal movement of wildlife. Between 1958 and 1964, when the country was white-minority-ruled Rhodesia, more than 5,000 animals were moved in what was called "Operation Noah." That operation rescued wildlife from the rising water caused by the construction of a massive hydroelectric dam on the Zambezi River that created one of the world's largest man-made lakes, Lake Kariba.

This time it's the lack of water that has made it necessary to move wildlife as their habitat has become parched by



**Figure 1.** An elephant is hoisted into a transport vehicle at the Liwonde National Park southern Malawi, July 10 2022. In neighbouring Zimbabwe, more than 2,500 wild animals are being moved from a southern reserve to one in the country's north. *Thoko Chikondi/AP*

prolonged drought, said Tinashe Farawo, spokesman for the Zimbabwe National Parks and Wildlife Management Authority.

The parks agency issued permits to allow the animals to be moved to avert "a disaster from happening," said Farawo.

"We are doing this to relieve pressure. For years we have fought poaching and just as we are winning that war, climate

change has emerged as the biggest threat to our wildlife," Farawo told The Associated Press.

"Many of our parks are becoming overpopulated and there is little water or food. The animals end up destroying their own habitat, they become a danger unto themselves and they encroach neighbouring human settlements for food resulting in incessant conflict," he said.



One option would be culling to reduce the numbers of wildlife, but conservation groups protest that such killings are cruel. Zimbabwe last did culling in 1987, said Farawo.

The effects of climate change on wildlife are not isolated to Zimbabwe. Across Africa, national parks that are home to myriad wildlife species such as lions, elephants and buffaloes are increasingly threatened by below-average rainfall and new infrastructure projects.

Authorities and experts say drought has seriously threatened species like rhinos, giraffes and antelope as it reduces the amount of food available.

For example, a recent study conducted in South Africa's Kruger National Park linked extreme weather events to the

loss of plants and animals, unable to cope with the drastic conditions and lack of water due to longer dry spells and hotter temperatures.

The mass movement is supported by the Great Plains Foundation, a non-profit organization that works "to conserve and expand natural habitats in Africa through innovative conservation initiatives," according to its website.

The organization is working with the Zimbabwe National Parks and Wildlife Management Authority, local experts, the University of Washington-Seattle's Center for Environmental Forensic Science and Oxford University's Department of Zoology, according to the website.

One of the new homes for the animals

moved in Zimbabwe is Sapi Reserve. The privately-run 280,000-acre private concession is east of Mana Pools National Park, a UNESCO World Heritage Site known for its splendid setting along the Zambezi River that forms the border between Zimbabwe with Zambia.

Sapi "is the perfect solution for many reasons," Great Plains chief executive officer Dereck Joubert said on the foundation's website.

"This reserve forms the middle-Zambezi biosphere, totalling 1.6 million acres," wrote Joubert. "From the 1950s until we took it over in 2017, decades of hunting had decimated wildlife populations in Sapi Reserve. We are rewilding and restoring the wild back to what it once was."

## BRIZA PUBLICATIONS — BOOKS FOR NATURE LOVERS

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### Problem Plants and Alien Weeds of Southern Africa Probleemplanten en Indringeronkruiden van Suider-Afrika

by Clive Bromilow

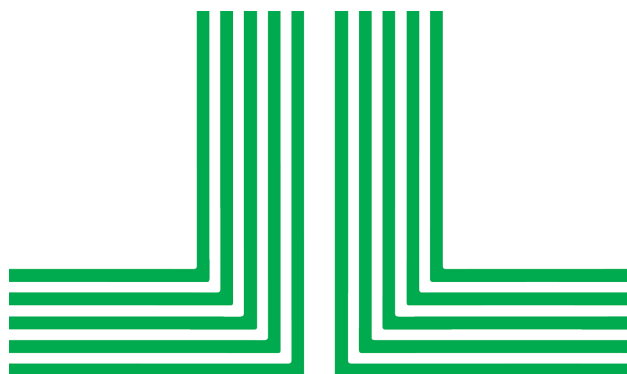
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# NLT



# Cape Town is letting the flowers grow

*Decision not to mow in some city parks is an important boost for biodiversity*

**Peta Brom**

Current Address: GroundUp  
Reprinted from: <https://bit.ly/3sfNOPk>

With the coming of spring, displays of flowers in parks in Cape Town can easily rival the famous daisies of Namaqualand. This is because the City of Cape Town stops mowing in spring, and mowing will start even later this year.

