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Grassroots

Newsletter of the Grassland Society of Southern Africa

To kill a grassland forb

The Table Mountain Fire: what we can learn

Guardians of the Karoo Rangelands

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Advancing Rangeland Ecology and Pasture Management in Southern Africa

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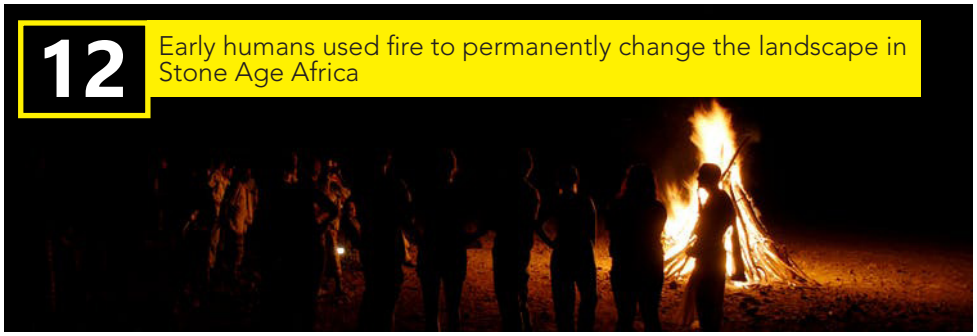

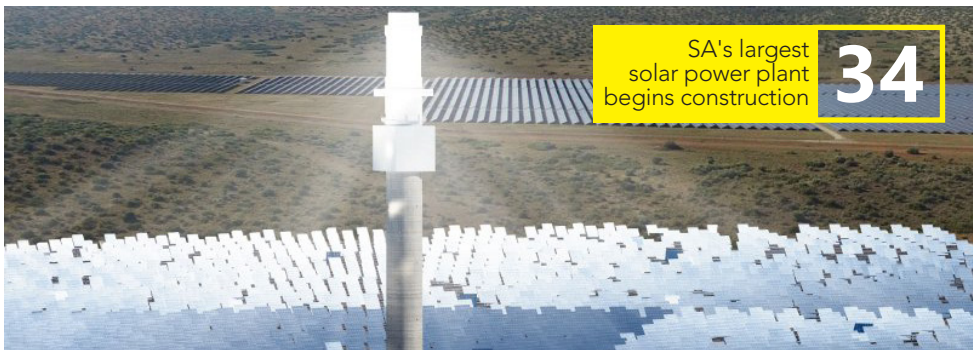

From our editor

Dear reader,

We are halfway through the year 2021 and it certainly has not been uneventful. The third wave of COVID-19 has thrown us yet another curveball and GSSA Congress 56 had to change from a hybrid to a full virtual event. However, the organising committee kept a clear head and put together an exciting programme (Well done Charné and her team!). A special thanks to all the delegates who are sharing their interesting research and are keeping our Society going.

Highlights of this issue

Craig Morris wrote an insightful feature article, "To kill a grassland forb" where he addresses the role of fire and overgrazing in the mesic grasslands.

As with many parts of the world, the Karoo has been undergoing desertification and in the article "Guardians of the Karoo Rangelands", we learn how regenerative land management is bucking this trend. Two farmers from the Eastern Cape also share how they use technology and regenerative farming to successfully manage livestock.

The ARC employed a soil testing lab on wheels to assist farmers in rural areas, meanwhile, in Australia and New Zealand, farmers are participating in the "Soil Your Undies" Challenge. The state of cotton underwear after being buried in the soil for 8 weeks is used to indicate the health of the microbiome.

We revisit the horrific Cape Town fire that destroyed UCT's Plant Conservation Unit to assess the damage, miracles, causes and what we learned from it. The role of invasive alien plants in this event is also discussed. Be sure to check out the new guide on "how to best get rid of invasive alien plants".

Lastly, we pay tribute to one of the world's greatest scientists, Bob Scholes, who passed away earlier this year (make sure to watch the video tribute by ReWild). Grassroots would like to extend our sincere condolences to his family, colleagues and students.

Enjoy the Congress, the Workshops and of course, Grassroots too!

Best regards

Malissa

Contact us

If you have any feedback, comments, or suggestions, feel free to contact us at:
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GRASS OF THE MONTH

Figure 1: *I. cylindrica in situ.* Photo: S Kusel
https://www.inaturalist.org/observations/80501886

Imperata cylindrica (Cottonwool grass)

Author: Janet Taylor | janet.taylor@kzndard.gov.za
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Imperata cylindrica is a tough perennial grass that is global a very widely distributed grass and grows in all nine provinces of South Africa. It is also found in Namibia, Lesotho, Eswatini (Swaziland) and Botswana. It has become naturalized throughout the tropical and temperate areas of the world. It has also become a highly invasive weed in many parts of the world and is on the USA's Federal Noxious Weeds List and has been nominated by the IUCN Invasive Species Specialist Group as one of the world's worst invaders.

This plant is an Increaser I grass species: the plants classified in this ecological category will generally thrive and develop into dense stands in under-utilized veld and will increase in relative abundance under such conditions. It is not grazed much by animals *due to its hard leaves.*

Features:

- Perennial
- Found between sea level and 2700 masl and in areas of moderate to high rainfall
- Is rhizomatous and of erect habit
- Approximately 100 – 1200 mm tall
- Long leaf blade with a sharp tip
- Flowers from August – June
- Fluffy white inflorescence and is a prolific seed disperser
- Forms dense stands in wet and poorly drained soil.

Economic uses:

- Is extremely low in palatability and therefore is not usually used for grazing.
- Has a very strong rooting system and can act as an important soil stabilizer (especially in construction sites) and has apparently protected over 16 million hectares of old cultivated lands in Indonesia from soil erosion.
- Can be used for thatching, paper and fuel.
- Unless it is contained, it is not recommended as a garden plant – due to it being highly invasive.
- Parts of the plant have been known to be used for medicinal practices as well as cooked and eaten.

Figure 2: Fluffy white inflorescence of *I. cylindrica*. Photo: R. Taylor
https://www.inaturalist.org/observations/34904918P

Environmental impacts

- *I. cylindrica* is regarded as the worst perennial grass weed of south-eastern Asia and west Africa impacting negatively on crop yields.
- In other African countries, there has been a reported 50-90% loss of cassava yields as well as high soya bean losses.
- Increases cost of crop production.
- Increases fire risk in perennial crops as well as plantations and forest reserves as it burns readily, even when wet.

Figure 3: Vast areas can be covered with *I. cylindrica*. Photo: D. Mckenzie
https://www.inaturalist.org/observations/79370678

Management of the plant where it is a problem

- In areas where the plant is not native, it is best to treat weed infestations when it is small and to prevent further establishment.
- It is important to control the plant before it set seeds: 1 plant can produce 3000 seeds! These are easily dispersed by wind.
- Control can be done in a variety of different ways:
  - Fire
  - Slashing/cutting
  - Tillage
  - Chemical control
- As with all invasive plant species, control the least infected areas first. A consistent follow-up regime is needed to prevent any further growth.

Figure 4: A single plant can produce over 3000 seeds. Photo: R. Taylor
https://www.inaturalist.org/observations/10312752

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PASTURE OF THE MONTH

Figure 1: White clover is a very nutritious forage legume. Photo: Malissa Murphy

Trifolium repens (White Clover / Witklawer)

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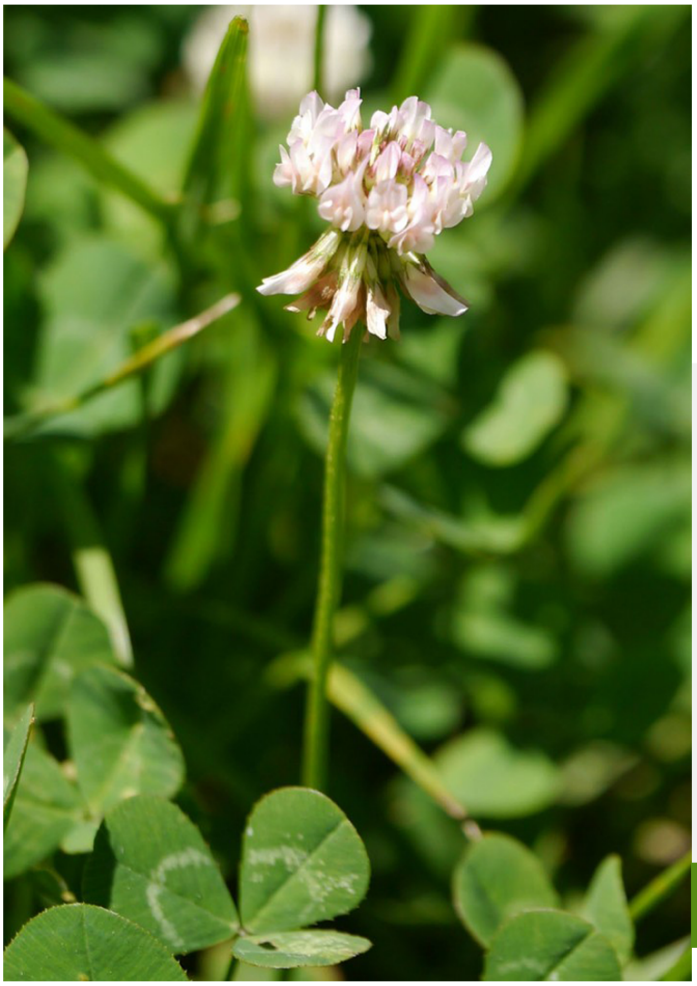
White clover (*Trifolium repens*) is a very palatable, nutritious, and digestible perennial forage legume. On its own, it is considered a relatively low producing crop (5 t DM/ha/season) and can cause bloat in livestock. If it is included in a mixed sward with grasses, the chances of bloat are low. Its ability to fixate nitrogen will increase the quality of the sward and help to save on fertiliser costs. It thrives in cool and wet conditions and is therefore mainly produced under irrigation.

White clover has three-part green, heart-shaped leaflets that are typical of clover. These leaflets are smooth and have a white crescent in the middle. The flowers are also white and can sometimes have a pinkish colouration. White clover has a prostrate, stoloniferous growth habit which makes it less vulnerable to overgrazing and allows for good persistence under high stocking rates.

Other Characteristics

- It grows well with ryegrass, tall fescue and cocksfoot.
- It is excellent for soil stabilisation.
- It behaves as an annual in drier areas, regenerating from seed when conditions are favourable.
- It makes a good cover crop and can even be used as lawngrass.

Figure 2: A white clover and ryegrass pasture sward. Photo: Malissa Murphy



Growth requirements:

- Well-drained soil
- Soil pH (KCl) > 5.5
- 800 mm of rainfall per annum
- Establish late summer or early autumn.

Fun fact about white clover:

Clover was once believed to be a curative for heart disease because of their heart-shaped leaves.

Today medical labs extract a chemical called "coumarin" from clover which is used as a blood thinner.

Figure 3: White clover (*Trifolium repens*)
Photo: *www.identifythatplant.com*

How to distinguish between White and Red Clover?

- **White clover**'s leaflets are more round-shaped whilst the leaflets of red clover are more oval-shaped. White clover grows closer to the soil's surface and is thus shorter than red clover. Red clover generally has larger leaves and flower heads than white clover.

- **Red clover** is shorter-lived than white clover but has better summer production than white clover. Therefore, having both red and white clover in a pasture sward will increase the length of the sward's productivity.

Figure 4: Red clover has more oval-shaped leaflets than white clover. Photo: *www.identifythatplant.com* and *www.thinkingcountry.com*

Figure 5: A white clover and ryegrass pasture sward.
Photo: Malissa Murphy

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TREE OF THE MONTH

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Searsia erosa

Broom Karee, Besembos, Besemkaree (RSA Tree No.383)

The Broom Karee is a fairly common much-branched shrub to small tree that occurs in the eastern Karoo bioregion of the Northern, Eastern and Western Cape as well as dry grasslands of the Free State and Lesotho. This evergreen shrub prefers rocky terrain and can be found in large numbers on rocky hills and ridges throughout its distribution range. Large individuals can grow up to 4 m high with an impressive spread up to 9 m wide. Broom Shrubs are very hardy and can tolerate a wide temperature range as well as drought and frost. The scientific name, "*erosa*", meaning toothed or gnawed, refers to the plant's characteristic elongated leaves with its extreme jagged edges.