The announcement by the City of Cape Town that the wildflowers in some of the city's parks won't be mowed until the end of November might have escaped most people's attention. Yet it is a critically important move if the city is to preserve its famed biodiversity.

Cape Town is one of the world's top cities for biodiversity, and it's not just because of the Table Mountain National Park. There are 19 different vegetation types across the city, most of which are not protected by Table Mountain National Park. This means that critical biodiversity is dotted in small patches across the city.

Research on how this biodiversity can be better managed to improve both human access and animal movements (and gene flow) has shown the importance of letting the wildflowers grow until the end of the seed-producing period, rather than mowing them down as soon as the flowering peak has ended.

For the third year running, the City has decided not to mow selectively in spring. And in a recent press release, the municipality announced that this year mowing will be suspended in selected parks until the end of November.

This is excellent news as spring mowing must be stopped for two and a half months if urban flowers are to finish producing seeds. After two years of monitoring the spring reproductive season for more than 20 species of indigenous bulbs and daisies that grow wild in the

city's parks and road verges, I found that the City's previous two-month suspensions had not been long enough to allow the plants to reach maturity.

After the flowers have finished, the wildflower seeds take an additional month to reach maturity. When cut in September, the flowers don't bloom at all. And if they are cut too soon in October, we lose the following year's seed bank, along with the food it provides for fledglings and other small animals.

However, the flush of flowers does present problems, which will need to be managed in the years to come. I am most worried about the potential spread of invasive weeds, especially *Echium* spp (known as Patterson's curse because it is poisonous to livestock). The peak *Echium* flowering season is in the second half of November. Two species of *Echium* are noxious and invasive in our region. My observations of the *Echium* cycles suggest that they go straight to seed almost as soon as the flowers appear. This means that mowing spreads the seeds, so waiting until the very end of November to mow will help the *Echium* to spread.

Fortunately, researchers in Australia are investigating potential biological solutions to the *Echium* invasion.

I think we need to be mowing in July to prevent the invasive grasses from becoming too dense during spring. Unfortunately, mowing is not done routinely in July because the municipal budget comes to an end at this time and nothing happens while we wait for approval of new budgets, which usually happens at the beginning of August. The contractors also prefer not to mow during the winter storms.

The City of Cape Town and the Over-

berg Municipality have both acknowledged that the suspension of mowing means we will have to tolerate long grasses and grass seeds during late spring.

As an example, by the end of October, the wild oat grass on Alphen Common was taller than I am (165 cm). Alphen Common is not currently one of the places where mowing is suspended. I think it should be, and ideally, there would be a collaboration with nearby stables to graze horses there and prevent the oats from getting that tall!

Ultimately, the City needs to supplement the mowing suspension by employing contractors to undertake weeding during spring.

For years, conservationists have called for specific areas to be spared the chop where there are plant species of conservation significance. This has resulted in a stalemate between city landscapers, road-safety maintenance managers, and those concerned with biodiversity objectives. Within the urban context, there are (often competing) layers of use and objectives for every square meter of land. This adds complexity to objectives that may seem straightforward on the surface.

If mowing is suspended, additional management is generally recommended. Either burning or grazing prevents overgrowth and makes space for the growth of more sensitive species. In Europe, rewilding projects use animal livestock to maintain open habitats, while in South Africa, Petro Botha has tested the use of eland with similar objectives in the Cape's local nature reserves.

Long-standing traditional systems of urban grazing exist in many peri-urban and informal areas in South Africa. From



a biodiversity perspective, agricultural grazing is too intense and does not allow wild plants to establish themselves, whereas casual and occasional grazing does.

The Namaqualand daisies that people flock to see every spring on the West Coast are the result of a disturbance in the renosterveld and strandveld ecosystems. Fallow fields returned to the wild and quickly become home to pioneering daisies. Fields that were grazed, rather than ploughed and planted with crops, re-

sprout flowers from bulbs lying dormant in the soil.

Closer to the city, the length of the M5 from Rondebosch East to Ottery is currently awash with the yellow blooms of *Senecio* and *Cotula* indigenous daisies.

The area between Vasco and Joostenburg is also a renosterveld ecosystem. Groups such as the Botanical Society and the Weltevreden improvement district are negotiating no-mow areas in their local parks and are implementing projects for wildflower corridors throughout their neighbourhoods.

All over Cape Town, the parks benefiting from the mowing suspension are in flower. The City has asked residents to

identify parks and open green spaces with a rich fynbos floral spring to be spared the chop during the spring flowering season.

In the long term, a mix of solutions could be implemented, but for now, strategically adjusting the mowing schedule is the most accessible tool we have for urban park management and these early steps should be celebrated.

*Dr Peta Brom is a postdoctoral research fellow at the University of Pretoria. This article is based on her doctoral research which investigated pollinators and flower phenology in Cape Town. Rupert Koopman, of the Botanical Society, contributed content and editing suggestions.*



**Figure 1.** Wildflowers in Lincoln Park, Cape Town. Delaying the mowing season in the city's parks is a boost for biodiversity, says the author. Photo: Rupert Koopman



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# In Memory of Richard Dean

Gill Murray

Current Address: Arid Zone Ecology Forum: Secretariat

It is with immense sadness that we share with you the news that Richard Dean passed away on the morning of the 3<sup>rd</sup> of August 2022 with his wife, Sue Milton, by his side.

Richard, as many of you will know, was one of the founders of the Arid Zone Ecology Forum, which was formed in the early days of starting their Karoo research programme in Prince Albert in the mid-1980s. They had moved to Prince Albert in search of the 'perfect' site of homogeneous vegetation from which they could study the impacts of livestock overgrazing on Karoo vegetation.

At the time, this was an urgent research need for the country and was formally established through the Karoo Biome Project in 1985. Not only did they set up the Tierberg-Long Term Ecological Research site (~30 km east of the town), formerly called the Tierberg Karoo Research Centre, but together they went on to produce much of the knowledge that has been so foundational to our ecological understanding of the Karoo.

Together they devoted much of their research towards understanding Karoo rangelands and how to best manage and restore them. Their most notable contribution to Karoo ecology has been their co-edited book, *The Karoo: ecological patterns and processes*.

Richard was an ornithologist by training, having obtained a PhD on the nomadic birds of the Karoo. He also had a wide range of research interests but was particularly interested in studying bird and invertebrate biology and behaviour, having published numerous studies on birds, ants, cicadas, solifuges, spiders, and termites.

They went on to publish their findings in a multitude of scientific arti-

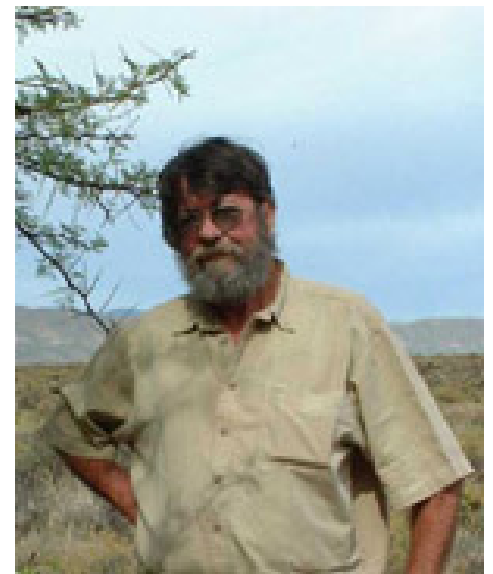
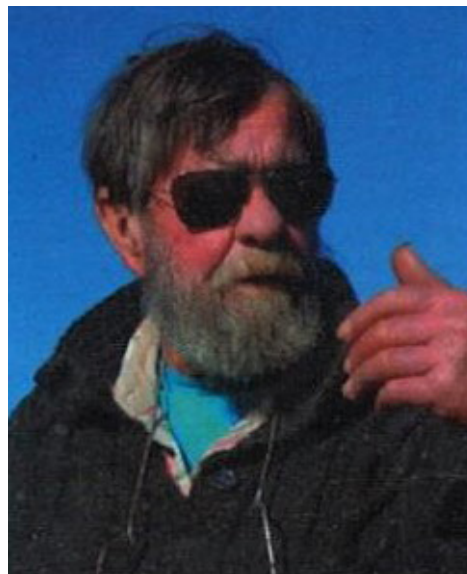


Figure 1 & 2. Richard Dean

cles, whole books, and book chapters, edited several more books, as well as communicated their observations to broader audiences including farmers. In response to this knowledge production, they applied their research in a very practical way by opening a small nursery business in Prince Albert that grows and sells native Karoo plants and seeds for restoration purposes.