Figure 1: Example of its elongated leaves with jagged edges

Diagnostic features and phenology

- Much-branched, evergreen shrub
- Trifoliate olive green leaves with very long leaflets up to 13 cm long
- Leaflets are jagged/toothed
- The small greenish to white flowers are borne in loose, slender sprays and are present from late spring to summer (Oct-Dec)
- The drupes (fruit) are yellowish to light brown, hairless and carried during summer (Jan-Apr)
- Secretes clear latex when cut

Figure 2: Example of hairless drupes (fruit) Photo: *www.ispotnature.org/communities/southern-africa/view/observation/312266/searsia-erosa*

Figure 3: The Broom Karee often grows on slopes where it plays an important role in stabilising soil and protecting it against erosion. Photo: *https://www.ispotnature.org/communities/southernafrica/view/observation/312266/searsia-erosa*

Ecological value and uses:

The Broom Karee is not browsed by livestock or game but the fruit is eaten by birds. The shrub plays an important role in stabilising soils and preventing soil erosion, particularly on slopes where the species often grows. The bark and leaves are often used by the Basotho people to treat diarrhoea in both people and livestock. A study conducted by the University of Witwatersrand found that numerous chemical components found in the plant are effective against *Salmonella sonnei* and *Escherichia coli*. The plant grows extremely well and fast in gardens and ideal for use as a hedge plant. The branches and leaves were historically used as brooms, hence the common name of Broom Karee (Besemkaree in Afrikaans).

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To kill a grassland forb

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"[However,] for perennial herbs and shrubs, belowground is also the place where plants are safe from disturbances (e.g., fire, mowing, grazing) … or climatic adversities (e.g., drought, frost)." Klimešová et al. (2018, p. 3).

The ancient mesic grasslands of southern Africa were born in fire and are maintained by fire (Bond and Parr 2010). Grasses fuel the fires that remove their dry leaves, allowing fresh shoots to emerge into the bright light of spring. Fire maintains a productive grass sward and recycles minerals into the soil for regrowth. Although grasses dominate the biomass of grassland, most of the species (often more than 80%) occurring in mesic grassland are herbaceous forbs, not grasses. These grassland forbs not only survive fire but thrive, resprouting rapidly and flowering profusely after a burn. Many of the mesic grassland perennial forbs are geophytes, possessing an underground storage organ (USO) that provides the energy (non-structural carbohydrate), minerals, and water necessary to produce new growth in spring. These USOs – ranging in size and form from thickened rootstocks and rhizomes to larger corms and bulbs – enable forbs to get a head start before the slower-growing grasses close up the canopy, dimming the light available for forbs to grow.

Although mesic grassland geophytic forbs are fire-adapted, they are not resistant to overgrazing. Walking through an ungrazed (but regularly burned) or lightly grazed grassland, one would expect to encounter more than 50 forb species in a 100 square metre area of mesic grassland but will struggle to find more than 10 or 15 species in a similar-sized heavily overgrazed area (Scott-Shaw and Morris 2015). The first plants to be wiped out by chronic overgrazing are erect forbs, which have aerial parts most exposed and vulnerable to the teeth, tongues, and hooves of livestock while the last remaining are the few prostrate, mostly non-native, ruderal forbs that tolerate or escape extensive leaf damage (Chamane et al. 2017a; Morris 2019). Directing growth underground into roots and USOs, out of the reach of grazing and trampling livestock, does not, however, render a forb immune to disturbance as geophytes also decline with overgrazing (Scott-Shaw and Morris 2015).

A possible mechanism to account for the demise of geophytic forbs in heavily stocked or frequently mown grassland was explored by assessing the link between frequent growing season disturbance of the shoots and leaves of forbs and the size of their USOs. It was predicted that repeated disturbance of active green leaves should limit aerial growth and deplete underground stores, leading to diminished USOs and reduced regrowth potential in the following spring. A progressive decline in vigour under relentless recurrent disturbance could eventually kill a mesic grassland forb.

In a pot experiment, *Hypoxis hemerocallidea* (Figure 1), a common mesic grassland forb (which is one of the most widely used medicinal plants in the country), was subject to six severe defoliations during the growing season, removing almost all the leaf area each time (Figure 2a). *Hypoxis hemerocallidea* has a substantial corm (Figure 2c) which should enable it to withstand extensive and repeated leaf disturbance. Growth performance of clipped and unclipped plants (Figure 2b) during

Figure 1: *Hypoxis hemerocallidea* in a mesic grassland.

Figure 2: *Hypoxis hemerocallidea plants severely defoliated (a), undefoliated (b), corms and root (c), and defoliated and undefoliated corms (d).*

the first season and at the end of the subsequent spring (October) was compared and the relation between corm mass and above-ground (AG) growth assessed. Half the plants regrew in the dark under light-proof boxes to assess the ability of USOs to support new growth.

Some of the results of the pot trial were expected while others were a surprise (for the full results see: https://www.biorxiv.org/content/10.1101/2021.03.18.435941v1). Defoliated *H. hemerocallidea* plants were largely resilient, growing back rapidly after each cut, producing the same amount of total biomass (offcuts plus final harvest) as undefoliated plants during the first season. Defoliation did, however, reduce the number of leaves by approximately 60% and inflorescences by almost 85%. The effect of repeated, severe defoliation carried over into the following spring when the biomass production of clipped plants was reduced by a third, again with fewer flowers (Figure 3).

Plants that grew in the dark kept up with those that grew in full sunlight, confirming the importance of reserves in USOs for forb spring growth. The unexpected result was the marked reduction, by almost 55%, of corm mass under clipping (Figure 2d; Figure 3). Plants with larger corms produced the most AG biomass in spring.

The results of the short-term pot trial suggest that recurrent AG disturbance can markedly affect the USO of a forb, most likely because frequent defoliation requires plants to draw repeatedly on reserves in USOs for regrowth, with little chance for replenishment of stores. If such disturbance continues unabated, USOs will likely diminish, eventually losing their ability to sustain any new plant growth. Forbs with smaller underground stores (in rootstocks or rhizomes) than those in the large *H. hemerocallidea* corms would probably succumb relatively quickly to heavy grazing or frequent summer mowing, even if their leaf loss or damage is less than that implemented in this trial.

This study indicates that grassland forbs are highly sensitive to AG disturbance, despite having their growth reserves stored 'safely' underground. Consequently, careful management using moderate stocking rates with dormant-season burning and regular full-season rests, or infrequent mowing, is required to maintain forb plants and populations in a mesic grassland.

Once forbs are lost through overgrazing or below-ground disturbance by tilling, they do not readily return, even after many centuries of recovery (Nerlekar and Veldman 2020). Trampling by large, concentrated herds of cattle, as advocated by proponents of mob or high-density grazing (e.g., by Alan Savory), should never be applied to species-rich mesic grassland as such intensive stock-

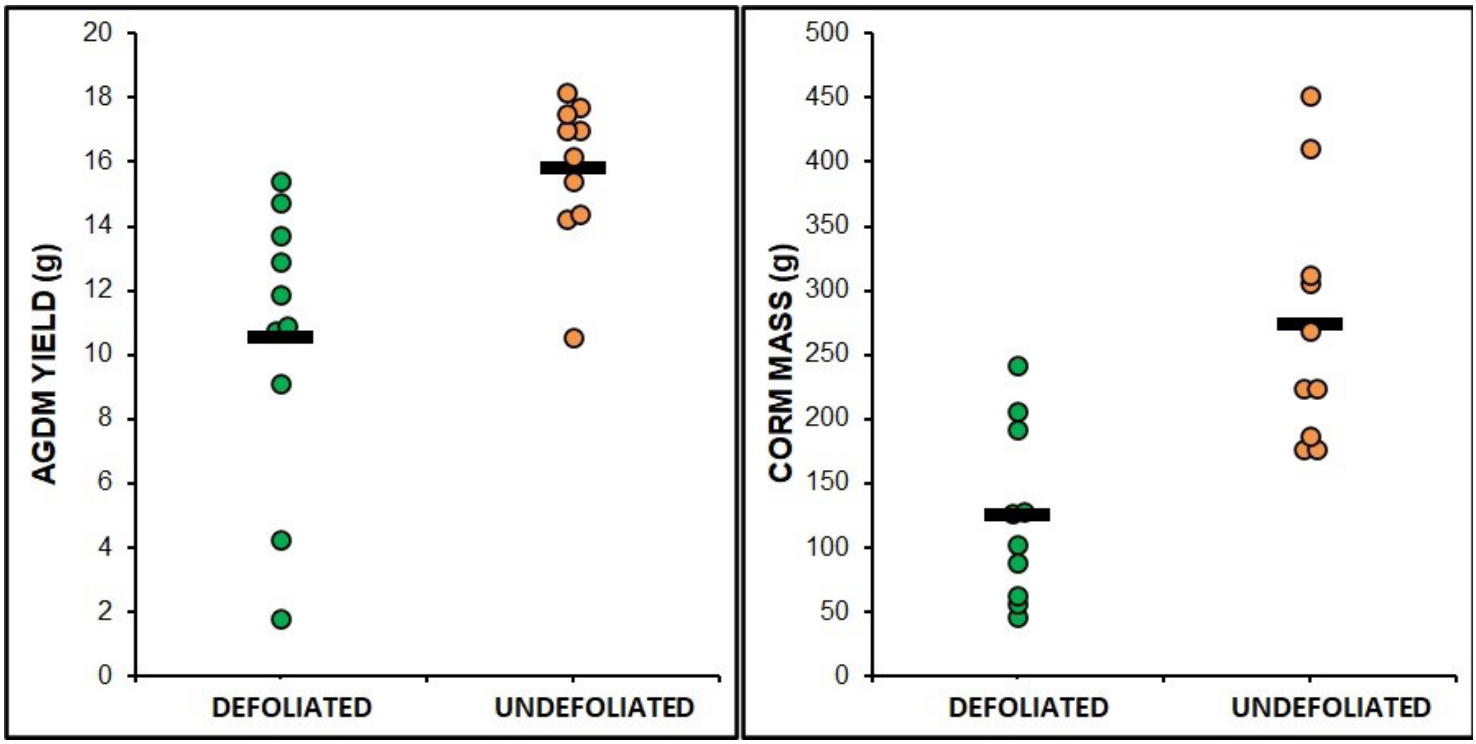

Figure 3: Above-ground dry matter (AGDM) yield and corm dry mass of defoliated and undefoliated *Hypoxis hemerocallidea* plants in spring.

ing can eliminate plants and substantially transform forb communities (Scott-Shaw and Morris 2015; Chamane et al. 2017b). Most (80%) of the biomass of grassland is hidden below ground (Ottaviani et al. 2020) and most of its species are not grasses, so grassland ecologists should aim to understand the whole grassland ecosystem, including forbs and their underground ecology. Research on this neglected, but vitally important, component of the grassland ecosystem deserves greater attention (Siebert et al. 2019).

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Early humans used fire to permanently change the landscape tens of thousands of years ago in Stone Age Africa

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Fields of rust-coloured soil, spindly cassava, small farms and villages dot the landscape. Dust and smoke blur the mountains visible beyond massive Lake Malawi. Here in tropical Africa, you can't escape the signs of human presence.

How far back in time would you need to go in this place to discover an entirely natural environment?

Our work has shown that it would be a very long time indeed – at least 85,000 years, eight times earlier than the world's first land transformations via agriculture.

We are part of an interdisciplinary collaboration between archaeologists who study past human behaviour, geochronologists who study the timing of landscape change and paleoenvironmental scientists who study ancient environments. By combining evidence from these research specialities, we have identified an instance in the very distant past of early humans bending environments to suit their needs. In doing so, they transformed the landscape around them in ways still visible today.