They also purchased a piece of land in the town, Wolwekraal Nature Reserve, to conserve a remnant of the Prince Albert Succulent Karoo vegetation type which contains endemic plant species.

Richard regularly wrote articles about his observations of nature which were published in the local Prince Albert newspaper, *The Friend*. He recognised the importance of sharing his knowledge to help people take care of the environment.

He supervised several student projects including doctoral students, and with Sue, oversaw the training of interns that

have been hosted through Saasveld and SAEON over the years. Many of these projects, including his own studies, have been presented at the annual AZEF conferences. In the last 6 months, despite his declining strength, Richard continued to write and publish work. In his free time, Richard thoroughly enjoyed cooking, restoring vintage motorbikes, making wooden utensils and furniture, feeding and growing chickens, and he was a very talented artist who painted a few pieces which are displayed in their home.

On behalf of the AZEF community (and GSSA – ed.), we would like to send our warmth and condolences to Sue during this very difficult time. Richard has left behind an unmatched legacy and his contributions to the AZEF community have been greatly valued.

We know that many in our community have fond memories of him which they will cherish for many years to come.



# Websites, Webinars & Podcasts

## REDTANK ICT Academy

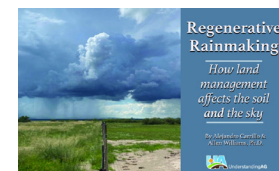
This organisation is dedicated to the cause of building Technology Centres for the unemployed youth in our community. It is unimaginable for many to envision a life without a computer, laptop, and continual access to the internet. Unfortunately, not everyone can afford this seemingly indispensable privilege. The Redtank ICT Academy has taken it upon themselves to cater to the needs of the technologically unprivileged by providing them with access to Computer Facilities that fulfil their Technology needs. Along with the computer, we provide the necessary accessories such as the keyboard, mouse, monitor, and Internet.



They call upon organisations to help them achieve their goal. They are currently running short and need Laptops/Computers/Printers and any technology that can be donated to make the Projects a success. Any old laptops, computers, software, or other accessories will be accepted. Any faults in the machine will be refurbished and integrated into their Academy Infrastructure. Visit them at [www.redtanks.co.za](http://www.redtanks.co.za) for more information.

## Regenerative Rainmaking

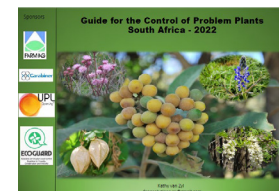
New evidence and research regarding the impact of soil microbes on the creation of precipitation can be accurately characterised as a game changer in our understanding of what it takes to produce rain across the globe. The immediate question is: What can we do to create favorable situations for this ice-nucleation cycle to occur? The answer resides in managing more acres regeneratively. The evidence presented from Chihuahuan ranchers is both strong and compelling. What they are observing and documenting, is not happenstance or mere correlation. It has occurred far too often and too consistently for that to be the case. It's increasingly clear that when it comes to rainmaking (and rain retention) we reap what we sow—in the soil and in the sky. Visit <https://understandingag.com/regenerative-rainmaking/> to learn more.



## Guide for the Control of Problem Plants South Africa 2022

The new Guide for the Control of Problem Plants, South Africa 2022 (chemical control) is now available. The guide comes in a pdf format and can be purchased at a rate of:

- R100.00 for an individual user (no printing option), or
- R200.00 for a printable option.
- Organisations wishing to purchase the guide may do so in a pdf format that allows multiple shares and prints. A donation is requested in this instance.



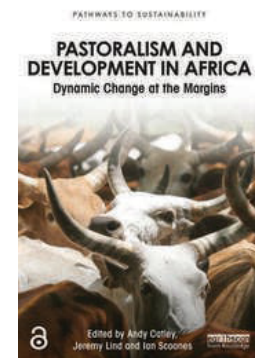
Kindly contact Kathy van Zyl at [cropsolutions.za@gmail.com](mailto:cropsolutions.za@gmail.com) or 072 599 2883 if you would like to support this initiative by purchasing a copy.