Digging for behavioural and environmental clues

The dry season is the best time to do archaeological fieldwork here, and finding sites is easy. In most places we dig in these red soils, we find stone artefacts. They are evidence that someone sat and skillfully broke stones to create edges so sharp they can still draw blood. Many of these stone tools can be fit back together, reconstructing a single action by a single person, from tens of thousands of years ago.

So far we've recovered more than 45,000 stone artefacts here, buried many feet (1 to 7 meters) below the surface of the ground. The sites we are excavating date to a time ranging from about 315,000 to 30,000 years ago known as the Middle Stone Age. This was also a period in Africa when innovations in human behaviour and creativity pop up frequently – and earlier than anywhere else in the world.

How did these artefacts get buried? Why are there so many of them? And what were these ancient hunter-gatherers doing as they made them? To answer these questions, we needed to figure out more about what was happening in this place during their time.

Figure 1: Today the shoreline of Lake Malawi is open, not forested the way it was before ancient humans started modifying the landscape. (Photo: Jessica Thompson, CC BY-ND)

Figure 2: Crew members excavate artefacts at a site in Karonga, Malawi, where stone tools are buried more than 3 feet (1 meter) below the modern ground surface. (Photo: Jessica Thompson, CC BY-ND)

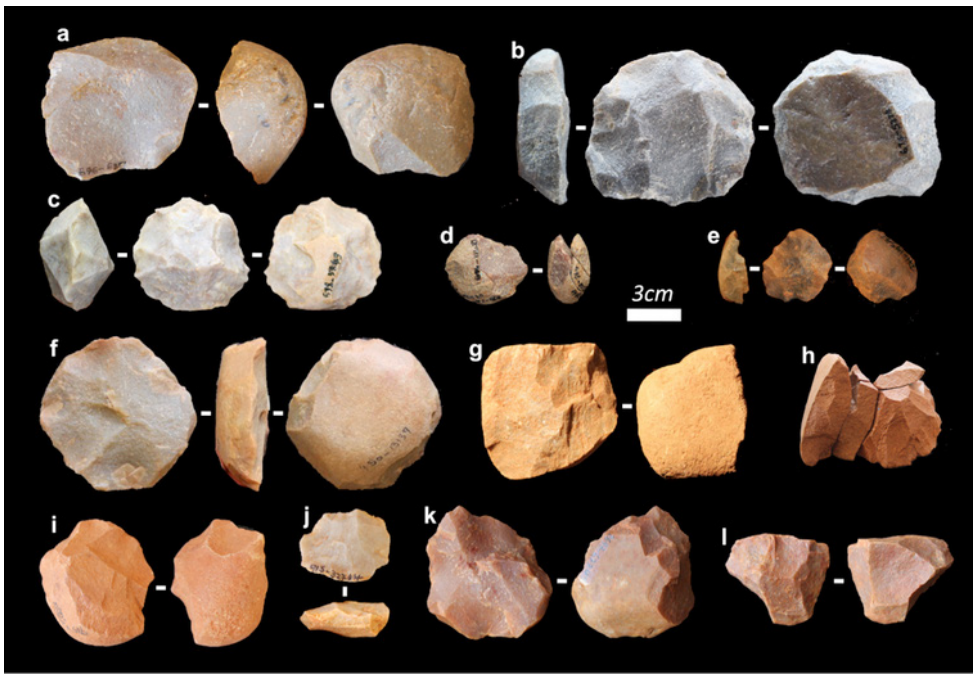


Figure 3: Middle Stone Age artefacts, some of which can be fit back together. (Photo: Sheila Nightingale, CC BY-ND)

For a clearer picture of the environments where these early humans lived, we turned to the fossil record preserved in layers of mud at the bottom of Lake Malawi. Over millennia, pollen was blown into the water and tiny lake-dwelling organisms became trapped in layers of muck on the lake's floor. Members of our collaborative team extracted a 1,250-foot (380-meter) drill core of mud from a modified barge, then painstakingly tallied the microscopic fossils it contained, layer by layer. They then used them to reconstruct ancient environments across the entire basin.

Today, this region is characterized by bushy, fire-tolerant open woodlands that do not develop a thick and enclosed canopy. Forests that do develop these canopies harbour the richest diversity in vegetation; this ecosystem is now restricted to patches that occur at higher elevations. But these forests once stretched all the way to the lakeshore.

Based on the fossil plant evidence present at various times in the drill cores, we could see that the area around Lake Malawi repeatedly alternated between wet times of forest expansion and dry periods of forest contraction.

As the area underwent cycles of aridity, driven by natural climate change, the lake shrank at times to only 5% of its present volume. When lake levels eventually rose each time, forests encroached on the shoreline. This happened time and time again over the last 636,000 years.

Harnessing fire to manage resources

The mud in the core also contains a record of fire history, in the form of tiny fragments of charcoal. Those little flecks told us that around 85,000 years ago, something strange happened around Lake Malawi. Charcoal production spiked, erosion increased and, for the first time in more than half a million years, rainfall did not bring forest recovery.

At the same time, this charcoal burst appears in the drill core record, our sites began to show up in the archaeological record – eventually becoming so numerous that they formed one continuous landscape littered with stone tools. Another drill core immediately offshore showed that as site numbers increased, more and more charcoal was washing into the lake. Early humans had begun to make their first permanent mark on the landscape.

Fire use is a technology that stretches back at least a million years. Using it in such a transformative way is human innovation at its most powerful. Modern hunter-gatherers use fire to warm themselves, cook food and socialize, but many also deploy it as an engineering tool. Based on the wide-scale and permanent transformation of vegetation into more fire-tolerant woodlands, we infer that this was what these ancient hunter-gatherers were doing.

By converting the natural seasonal rhythm of wildfire into something more controlled, people can encourage specific areas of vegetation to grow at different stages. This so-called "pyrodiversity" establishes miniature habitat patches and diversifies opportunities for foraging, kind of like increasing product selection at a supermarket.

Just like today, changing any part of an ecosystem has consequences everywhere else. With the loss of closed forests in ancient Malawi, the vegetation became dominated by more open woodlands that are resilient to fire – but these did not contain the same species diversity. This combination of rainfall and reduced tree cover also increase opportunities for erosion, which spread sediments into a thick blanket known as

Figure 4: The Viphya drill barge on Lake Malawi, where researchers braved waterspouts and lake fly swarms to obtain a long record of past environments. (Photo: Andy Cohen, CC BY-ND)

Figure 5: Today, the high plateaus of northern Malawi harbour most of the remaining forests that once extended all the way to the Lake Malawi shoreline. (Photo: Jessica Thompson, CC BY-ND)

an alluvial fan. It sealed away archaeological sites and created the landscape you can see here today.

Human impacts can be sustainable

Although the spread of farmers through Africa within the last few thousand years brought about more landscape and vegetation transformations, we have found that the legacy of human impacts was already in place tens of thousands of years before. This offers a chance to understand how such impacts can be sustained over very long timescales.

Most people associate human impacts with a time after the Industrial Revolution, but paleo-scientists have a deeper perspective. With it, researchers like us can see that wherever and whenever humans lived, we must abandon the idea of "pristine nature," untouched by any human imprint. However, we can also see how humans shaped their environments in sustainable ways over very long periods, causing ecosystem transformation without collapse.

Figure 6: Many people around the world still rely on fire for warmth, cooking, ritual and socializing – including the research crew when doing fieldwork. (Photo: Jessica Thompson, CC BY-ND)

Seeing the long arc of human influence, therefore, gives us much to consider about not only our past but also our future.

By establishing long-term ecological patterns, conservation efforts related to fire control, species protection and human food security can be more targeted and effective.

People living in the tropics, such as Malawi today, are especially vulnerable to the economic and social impacts of food insecurity brought about by climate change. By studying the deep past, we can establish connections between long-term human presence and the biodiversity that sustains it.

With this knowledge, people can be better equipped to do what humans had already innovated nearly 100,000 years ago in Africa: managing the world around us.

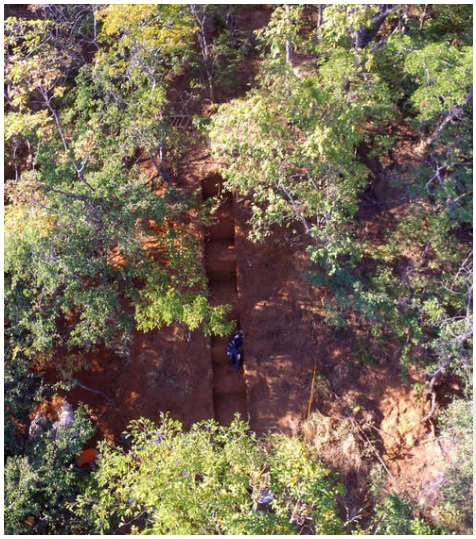


Figure 7: The research team exposes ancient stone tools near Karonga, Malawi. (Photo: Jessica Thompson, CC BY-ND)

Figure 8: Open woodlands have grown over alluvial fans that formed during the Middle Stone Age. Trenches such as this one at an excavation site show multiple layers of discarded artefacts over a period of tens of thousands of years. (Photo: Jessica Thompson, CC BY-ND)

Global Recognition of Rangelands

Anne Gondor

Current Address: University of Arizona

Reprinted from: The Rangeland Partnerships Newsletter

In addition to the International Year of Rangelands and Pastoralists, a convergence of global international efforts are putting rangelands on the map.

The newly launched online Rangelands Atlas was developed by the International Livestock Research Institute (ILRI) in collaboration with FAO, IUCN, WWF, UNEP and ILC Rangelands Initiative with major funding coming from the CGIAR Research Program on Livestock.

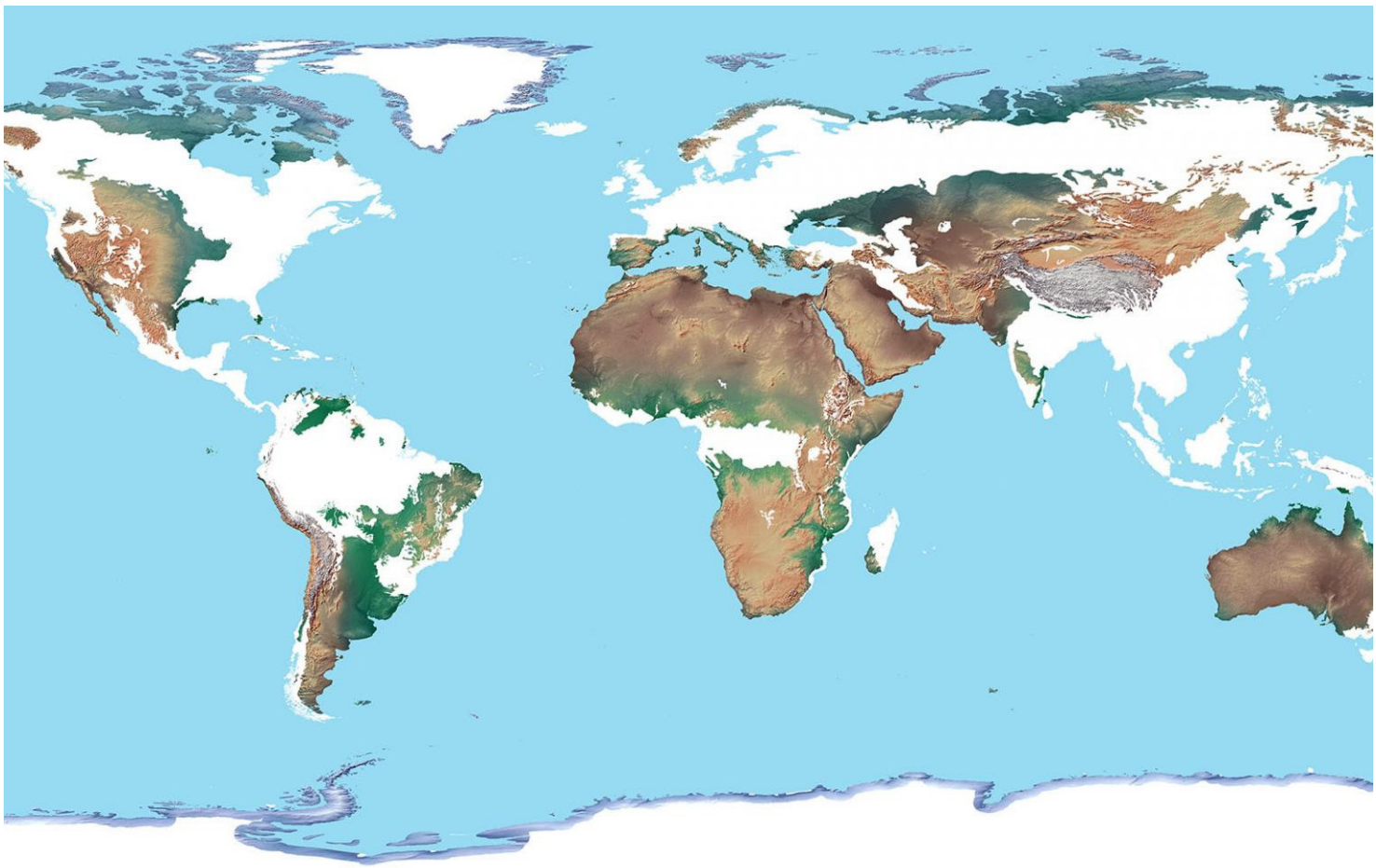
The atlas represents the first combined effort to map the full global distribution of rangelands to help bring to light data gaps in our knowledge. The Atlas also includes 15 maps that evaluate aspects of rangelands such as biodiversity, protect areas status, changes in land cover as well as future projections due to climate change.

See the live-streamed launch event recording as well as a testimonial video about the Atlas.

The World Wide Fund for Nature (WWF) Global Grassland and Savannah Dialogue Platform is an international exchange of knowledge on grasslands and savannahs and a forum for bringing awareness of these systems into global policy and advocacy projects.

One example of this is to highlight the gap that rangelands and grasslands are not included as land cover types recognized for the nationally determined contributions (NDCs) that nations agree on to satisfy their emissions reductions of the Paris Agreement.

Another result is the Advancing International Action for Rangeland Restoration report that identified challenges and opportunities to help advance rangelands restoration efforts internationally through the UN Decade for Ecosystem Restoration.



Guardians of the Karoo Rangelands

Julienne du Toit

Current Address: Karoo Space – At the Heart of South Africa

Reprinted from: https://bit.ly/3x6qzqF

Think Prairies. Think Steppes. Think Australian Outback. Think Great Plains, Pampas, Grasslands and Savannah. Think Karoo and Kalahari. In other words, consider all the places that South Africans might conceivably call veld.

These are the rangelands of the world, covering more than half the Earth's dry surface. This is where livestock, farms and people intersect with wild places and creatures. These are areas that are critically important in terms of food security, biodiversity, carbon capture and water storage.

According to the Agricultural Research Council, rangelands cover around 70% of South Africa's surface, and are essential for producing affordable food. The ARC's Rangeland Ecologist, Dr Igshaan Samuels, reports that South Africa's veld is forage for 13 million cattle, 20 million sheep, 2 million goats and at least 40 species of game animals.

Karoo Bucks the Trend

As with the rest of the world, South Africa's rangelands have been degrading, eroding, quietly unravelling as topsoils wash away and grasses thin out. The experts call it desertification. For decades, it was thought to be a process that could not easily be reversed.

But there are a few areas in the world bucking the trend, and one of them is in the Karoo. Regenerative land management seems to have sunk its first and strongest roots in Southern Africa, more specifically, in a few dozen farms around Graaff-Reinet.

Here, bare earth that was once crusted and impenetrable to seed and water is steadily being covered with vegetation, the soil soft, carbon-rich and moist. Climax grasses that haven't been seen in decades are popping up, along with vleis and springs of good clear water.

All this in the midst of the worst drought in living memory.

Figure 1: Holistic Management or Regenerative Agriculture helps revitalise soils, capture carbon, increase food security and store water.

Figure 2: Too many animals left on veld for too long a time left it impoverished and heading towards desertification, said Acocks.

Figure 3: The Karoo was once the scene of unimaginably large springbok migrations.

Figure 4: The first rule of regenerative agriculture is to make sure the soil is covered.

Figure 5: The Karoo was once the scene of unimaginably large springbok migrations. Livestock can ruin the land. But with the right grazing regimes, they can also dramatically improve it.

Graaff-Reinet is also where the world's first Herding Academy was founded in 2018.

This rise in regenerative land management began in the 1950 and 1960s. Two men were to play a major role in this revolutionary agricultural ethos, one from Zimbabwe, and the other a son of the Karoo.

Understocked and Overgrazed

John Acocks was born in Middelburg, Eastern Cape, in 1911. After completing his Masters in botanical studies, he began work for the Department of Agriculture, doing veld surveys across the entire country. In 1953, he published his best-known book, The Veld Types of South Africa.

While striding across the countryside, literally and intellectually outpacing his research assistants, Acocks worried more and more about the loss of perennial, climax grasses, particularly in his home turf of the Karoo. He saw how sheep returned again and again to palatable plants, grazing them repeatedly until their rootstock was damaged and they died.

Back then, the academic wisdom was that veld quality would decline every year, and there was nothing anyone could really do about it. In the wetter parts of the world, like Europe, allowing the land to lie fallow and ungrazed would heal it. That didn't seem to work in the drier, more brittle areas like the Karoo and Kalahari.

By the 1960s, Acocks had come to the conclusion that South Africa was "understocked and overgrazed". This ran completely counter to the conventional conclusions that veld degradation was caused by overstocking.

Overgrazing was a function of time, not numbers, he said. Leaving a few animals on the veld over a long period of time meant they just kept returning to the palatable plants and slowly degraded the biodiversity of the veld.

Yet there was once a time when millions of animals roamed the Karoo. How did the veld sustain them?

The Springbok Solution

Springbok were once synonymous with the Karoo. Until 1896, massive springbok migrations used to move through from the southern Kalahari into the Karoo at erratic intervals, following rain and fresh forage. In their wake, they would leave the veld crushed and devastated, covered in hoofprints, dung and urine. In the following rainy seasons, the bossies

Figure 6: The only Herding Academy in the world, just outside Graaff-Reinet.

and grass would bounce back dramatically.

To mimic these vast herds of wild animals, Acocks supported putting large numbers of livestock on a piece of land for days rather than weeks, months or years. While fertilising the veld on a grand scale, they would keep moving and would eat nearly every plant, palatable and unpalatable. Then they would be moved off to allow the earth to repair itself.

Acocks coined the term Non-Selective Grazing for this method of rebooting the veld. He said it would stabilise the soil, bring back climax grasses and palatable shrubs, and restore the health of the groundwater system.

"NSG is simply Nature's method of grazing," Acocks stated in 1966.

Rebooting the Veld

Meanwhile, Allan Savory was a young biologist in what was then Northern Rhodesia, working on conservation and the creation of national parks in the 1950s. Seeing the condition of veld deteriorating, he was part of a team that concluded that the presence of too many animals was to blame. As a result, around 40 000 elephants were culled over a number of years.

In a 2013 TEDTalk, seen by more than 7.5 million viewers, Savory confessed that this decision was the saddest and greatest blunder of his life.

Figure 7: Sholto Kroon, on Klipdrift farm, part of the Camdeboo Conservancy.

The condition of the veld, he said, "got worse, not better. But one good thing came out of it. It made me absolutely determined to devote my life to finding solutions".

What he came up with was a theory he called Holistic Management, or as he saw it, a way to reverse the desertification and land degradation that affects two-thirds of the planet's landmass, to absorb carbon and reverse climate change, to store groundwater in arid regions, to restore the earth while at the same time securing food supplies and generating fair incomes.

The spellbound audience present at the TEDTalk gave him a standing ovation. The method he proposed?

"The only option was to do the unthinkable, to use livestock, bunched and moving as a proxy for the former wild herds and predators, and mimic nature."

As Savory, Acocks and others would prove time and again, putting livestock put onto degraded land at high densities for a short amount of time (typically three to eight days) can transform it with startling rapidity. Within weeks of subjecting the earth to this intense high consumption, high fertilisation and trampling, the seeds and bossies start to grow, especially if there are good rains. The trampled crust is softened

Figure 8: Angora goats, on their way to be shorn on Klipdrift farm.

Figure 9: Rolie Kroon, among the first regenerative farmers in the Karoo.

Figure 10: The unusual sight of clear water, vlei grass and a frog in a livestock watering trough on Excelsior.

and transformed. Flattened plants act as mulch and seedling nurseries.

It is no accident that the bacteria in the soil (which are critical to its health) are related to the bacteria in the guts of grazing animals. The roots trap carbon in the subterranean levels of the earth and provide pathways to absorb water. Even if those grassroots die in a year or two, their prolific root system containing all the carbon remains underground where it can do the most good, removed from the atmosphere.

Rooted in the Karoo

Acocks became a friend and mentor to Paul McCabe of St Olives farm, north of Graaff-Reinet, off the Murraysburg road. Oom Paul was a legend around Graaff-Reinet until his death in 2017. His farm is now the home of the holistic regenerative training hub, The Herding Academy.

The land McCabe had inherited was damaged, with enormous bald stretches of hardened earth and many erosion dongas. He made it his life's work to repair it.

He implemented the Acocks system and was staggered to see how well it worked. In an interview with Landbou Weekblad magazine in 2015, McCabe said one of the incredible benefits was the rising of the water table.

Figure 11: Rolie Kroon, Masters student at NMU Sarah Cromhout, and Johan Bouwer at St Olives Farm, with Professor the bull mastiff. Sarah is doing her thesis on the short-term (six month) effect of high densities of sheep on the vegetation composition, landscape functioning and soil properties of the Nama Karoo.

"We used to drill down to 100 metres to get water. Now it is mostly only six metres below the surface. Acocks predicted that would happen. He also said the old dried-up wetlands would return, and they have. Vleis are incredible natural sponges that store water until it is needed."

Both Acocks and Savory would go on to influence the thinking of many farmers around Graaff-Reinet, long before the latter went overseas to America and formed the Holistic Management Institute. Regenerative Agriculture has been rooted for several generations in the Karoo, while other areas in the world are only starting now.

Among the first farmers to use Savory's Holistic Management on their farms in South Africa in general, and the Karoo in particular, were brothers Sholto and Rolie Kroon.

Savory and the Kroons

Their parents, Malcolm and Wendy Kroon, had become firm friends with Allan Savory while Savory was still in what was then Northern Rhodesia, and the Kroons were farming in South West Africa, now Namibia.

In the 1970s, Malcolm and Wendy left Namibia to take over a family farm called Klipdrift in the Karoo's Camdeboo Conservancy, south-west of Graaff-Reinet. This would become the first 're-generative farm' in the Karoo.

On Klipdrift was a huge strip of land that was in particularly bad condition, riven by great dongas and huge bare patches.

"My dad couldn't drive on it at all," says Sholto. "We could barely traverse the dongas on foot. But now the veld has flattened and it is 'vlei-ing'," he says. Vlei-ing?

He explains: "We are managing to catch the seeds, retain the soil and water, and the dongas have filled up. The bare patches are steadily disappearing. We have watervleis (small wetlands) popping up everywhere."

In some places, at the base of a fence, he can point at an old fence post poking up, barely shin-high, nearly covered by new topsoil. The new fence is atop a full metre of newly settled soil.

Sholto, who farms with sheep, Angora goats and cattle, is elated at the return of the topsoil, and creatures like moles. They aerate the earth, he says.

"We also have a Masters student looking tiny micro-organisms like springtails in the soils."

In 1990, Sholto's brother Rolie took over Excelsior Farm north of Graaff-Reinet, just under the imposing Nardou mountain in the Voor-Sneeuberg. It is part of a critically important catchment where both the Great Fish and the Sundays Rivers rise.