## Common names of South African Grasses

Frits van Oudtshoorn has compiled a list of common names of grasses of South Africa in one document. Visit the Grassland Society of South Africa at: <https://grassland.org.za/> to view this list.

## Open Access Book: Pastoralism and Development in Africa

The book *Pastoralism and Development in Africa: Dynamic Change at the Margins* is now available Open Access, ten years after its release in 2012. The open access version is being launched along with a set of new commentaries from book contributors and others, reflecting on changes in the last decade. Visit <https://pastres.org/2022/07/15/pastoralism-book/>.





# Websites, Webinars & Podcasts

## Jumbo-gardeners: How elephants affect weather

In this film, The Nature Conservancy's lead scientist Dr M Sanjayan, Dr Valerie Kapos of the UN Environment Programme, and tropical field biologist and conservationist Dr Ian Redmond reveal the crucial role that elephants play in keeping these forests strong and resilient, and how elephants are the most important player when it comes to the diversity of tree species in the rainforest.

Watch it [here](#).



## Nuclear power is our best hope to ditch fossil fuels - TED

Nuclear power is one of the safest, cleanest forms of energy - yet to most people, it might not feel that way. Why is that? Isabelle Boemeke, the world's first nuclear energy influencer and creator of the social media persona Isotope, deftly debunks the major objections to nuclear power and explains her unconventional way of educating people about this clean energy source.

Watch it [here](#).



## BotSoc/CREW/SANBI webinar: Celebrating 10 years of the Overberg Renosterveld Conservation Trust

Ten years ago, appreciating the incredible richness and seeing the loss of renosterveld in the Overberg, Dr Odette Curtis-Scott established the Overberg Renosterveld Conservation Trust. In this recorded webinar the Botanical Society of South Africa chats to Dr Odette Curtis-Scott, Grant Forbes, Nande Notyalwa and Rupert Koopman about 10 years of renosterveld conservation, how they've changed the mindsets of many people and how BotSoc members can get involved in helping to conserve renosterveld.

Watch it [here](#).



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# Upcoming events

**31 Oct – 4 Nov 2022 (Hybrid event)**

## The Conservation Symposium

The Conservation Symposium serves as a bridge between conservation practitioners, scientists and policymakers in a conducive environment to solve real-world problems. It integrates a broad range of disciplines in a meaningful way, creating and strengthening connections both within and between disciplines. It provides an effective platform for researchers to demonstrate the relevance of their work in addressing real-world conservation problems, and to identify new applied research opportunities and directions. It also provides a platform for training and skills development for conservation science and monitoring.

Emerging or ongoing issues identified by the conservation sector will be tackled through careful construction of the programme, including providing a selection of leading international keynote speakers, presentation of synthesis papers, and facilitated discussions. It also provides a platform for horizon scanning and exploration of new policy directions.

Visit: <https://conservationsym2022.dryfta.com>

**23 – 25 November 2022**

## Nelson Mandela University Fire Management Symposium

The 2022 Fire Management Symposium promises will be held at the NMU Campus in George, Southern Cape, South Africa. This event aims to integrate the efforts of natural resource managers, engineers, fire managers and scientists. Through an integrated approach, different role-players will be sensitised about each other's realities, successes, and failures. Internationally renowned fire scientist, Prof Pete Fule, will deliver the first keynote address and will be supported by local fire specialists such as Pieter van der Merwe. We will also proudly host other national and international fire specialists. The 2<sup>nd</sup> day of the event (Hosted by The Southern Cape Fire Protection Association (SCFPA)), will provide opportunities to visit the Southern Cape region to visit pristine Fynbos vegetation areas and learn about the unique fire ecology of the vegetation.

For more information contact [tiaan.pool@mandela.ac.za](mailto:tiaan.pool@mandela.ac.za) (072 374 2347), [Hannes.vanZyl@mandela.ac.za](mailto:Hannes.vanZyl@mandela.ac.za) (072 733 1692) or [sonia.roets@mandela.ac.za](mailto:sonia.roets@mandela.ac.za) (044 801 5091).