"It was June and my mom dropped me off here leaving me with a tractor and a horse for transport. Excelsior is 5 400 hectares. It had seven camps, no pipelines, 50% of it mountain lands, no roads. The windmills were so ancient they were literally made of wood.

"I did all my work on horseback. The house had no running water and the veld was shot."

A Solar Farmer

Like Sholto, Rolie used Savory's methods of small camps, intensive grazing and then long periods of recovery – at least a rainy season. He takes us to a valley that was once bare and exposed, the soil hard. Now a herd of cows grazes contentedly, surrounded by thick grass, near a small dam of water that is gin-clear. A watchful frog floats just above the vlei grass in the trough.

Figure 12: The Camdeboo Conservancy, south-west of Graaff-Reinet.

Figure 13: Trenly Spence of Kriegerskraal Farm.

Figure 14: Dave Stern has seen the long-term benefits of Holistic Management.

Figure 15: Carbon credits are a potentially lucrative reward for farming with nature, says Rolie Kroon.

Figure 16: James Brodie and three-legged dog Emma of Doornplaats Farm, herding 2000 sheep and a dozen alpacas.

"About ten years ago, if we had as little as 10 or 20 mm of rain, it would run off and form washaways and floods. If you leave soil bare, more than 87% of the water runs off. You have to stop a raindrop where it falls. If it moves, it takes soil with it."

Now the land is thickly covered in a luxuriant cover of grass and dwarf shrubs.

"My children and I came out here recently and counted all the different species in an area we could span with our arms. Each of us identified around 18 species each."

The water flows slowly underground through the best filter in the world – healthy soil. It emerges at a poplar grove-lined dam near the farmstead, completely translucent.

Rolie refers to himself as a solar farmer.

"I harvest the sun via the grass and cows and make money from it. We get sun, plants and rain for free. Each plant is a spaza shop, absorbing carbons that feed the microbes. The more microbes, the more humus, the happier everything is."

Rolie is now one of the instructors at the Herding Academy on St Olives Farm, which has become something of a showcase for veld restoration.

The Herding Academy

St Olives plays an important part in this story.

Johan Bouwer, also mentored by Oom Paul, bought St Olives Farm and starting the Herding Academy thereafter McCabe's death in 2017. Johan's vision was to mimic natural migrations by using domestic livestock within a wildlife reserve. This was a first in South Africa.

The Academy also offers the only accredited Herding course in the world.

It teaches young livestock handlers and farm workers from all over Africa how to reinvigorate and heal the veld using cattle or sheep. Along with the Tracker Academy, the Herding Academy falls under the SA College for Tourism (SACT).

All three training institutions are supported by the Peace Parks Foundation. The Herding Academy course is also backed by Conservation South Africa.

The herders are taught animal husbandry, how to work according to a grazing plan, learning the practice and theory of holistic veld management over several months.

Bunching animals and moving them across the veld, confining them at night with movable gates and fences has become a way of using Holistic Management (or Non-Selective Grazing), conveniently without the expense of fencing and watering dozens of small paddocks.

More recently, the Herding Academy has begun to offer short courses, including a five day Executive Regenerative Land Management Course. They have proven to be extremely popular.

"This is one of the most exciting and mind-challenging experiences any land-owner, manager, conservationist or decision-maker will experience," says Johan. "It is changing the way we think about land management forever."

Holistic Management spreads

Trenly Spence of Kriegerskraal, also part of the Camdeboo Conservancy, started farming after his father became sick in the late 1980s. He had been studying horticulture in Cape Town.

"The veld was my passion. I had to learn my job fast, so I went around to see which farms looked the best. One of them belonged to my neighbour, Norman Kroon, Malcolm's brother.

"I'd always felt as if there was something

Figure 17: James Brodie, with the Camdeboo Conservancy behind him.

missing in our understanding of the veld and livestock. When Norman explained that overgrazing was a function of time, not the number of animals, this lightbulb went on in my head. Finally it made sense. I wanted to tell everyone."

Trenly set about using Holistic Management principles to regenerate the grazing on his farm for his Nguni cattle. When he started, the carrying capacity was one large livestock unit for every 28 hectares. Now thanks to the work he had done on the veld, it is around one for every 8 hectares.

Dave Stern is in the process of taking over farming from his father Doug Stern at Rietpoort, down the road from St Olives.

"Thanks to all the work my dad did to restore the veld using Holistic Management (HM), we have been given this massive gift: a fountain popped up two years ago, in the middle of the drought, and has been flowing constantly ever since. We were able to install a weir and use the water to grow lucerne for ewes and lambs."

He bends down to pick up a cowpat, turns it upside down to show how it is riddled with holes – dung beetles have been industriously burying this nutrient-rich stuff underground.

"We can't do without these guys, or the bees or the ants. That's why we don't spray against locusts. A massive swarm covered all the bossies here. But look what they left us," he says, showing us the locust frass, which looks like pale wheat grains, thinly covering the earth.

"When locusts come, we work it into our plan, and we are responsive. HM gives us the tools we can use to implement decisions."

Dave is also elated about the climax grasses that have emerged after the generous rains that fell at the beginning of 2021.

"We were on the brink of organising feed for our livestock. Then the rains fell and these top-class grasses sprang up: *Digitaria*, *Panicum maximum*, blue buffalo grass – plants that haven't been seen here for decades."

Carbon Credits

Rolie sees immense potential in carbon credits for good rangeland management.

"It stands to reason that if we ensure that our plants are healthy and numerous we will be able to create a greater mass of life via growing plants, which will, in turn, enable the land to support more animals (above and below ground), which will enable the land to hold more water and store more carbon, without relying on addictive inputs to falsely underpin the mechanics of food production.

"Well-managed grasslands will optimise the use of available rain and sunlight, and in so doing will sequester millions of tons of carbon. Savory said in his TEDTalk that if all grass farmers increased their soil organic matter by just 1%, global CO_2 levels will revert to pre-industrial levels."

The other, more common way of 'rebooting the veld' is by burning it to get rid of moribund, woody vegetation. But Rolie points out that this leaves bare earth.

The vegetation then changes to fire-dependent species, encouraging unpalatable grasses like suurpol, and worse still, "one hectare of grassland fire releases more climate-changing gases than 6 000 cars. According to Allan Savory, we burn over a billion hectares a year in Africa."

He later sends a link to an article about an Australian farmer who is being paid lucrative carbon credits by Microsoft for sequestering 40 000 tonnes using these very methods of responsible rangeland management: "time-controlled rotational grazing, increased stocking density and decreased paddock size".

Woolly Beasts on a High Plateau

Oom Paul McCabe also mentored James Brodie on nearby Doornplaats, on the road between Graaff-Reinet and Murraysburg.

He takes us to a high grassy plateau where we glimpse 2 000 sheep and a dozen Alpacas grazing in the distance. "I could bring them closer," offers James helpfully.

He and his three-legged kelpie dog Emma head off at a brisk walk, leaving us to admire the Camdeboo Conservancy valley on one side, and the purple mountainscapes leading to distant Graaff-Reinet on the other.

Within minutes, the sheep hove into view, tightly bunched as a woollen carpet. In the middle are the slightly disconcerted alpacas, their heads swivelling atop long woolly necks to keep an eye on Emma as she runs from side to side behind the flock, guided by whistles and commands from James.

We follow in the flock's wake, the humus and vegetation thick under our boots. James bends to pick up sheep droppings and shows it to us with every evidence of pride.

"What we're looking for here is good moisture and consistency in the dung, which means their digestion is good. Gut or rumen health is critical. This paddock is around 20 hectares. They'll be here for a total of three days and then we'll move them to the next camp. We'll leave this one to recover for another 362 days.

"What we try to achieve is to graze with as many animals as possible for as short a period of time followed by as long a recovery period as possible. This allows us to benefit from maximum animal impact followed by a long period of recovery. We use a grazing chart to plan the grazing and it is our way of attempting to mimic nature. One of the spin-off benefits of frequent paddock moves is that it also helps break the parasite life cycle."

Using Holistic Management principles – and more than 50 km of pipelines for stockwater – James is now able to operate at higher stock densities allowing much greater animal impact than historically when stock water supply was often a limiting factor.

"The long-term benefits being seen are a positive grass species succession, improved ground cover and associated improvement in overall carrying capacity," he says.

Farmers Make the Difference

"We are extremely lucky to have these forward-thinking and community-minded farmers around Graaff-Reinet," says Johan Bouwer. "They benefit the town in so many different ways – from the food parcels they quietly organised during the drought and COVID-19 lockdown, to the region's food security.

"There is immeasurable value in having farmers who are highly productive and who also safeguard critical resources like water and soil."

His views are echoed by Derek Light, head of the Graaff-Reinet Economic Development Forum.

"Karoo towns, in particular economic hubs like Cradock and Graaff-Reinet, are largely dependent on the agricultural industry to be sustainable. Agriculture is the biggest industry in the Karoo and makes a meaningful contribution to food security in the country, supplying over 50% of South Africa's red meat, a large percentage of the country's wool and is also the world's largest mohair producer.

"The CSIR did a Strategic Environmental Assessment on the Karoo in the last five years and found that farming in the Karoo employs up to 100 000 people, and sustains a further one million.

"For these industries to be sustainable, responsible farming practices are essential, particularly in a brittle environment like the Karoo."

For more information see herdingacademy.co.za.

Photographs by Chris Marais

Figure 18: Derek Light of the Graaff-Reinet Economic Development Forum.

Regenerative farming: When agriculture & tech connect

Carin Venter

Current Address: Stockfarm
Reprinted from: https://bit.ly/3hYlLPU

Crowned as the Eastern Cape's Agri SA Toyota Young Farmer of the Year in 2015, Paul Collett of Speelmanskop Farming in Cradock aspires to progressively build an environment with biologically balanced soil, radiant crops, productive livestock and fulfilled people.

Paul completed his MSc in Aquaculture at Rhodes University before returning to the farm. Following in the footsteps of his father, David Collett, who dedicated his 42-year farming career to restoring natural ecosystems and hydrating the landscape through strategic fencing and dam building, Paul has taken regenerative irrigation farming to the next level since taking the lead in the business in 2013.

"I like to encourage young farmers to participate in processes such as the Young Farmer competition, as it forces them to conduct an in-depth evaluation of their business," says Paul during Stockfarm's visit to the Karoo farm with its abundant veld and fast-growing pastures.

"Project evaluation leads to a thorough self-evaluation. I have learned about my strengths, weaknesses, opportunities and threats. I was forced to work out policies and develop systems, spreadsheets and algorithms. The real reward of participation comes from going through the valuable process of in-depth business analysis, not from winning the prize that's at stake."

Emphasis on genetic make-up

Thanks to this introspection process, Paul realised that, although a passable livestock producer himself, he was more inclined to crop farming and that Speelmanskop needed a natural stockman to make effective use of resources.

Paul consigned the management of the livestock section to Jaco de Villiers who, at the time, was employed by a well-known Bonsmara stud breeder in Limpopo. "I noticed that Jaco had a seriously good eye for livestock, having done as well as he did and by helping to develop that stud to excellence. I knew he would be able to help build our business successfully," says Paul.

Figure 1: Ultra-high-density (UHD) grazing of 30 minutes per block tramples vegetation and allows nutrient recycling, turning the sheep into a 'bio-digesting fertiliser producing machine'.

Jaco has 14 years of experience in livestock production and has been managing the Speelmanskop Angora goats, Dohne Merino sheep and Red Angus cattle for the past four years, with a focus on building their genetic make-up. He says Paul had a theoretical plan about the livestock and of what he wanted. "He had created a 'best management practices manual' specifically for Speelmanskop, which has been a tremendous help to me in understanding his objectives, policies and historical knowledge, especially in the beginning."

This manual is a living document and the record of information on the best management practices for Speelmanskop will be available in the event of sickness, retirement or death so that the farm can continue to build on past suc-

Figure 2: The formidable team of Paul Collett (left) and Jaco de Villiers (right).

cesses instead of reinventing the wheel with each management change.