**If you would like to advertise your upcoming event, please contact us and we will include it in our next edition.**



# Upcoming events

**30 January – 2 February 2023**

## **5<sup>th</sup> National Global Change Conference 2023**

The Global Change Conference is a national conference that is organised biennially by the Department of Science and Innovation (DSI) and the National Research Foundation (NRF) under the auspices of the Global Change Grand Challenge (GCGC).

The next conference (GCC5) will be hosted in partnership with the University of the Free State and will be held at the Bloemfontein Campus of the University of the Free State.

For more information go to <https://gcc5.org.za> or contact the Conference Secretariat at [secretariat@gcc5.org.za](mailto:secretariat@gcc5.org.za)

**2 – 6 June 2025, Adelaide, Australia**

## **XII International Rangeland Congress**

The Australian Organising Committee of the XII International Rangeland Congress, on behalf of the Australian Rangeland Society and the International Rangeland Congress Continuing Committee, invites you to participate in the International Rangeland Congress to be held June 2-6, 2025 at the Adelaide Convention Centre, Adelaide, Australia.

It is our goal to provide a vibrant platform for scientific exchange and education on the contemporary challenges and opportunities facing the rangelands and its communities. We will ensure there are many opportunities to network and connect with fellow delegates and celebrate achievements in our fields.

We recognise not everyone will be able to attend in person so we will design an exciting program that promotes exchanges via social media, live streaming, interactive Q&A sessions, and recording of select content. We look forward to seeing you in Adelaide in 2025!

Visit us and express your interest in attending the Congress:  
[www.irc2025.rangelandcongress.org](http://www.irc2025.rangelandcongress.org) or [conference@aomevents.com](mailto:conference@aomevents.com).

**If you would like to advertise your upcoming event, please contact us  
and we will include it in our next edition.**



# New Editor-in Chief for African Journal of Range and Forage Science

## NiSC – Publishing Africa's Research

Reprinted from: <https://bit.ly/3F4ZcF5>

**B**orn, raised and educated in eastern and southern Africa and displaying a keen interest in African grasslands and savannas, Dr Urs Kreuter has been appointed as incoming Editor-in-Chief of the African Journal of Range and Forage Science (AJRFS).

From its inspection at the Proceedings of the Grassland Society of Southern Africa, in which Dr Kreuter published his first scientific manuscript, the AJRFS has tended to publish manuscripts that focus on the biophysical dimensions of rangeland and pasture science. However, the AJRFS also encourages the submission of manuscripts that highlight transdisciplinary linkages among biophysical and social sciences that support management, policy, and societal values.

Dr Kreuter's doctoral research examined the comparative economics of cattle and wildlife production systems in the midlands of Zimbabwe. Dr Kreuter joined Texas A&M University as an Assistant Professor in 1998, was promoted to Associate Professor with tenure in 2004, and to Professor in 2010.

"As Editor-in-Chief, I will encourage the publication of more diverse manuscripts to encompass a broader range and integration of the ecological, economic, and social dimensions of rangeland and pasture science," said Dr Kreuter.

Dr Kreuter's research program explores the human dimensions of natural resource management and aims to inform policy that fosters positive incentives for people to restore the resilience of terrestrial ecosystems under diverse land tenure systems. He teaches three courses: (1) An undergraduate capstone course in Ecosystem Management; (2) A Study Abroad Course in South Africa that focuses on biodiversity conservation and eco-tourism; and (3) A graduate course in Ecological Economics.

NiSC is proud to welcome Dr Kreuter as Editor-in-Chief and looks forward to working with him on continuing the publication of high-quality material. We also bid farewell to Prof Pieter Swane-poel who, during his tenure as Editor-in-Chief assisted the journal immensely.