A division of responsibilities

Paul manages the irrigated pastures, feed production and cash crops, as well as the finances, marketing and business aspects. Jaco's responsibilities include the nutrition and health of livestock, as well as grazing management – Paul's role in this regard is basically only as a director in his enterprises.

Paul believes the business is big enough for both to each take responsibility for their own divisions and manage it according to their respective strengths. Concerning strategic decision-making, they usually converse to develop solutions in the best interest of the business.

They have faith in regenerative agriculture and utilise resources as sustainably as possible. Paul explains how they build irrigated pasture soil by managing the sheep in big groups to employ high-density grazing – sheep spend no more than 72 hours on any specific pasture within one growth cycle of 21 to 50 days. Through this, they have increased the carrying capacity to 58 sheep/ha during the summer months.

"The nutritional status of the pastures is improved by increasing species diversity, harvesting carbon from the atmosphere through photosynthesis on various levels and thereby improving soil balance. By using cover crops, we have increased our sheep's out-of-season conception by over 200%."

Developing on-farm trends

A particular segment that assists them in measuring improvements on the farm is the radio-frequency identification (RFID) tag system that produces huge amounts of data. Jaco is convinced that the method of managing this information is key to its successful implementation in a business. "We are still determining the type of on-farm data we produce which will enable us to build a model to continuously benchmark our livestock against our own standards."

In addition to the RFID system, they use technology such as AgriWebb, an agricultural and livestock farm management software programme that allows one to keep record of every aspect of the livestock business via a cell phone. The management software allows them to monitor grazing at various levels, such as evaluating growth trends, dry matter production, pasture growth rate, days since grazed, treatments of individual animals and reporting.

"We see it as a rapid field of growth in the business as it helps us to develop algorithms that will improve genetics, management and production. With platforms such as this one, we are able to collate important information to develop our on-farm trends."

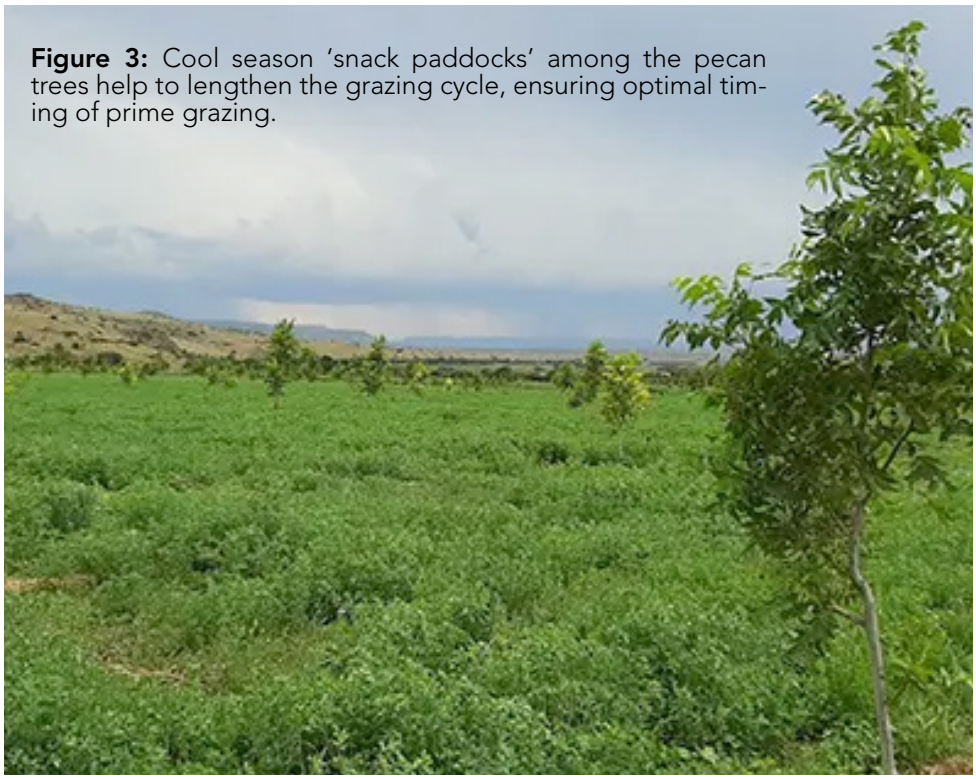


Figure 3: Cool season 'snack paddocks' among the pecan trees help to lengthen the grazing cycle, ensuring optimal timing of prime grazing.

Measuring progress

Additional benefits of the technology include that you can follow individual animals' progress in the feedlot, as well as make strategic decisions regarding feed options and the marketing strategy. It allows for full traceability of all animals on the farm. One can also keep track of growth and treatments to develop early warning triggers such as parasite infestations and nutritional shortages, quantify the production of marketable produce such as fibre or offspring, and establish trends and relationships between weight and fertility.

The software programme helps Jaco to keep a daily tally in addition to his traditional Excel-based stock counts list that he updates weekly, including the number of animals in the various camps on the farm. The feed inventory permits him to notify Paul timeously about the type of feed mixes that will be needed, while also providing information on the amount of feed each animal receives daily.

Distinction through partnerships

Paul and Jaco are involved in various informal partnerships with other producers in the area, such as their Angora partnership with William Copeman from the farm Rooiberg. Rooiberg is more suited to the kidding process and rearing of young goats, while the ewes are brought back to the veld at Speelmanskop once their kids are weaned. The kids usually remain on Rooiberg until they are big enough not to fall prey to predators.

Both farms are able to keep meticulous records of input costs and livestock movements between the farms. "This is a win-win situation for the goats, eliminating the shortcomings on both farms," says Paul. "All decisions are based on what is best for the goats. Rule number two is that we accept each other's mistakes and don't point fingers at each other's management styles."

They are all in favour of shared knowledge to help improve agriculture, particularly on the regenerative and technological front, as well as keeping up to speed with international trends on topics such as carbon building and international best practices on the wool and mohair front.

"We do not keep trade secrets to ourselves. Our competitive advantage is in making the best use of resources and opportunities on our farm, not in the knowledge itself," reflects Paul. "We believe that success follows happiness and money follows success, meaning that all we need to focus on is enjoying farming and what it entails."

For more information, contact Paul Collett at paul@speelmanskop.co.za, or Jaco de Villiers at jaco@speelmanskop.co.za.

Sheep vs. Lawnmowers: UC Campus Tests Which is Better to Maintain Grounds

Good News Network

Current Address: University of California - Davis Campus
Reprinted from: https://bit.ly/3BtOe7Y

Sheep were grazing the University of California–Davis campus this week in an academic experiment to see if the ewes can eat weeds and grass, fertilize, and control pests, as well as—or better than—using conventional landscaping methods.

The woolly ewes are part of a multidisciplinary study to explore the possibilities of saving the campus money and resources at the same time.

"My interest is taking the science on green infrastructure and sustainability and designing it so it's interactive, beautiful and practical," said A. Haven Kiers, assistant professor of landscape architecture in the College of Agricultural and Environmental Sciences, who is leading the project.

Kiers has hired student sheepherders to watch over the sheep's three-day stay on the grassy area along Old Davis Road, adjacent to the UC Davis Arboretum.

Kiers is a longtime proponent of green infrastructure such as green roofs you can grow plants on, and urban landscapes that are aesthetically pleasing as well as ecologically productive. The grazing sheep pilot project is a natural outgrowth of that research.

She said she is bringing to the campus her concept of Nature HEALS (for health, engagement, aesthetics, landscapes and sustainability) to emulate a historical practice throughout France—and even at the White House and in Central Park—and bring a pastoral setting to UC Davis, and hopefully spawn that idea for other campuses and municipalities at a grander scale.

The sheep put in a full day's work from Wednesday to Friday this week, snacking from 8 a.m. to 5 p.m. For the control, the adjacent traditionally landscaped acre of grassland was maintained by campus in the usual way. The grass height and condition will be assessed on each site before and after grazing.

There are four breeds of sheep, that are all being used for their wool, taking part in the study: Suffolk, Hampshire, Southdown and Dorset, said Matthew Hayes, who manages the sheep for UC Davis.

No worries about cleanup, either. "It (the manure) only stays for 10 days, and it actually attracts insects that are beneficial for the landscape."

In a proposal she presented to campus, Kiers said, "Sheep can eliminate invasive plants and restore native grasses, reduce carbon emissions, introduce beneficial insects attracted to their waste products, and improve soil health without compacting the soil. Culturally, the addition of sheep to a green space can add pastoral beauty to a site, provide a sense of place, inspire urban agritourism, serve as a living educational tool, and promote mental health."

There is, however, little peer-reviewed evidence to support those claims as they apply to urban lawn landscapes, she added. Kiers aims to change that with her research, which will continue intermittently throughout the summer—and she hopes to spread the idea to other parts of campus—and the world—in the future.

Southern Africa's 'water tower' slipping towards ecosystem collapse

Sheree Bega

Current Address: Mail and Guardian
Reprinted from: https://bit.ly/3BLPbc6

Southern Africa's "water tower" — the majestic Maloti-Drakensberg mountain range — is slipping towards a state of ecosystem collapse, with grave implications for water security.

According to Dr Ralph Clark, the director of the Afromontane research unit at the University of the Free State, the Maloti-Drakensberg range is the largest provider of freshwater in the region, and its alpine system is crucial to this function.

An alpine environment is cold, windy, snowy and characterised by low growing-season temperatures and a short frost-free period, according to ScienceDirect.

"But it (Maloti-Drakensberg) is under tremendous pressure from intense communal rangeland degradation. If the alpine system collapses, water production will be detrimentally affected," says Clark.

The Maloti-Drakensberg is a critical water source area, supporting nearly half of South Africa's GDP, supplying Gauteng with 34% of its water and Bloemfontein with 70%.

The problems facing the mountain ecosystem are neither simple nor driven by a single cause, Clark says. "You've got immediate local-scale impacts and global impacts such as climate change. When you're dealing with a mountain system like the Maloti-Drakensberg, it's about 40 000 km^2," he told the Mail & Guardian.

Figure 1: A Basotho horseman rides a horse along the road leading to the Maluti Mountains. (Photo by Marco Longari/AFP)

The mountain system is shared between South Africa and Lesotho, and in South Africa, between three provinces — the Free State, KwaZulu-Natal and the Eastern Cape.

"So you've got local actors doing different things, having different impacts that are positive and negative. If you take the Basotho herding situation for instance, you've got very, very poor people living in the mountains in a very desperate situation, with herding as one of their only livelihood options, using the alpine pastures in summer."

But this is not sustainable as the numbers of animals are too big for the available mountain pasture.

"The pressure is high, which leads to a reduction in vegetation cover, which leads to soil erosion. One of the biggest problems is the loss of wetlands in the alpine zone, so your vast sponge systems that basically retain water and release it slowly, become dongas … where the rain just washes away," says Clark.

"We see a pattern across the Maloti-Drakensberg trending towards what we would call ecosystem collapse … where the system gets so degraded that without major intervention with huge financial costs, you wouldn't be able to bring it back to what it was."

The knock-on effects, Clark says, lead to economic and social collapse. "Then you start getting migration of poor people from the mountains to the cities."

This is already unfolding in a part of Lesotho, where the mountain system is highly degraded. "There is more bare ground than vegetation. The rivers no longer run all year, only after rain, and this has an effect on the Lesotho dams'

project, for example."

The Basotho herders have few options to draw an income and are affected by economic and political problems. "Covid-19 has added to that with the loss of jobs and remittances from South Africa … so people have to go back to their rural livelihoods."

There is geopolitical tension along South Africa's border with Lesotho.

"It's almost like a passive-aggressive relationship where the boundaries are in dispute between South Africa and Lesotho, particularly on the KwaZulu-Natal side.

"Lesotho claims right to the edge of the escarpment where South Africa claims up to the watershed, which is a little bit behind the escarpment."

These "subdued tensions" lead to the heavy encroachment of Lesotho herders and their livestock into the South African side of the alpine zone.

Clark's research uses the Mont-aux-Sources mountain as a case study.

"We're really trying to unpack these challenges, examine the driving effects, look for alternative livelihood opportunities for herders and work with our Lesotho counterparts in government and research to come up with sustainable solutions."

Dr Peter Chatanga, an ecologist at the National University of Lesotho, says the Maloti-Drakensberg plays a significant role not only in supporting rich biodiversity but in delivering a wide range of other ecosystem services, especially in terms of water resources and livestock grazing.

"The high-altitude catchments in the region form an essential hydrological watershed and reservoir for the downstream riparian countries in Southern Africa. The region forms headwaters of many rivers that also provide water for the Lesotho Highlands Water Project (LHWP) dams (Katse, Mohale and Muela)," Chatanga explains.

The biggest of these rivers is the Senqu (Orange), which is one of the most utilised shared river systems in Southern Africa. The LHWP dams support both the hydroelectric power generation for Lesotho and the transfer of freshwater to the most densely populated and industrialised province in South Africa, Gauteng.

"The water from this region also plays an important role in the South African agricultural sector because a substantial portion of the agricultural production in the country's arid regions uses the water from the aqueducts connected to the dams associated with the Senqu (Orange) River," says Chatanga.

Figure 2: A map of Southern Africa showcasing the Maloti-Drakensberg.

Dams that supply the Lesotho population with water, such as Metolong, also depend on the headwaters in the Maloti-Drakensberg. "However, the water is not only important for Lesotho and South Africa, but also for Namibia as a downstream riparian country."

Chatanga says the value of the Maloti-Drakensberg in terms of water resources will likely increase, given that the SADC in 2008 predicted that, by 2025, South Africa will face total water scarcity, Lesotho will be water-stressed and Namibia will likely experience problems of water availability and quality, especially in the dry season.

"A better understanding of the ecology of the Maloti-Drakensberg ecosystems would enhance the conservation planning and monitoring of these important ecosystems. We can only value and protect what we know and understand," he explains.

Crop and livestock production provides the primary sources of livelihood for more than 80% of Lesotho's population.

"Livestock production is mainly dependent on the communal rangelands in the grassland found in the Maloti-Drakensberg. As they support the most palatable vegetation, wetlands in the region also form an important livestock grazing

resource. The ecosystems in this region also provide harvestable plant products that are used for different purposes, including traditional medicine, wild vegetables and artefacts," Chatanga says.

With their peat-forming capacity, the wetlands in the Maloti-Drakensberg contribute to climate regulation by sequestering and storing carbon. Chatanga points out, too, how the mountain range is an important recreation and tourist destination "because of its beautiful scenery. Thus, the region is important at the local, regional and international scales".

He says over-utilisation, poor range management and poor farming practices (in particular overstocking and overgrazing) are among the major culprits in the degradation of the range's ecosystems, including wetlands, particularly on the Lesotho side. "Most of the areas, including the sensitive wetlands, are overgrazed or over-utilised for cropping, leading to their degradation and loss of biodiversity.

"Although economically important, mining, damming and the associated infrastructure construction have also resulted in the degradation of the ecosystems, as well as increased grazing pressure on the remaining grazing areas. Invasion by alien plants has also been implicated in ecosystem degradation," says Chatanga.

Climate change, too, looms large. Chatanga says that because of its high altitude, the Maloti-Drakensberg area has recently been reported to be highly vulnerable to climate change.

Across the planet, mountains and polar regions are warming faster than anywhere else, Clark points out.

"There's a number of climate change scenarios for South Africa and the take-home story is that our mountains remain crucial for water security in southern Africa, whether we have more rain, less rain or more drought prevalence … There is a strong link between water and regional and national stability."

Understanding the alpine system holistically is the first step towards its sustainability and restoration, says Clark, whose research unit is partnering with several institutions of higher learning and policymakers on the continent to expand alpine research, as a better understanding of Southern African mountains as social-ecological systems is needed.
In general, these mountains are largely unexplored by scientists, poorly researched, under-appreciated by economists and politicians despite the valuable public goods and services they provide, and absent from most government policies.

"We want to push the sustainable development agenda so that our mountains not only retain their catchment value but so we can improve it in the face of climate change and increasing human demand."

Outside of South Africa, there's virtually no mountain science capacity, with the exception of Lesotho and Zimbabwe.

"There aren't people looking at southern African mountains at the scale that people are looking at the Alps, Himalayas, Andes or Rockies. If you compare us to East Africa, where you've got Kilimanjaro and Mount Kenya, we probably lag behind East Africa by 50 years in terms of research capacity, so we're trying to work towards closing the gap.

"Even our biggest system, the Maloti-Drakensberg, is understudied, but go further afield and even less has been done. Probably the most well-studied mountain in South Africa is Table Mountain," Clark says.

Figure 3: Tapped out: The Maloti-Drakensberg range provides water to border provinces Gauteng, KwaZulu-Natal and Free State, as well as Lesotho, where Basotho herders also use its summer pastures for grazing. (Photo: George Brits/AFP)

Burying underwear down under to help the earth

Elizabeth Schroeder

Current Address: Farmer's Weekly
Reprinted from: https://bit.ly/3zn0x4e

As part of a new global movement, farmers and schoolchildren in Australia and New Zealand are burying their cotton underwear in the soil and digging it up again eight weeks later.

The citizen science project, which started in the US, is called the Soil Your Undies Challenge and is now gathering momentum across the region.

CottonInfo, the Australian cotton industry's extension programme, joined forces with Oliver Knox, a senior lecturer at the School of Environmental and Rural Science at the University of New England in New South Wales, to launch the programme.

Cox told Al Jazeera that cotton contained cellulose, which made it a tasty snack for microbes and "the army of other tiny decomposers that live in the soil".

"The state of the garments when they are retrieved will indicate the health of the microbiome. If there is not much left of the cloth, then the soil is healthy and teeming with activity. If it is mostly intact, then work is necessary to improve the situation."

In 2018, Knox and Sally Dickinson, a regional extension officer at CottonInfo, asked 50 farmers if they would be willing to bury their underwear for science.

"Not only did they do it, but they were competing with each other, saying things like: 'My soil is better than yours because I have more degraded pants,'" said Knox.

The programme was initially started as a way of educating people about soil health and how it could improve the environment.

"A healthy soil microbiome is the lifeblood of plants and can accelerate growth and even bolster resistance to disease. Experts believe it can also affect the nutritional content of food," he told Al Jazeera.

Farmers whose underwear indicated poor soil health began exploring ways to regenerate their land, such as changing their crop rotation programme or leaving more stubble on the ground.

Since then, the Soil Your Undies campaign spread among farming communities, with schools also joining the initiative.

It was estimated that about 400 people had since buried their undergarments across the country, allowing scientists to explore soil health in different parts of Australia while collecting data for other research projects. People were now also submitting their results to CottonInfo.

In neighbouring New Zealand, a government-funded Soil Your Undies Challenge kicked off as a pilot project in six schools during 2020, while another six will be part of the project by July. It was hoped that the programme will eventually be rolled out nationwide.

Figure 1: About 400 people across Australia have buried their underwear in the soil to allow scientists to explore soil health in different parts of the country. Photo: Pixabay

Soil testing lab on wheels come to rural farmers' rescue

Gone are the days farmers had to send their soil samples to far-off laboratories with extended waiting times. The ARC has launched a mobile lab with a backup generator and a solar panel system.

Duncan Masiwa

Current Address: Food for Mzansi

Reprinted from: https://bit.ly/3zv00Nx

Farmers in deep rural areas and far-flung agricultural communities across Mzansi could soon be receiving agricultural advice right on their doorstep. This is thanks to a mobile agricultural laboratory launched by the Agricultural Research Council (ARC).

The ARC confirms that it is working on this concept that could see farmers get close to immediate analysis of their soil.

The project is still in its pilot phase. It was first rolled out to residents of the Sinqumeni village in the Eastern Cape. Other provinces will soon also benefit from the soil-testing lab on wheels.

This was developed by experts from the ARC's Institute for Soil, Climate and Water, as well as the departments for plant health and protection, and vegetable and ornamental plants.

The ARC team converted a panel van and equipped it with a cabinet and shelves for storing laboratory equipment. Together with a backup diesel generator, the lab also has a solar panel system installed for power when out in the field.

Great cost benefits for farmers

According to the ARC's Dr Goodman Jezile the mobile soil testing lab differs from other previously introduced labs through its focus on analytical techniques besides traditional "wet chemistry".

Figure 1: Not only does the ARC's mobile soil testing lab provide nutrient status information, but it also advises farmers on the quantities of fertiliser to add at specific crop growth stages. (Photo: Supplied/Food For Mzansi)

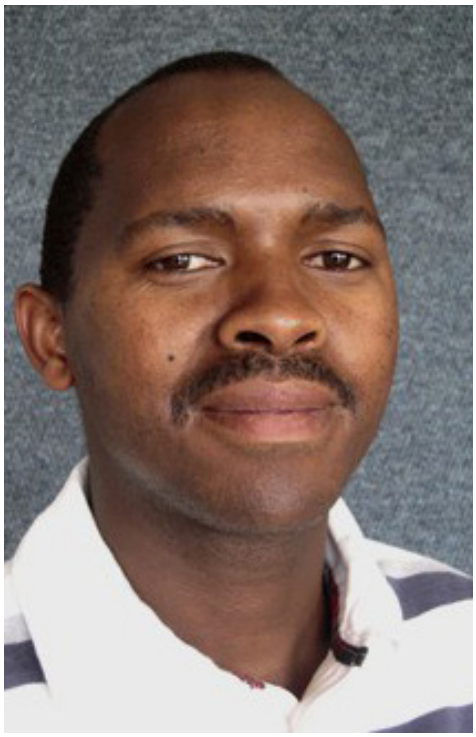


Figure 2: Dr Goodman Jezile, a soil scientist from ARC-Soil, Climate and Water. (Photo: Supplied/Food For Mzansi)

He says, "In comparison to traditional wet chemistry laboratories, there is no need of chemicals for testing soil."

Instead of chemicals, the current method uses light in a technique called near-infrared spectroscopy.

This technique has been used for many years in the sugarcane industry. It measured soil characteristics such as texture, organic matter and nitrogen content. More recently, it also supplied the data-hungry requirements of precision agriculture.

Although this technique is currently not as completely accurate as the standard laboratory methods, it offers acceptable results when a large number of samples need to be analysed. The cost of the analysis is also lower.

Assisting small-scale farmers

"The preparation time required by mobile soil testing lab is significantly less intensive than other laboratories demand," adds Jezile.

The emergence of the ARC's mobile soil testing lab could mean that the days of collecting soil samples, sending them to a far-off laboratory with extended waiting times to get the results, may soon be a thing of the past.

"The lab's cutting edge technologies will offer a faster soil testing method compared to the traditional two or three weeks, and users can receive their soil testing report between one to two days.

"This is especially important in the busiest periods of the growing season as most laboratories tend to get overwhelmed."

Real-time soil testing, the ARC states, is ideal for farmers who want to make timely decisions about what crops to grow. It will also help them with specific fertiliser and lime requirements in a quick, logical and easy-to-understand manner.

Many small-scale farmers, in particular, aspire to farm more efficiently, improving their yields and adding value to their production. The mobile soil testing lab will help farmers achieve these and other goals.

Figure 3: Dr Goodman Jezile inside the ARC's mobile soil testing lab. (Photo: Supplied/Food For Mzansi)

South Africa's largest solar power plant begins construction

Hanno Labuschagne

Current Address: MyBroadBandi
Reprinted from: https://bit.ly/3y39j7f

Construction of South Africa's largest renewable energy project to date – the Redstone concentrated solar power (CSP) plant – has commenced.

The R11.6 billion solar farm will be built roughly 30 km east of Postmasburg in the Northern Cape and will have a generating output capacity of 100 MW.

While this is less than the current largest solar power plant in South Africa – the De Aar project in the Northern Cape – it comes equipped with a 12-hour thermal storage system.

This makes it capable of persistently delivering electricity to almost 200,000 households, double the number powered by the De Aar plant.