Dr Kreuter, in his introductions, writes:

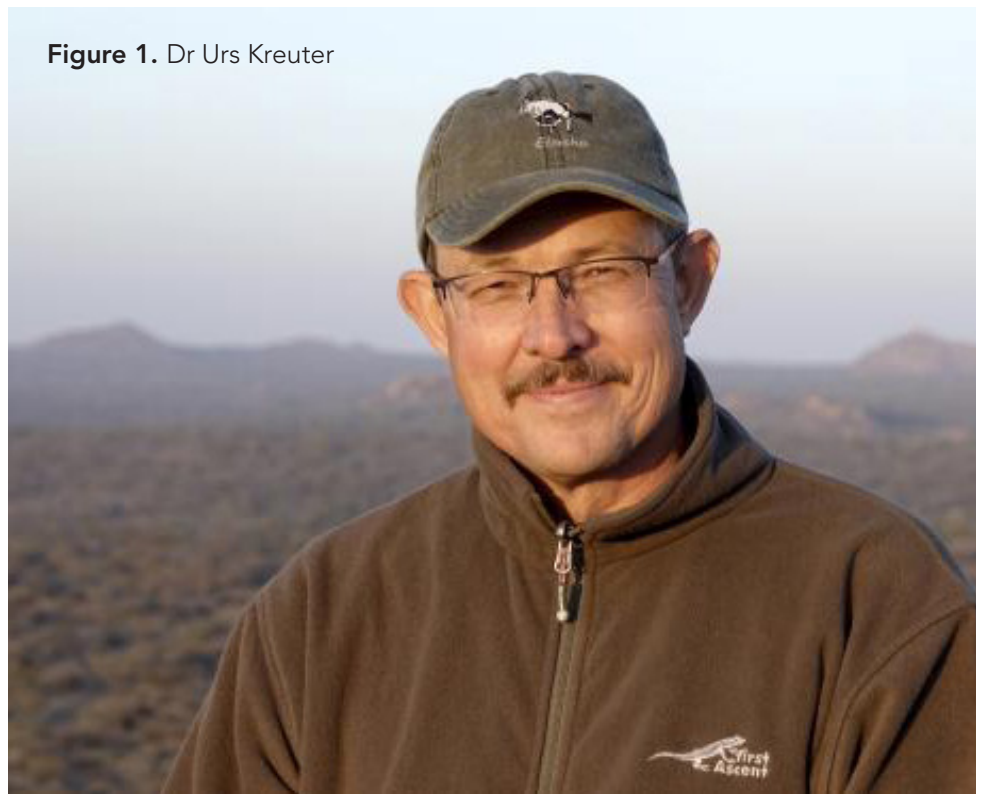
'I will also adopt the following guidelines to elevate the international stature of the AJRFS and its value to the GSSA:

1. While maintaining focus on the biophysical aspects of rangeland ecology and pasture management, expand the AJRFS's scope by soliciting more manuscripts that use social-ecological systems approaches to advance the scientific

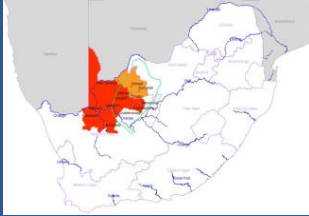
understanding of rangeland and pasture dynamics and resilience in the face of climate change.

2. Capitalize on the International Year of Rangelands and Pastoralists (2026) to promote the AJRFS as a high-impact platform for manuscripts that contribute to the enhancement of rangeland ecology and pasture management throughout Africa.
3. Actively promote the AJRFS at international conferences, including the International Grassland and Rangeland Congresses, Ecological Society of America, Society for Range Management (USA), and Australian Rangeland Society, among others."

Figure 1. Dr Urs Kreuter







**17 March 23 |  
Southern Kalahari  
Northern Cape  
Kathu**

# RESTORE KALAHARI

Connect with your restoration community, experts, scientists, managers

Bring industry  
leaders  
together

Focus on  
current closure  
and restoration  
challenges

Showcase  
regional case  
studies

The Southern Kalahari is a significant mining and solar energy region. This unique Kalahari ecosystem has been transformed since the 1900s. Regulatory and industry pressure to restore and conserve it is increasing. Area specific solutions are required to ensure efficient and successful restoration of impacted areas.

This event aims to exchange current practices, case studies and solutions.

**Presenting  
and  
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Contact Glaudin Kruger - [kruger@krugerassociate.com](mailto:kruger@krugerassociate.com)  
- 072 320 7015





**Deadlines for**

Newsletter of the Grassland Society of Southern Africa

**grassroots**

**submissions**

**Issue 4: 15 November 2022**

**Issue 1: 1 February 2023**

**Issue 2: 1 May 2023**

**Issue 3: 1 August 2023**

**Issue 4: 1 November 2023**

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