The solar plant is expected to displace an estimated 440 metric tons of CO_2 emissions per year.

The project is being led by California-based SolarReserve and Saudi developer, investor, and operator of power generation and water desalination plants ACWA Power, which secured financing from leading international and South African financial institutions.

Investors include the African Development Bank (AfDB), Absa Bank, Development Bank of Southern Africa (DBSA), CDC Group, Nedbank Limited, Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO), Deutsche Investitions- und Entwicklungsgesellschaft (DEG), Investec Bank and Sanlam Life Insurance.

ACWA Power Chief Portfolio Management Officer and Acting Chief Investment Officer Rajit Nanda said the company was proud to play a role in South Africa's decarbonisation efforts and grateful for its partners' contributions to deliver power at an affordable cost.

"Following in the footsteps of the record-breaking Bokpoort CSP and deploying the same thermal salt storage system, Redstone CSP is set to be yet another ACWA Power flagship project in South Africa that directly benefits households in the area with remarkable plant performance," Nanda stated.

CSP plants use numerous mirrors which concentrate light energy from the sun and convert it into heat which can then be channelled through a typical generator to generate electricity.

Redstone is a power tower-based system with a central receiver to which the sun's rays are directed via a network of mirrors surrounding it.

The receiver contains a fluid – typically molten salt – which is heated to immediately make steam for electricity generation or storage.

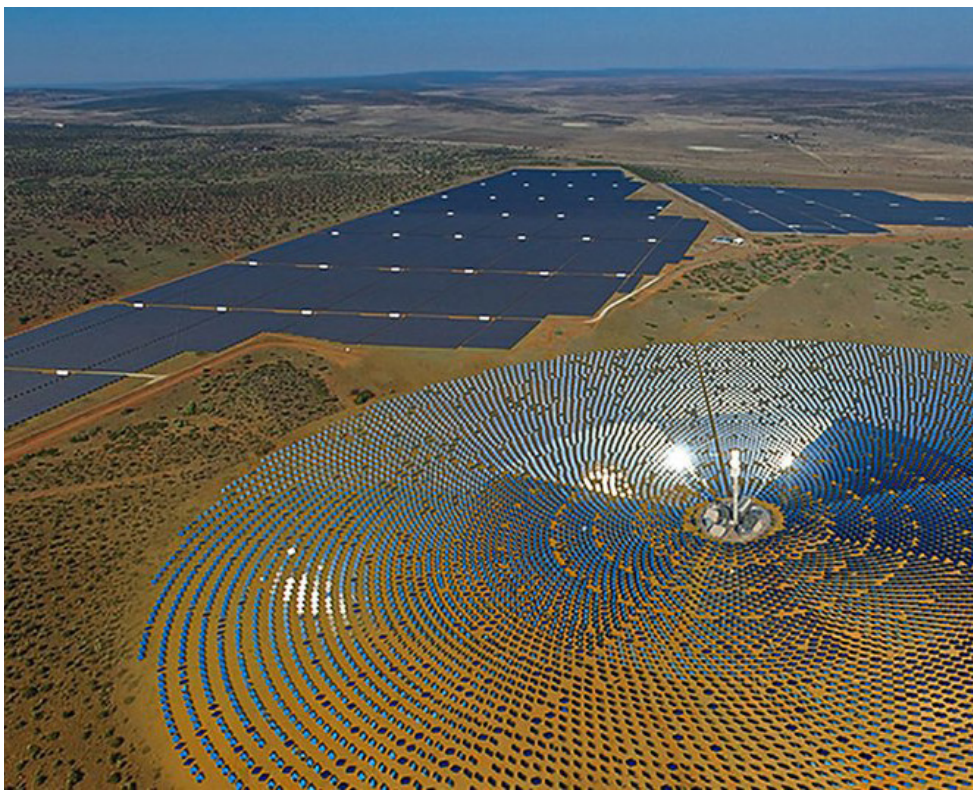


Figure 1: South Africa's largest solar power plant.

Figure 2: Redstone is a power tower-based system with a central receiver to which the sun's rays are directed via a network of mirrors surrounding it.

ACWA Power said that in addition to providing clean and reliable energy to the national grid, the Redstone CSP will deliver tangible socio-economic benefits.

The construction project will create more than 2,000 jobs at its peak, including about 400 from the local community. It will also result in approximately 100 permanent direct jobs during the operating period. Furthermore, the project will reach close to 44% local content on procurement during construction.

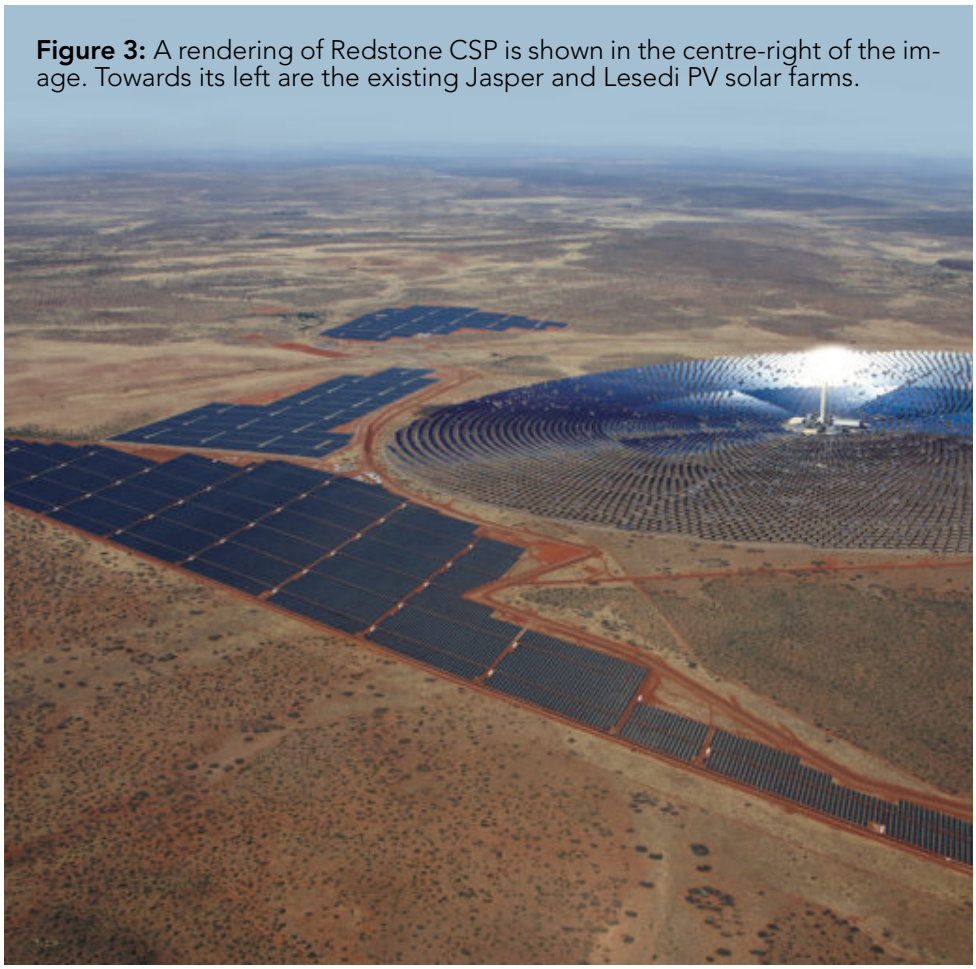
Commercials operations at Redstone CSP are expected to commence in the fourth quarter of 2023, with 100% of design capacity expected to be reached within 365 days from that date.

Notably, it is expected to be the first renewable energy plant in the country to provide ancillary services at no cost to Eskom.

This would allow the power utility to tap into Redstone's reserve resources when it requires additional capacity to serve electricity demand.

The image (Figure 3) shows a rendering of what the Redstone CSP will look like once constructed at its planned site in the Northern Cape.

Figure 3: A rendering of Redstone CSP is shown in the centre-right of the image. Towards its left are the existing Jasper and Lesedi PV solar farms.



Why Kenya is trying to count every single animal

Bethlehem Feleke, Saskya Vandoorne, Larry Madowo & Fabien Muhire

Current Address: CNN
Reprinted from: https://cnn.it/3ruOq2l

The wildlife researcher diligently marks his notepad as the elephants come into view, eager to not miss a single one in his count.

Meanwhile, the pilot flying high in a helicopter above Kenya's Amboseli Park, circles around the herd to reveal a clearer view of the pack - and an extremely rare set of twin baby elephants among them.

"The last time Kenya recorded elephant twins was 40 years ago," Najib Balala, Kenya's tourism minister, says over the crackly headphone set.

In the span of the pandemic, Kenya has seen a baby boom of over 200 elephants, or "Covid gifts" as Balala calls them.

But although some animals have thrived in the less crowded parks during the pandemic, Covid-19 has had a devastating impact on conservation on the African continent and the millions of livelihoods that depend on ecotourism.

In March 2020, Kenya abruptly closed its border in an effort to curb the spread of the virus. The country's billion-dollar tourism industry came to a screeching halt, losing over 80% of revenue. It is not expected to recover until 2024, says Balala.

"Can tourism survive until 2024? We need to rethink and remodel our way of doing things so that we can survive until tourism rebounces," he tells CNN.

That question has triggered Kenya's most ambitious conservation effort yet: counting every single animal and marine life in all 58 national parks across the country for the first time ever.

The great wildlife census will be critical to understanding and protecting the more than 1,000 species which are na-

Figure 1: Kenya has experienced an elephant baby boom during Covid. (Photo by Saskya Vandoorne)

Figure 2: Conservationists are trying to count every single animal in Kenya. (Photo by Saskya Vandoorne)

Figure 3: Conservationists are using GPS trackers, aircraft, camera traps and manpower to track animals. (Photo by Bethlehem Feleke)

Figure 4: The Masaai people have been badly hit by the drop in tourism. (Photo by Saskya Vandoorne)

Figure 5: The natural habitat for many animals is dwindling in Kenya. (Photo by Saskya Vandoorne)

tive to Kenya, some of which have seen alarming population declines over the last few decades, according to scientists.

Using GPS trackers, aircraft, camera traps and significant manpower, Kenya's Wildlife Service (KWS) will count everything from the regal giraffe to the endearing cat-sized dik-dik over three months.

They will focus on rare species, including the pangolin - often illegally traded - the sitatunga antelope, aardvarks and hedgehogs, none of which have ever been counted before.

Shrinking habitats

This level of unprecedented data will help Kenya better understand its wildlife and the various threats facing it today - such as climate change, human-wildlife conflict and shrinking habitats amid the growing competition for land use.

For decades, the Maasai people have given up land for some of Kenya's most famous parks. Noah Lemaiyan - a herdsman clad in a red and blue shawl - lives on the outskirts of Amboseli.

Since the tourists stopped coming, he says, the income for his village has dried up.

"Women used to make bracelets and necklaces," he says. "But now we have to sell one cow to buy food."

Lemaiyan is also struggling with a shortage of water - crucial to keep his herd alive.

Dr Patrick Omondi, the acting director of biodiversity, research and planning at KWS, hopes the census will give them a better understanding of how erratic weather patterns are affecting the animals and have forced habitats to change.

"We will establish where this wildlife is in time and space," he says -- which will enable them to create a more robust management plan.

"We have seen wildlife going into spaces they have not been in 50 years," he adds.

By the end of July, Omondi and his hundreds-strong team will have scoured every bit of Kenya's rolling landscapes by air and on land, and have surveyed every lake and marine park by boat and underwater.

And with the census complete, the work can begin.

Jacarandas in parts of South Africa are flowering earlier: why it's a warning sign

Jennifer Fitchett

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Reprinted from: https://bit.ly/3BA3FeUl

In September each year, South Africa's Gauteng province turns purple. The cities of Johannesburg and Pretoria are well covered with trees – and jacarandas (*Jacaranda mimosifolia*), with their purple blooms in late spring, are a prominent part of this urban forest.

About 16% of the land in the Gauteng city region is planted with trees, forming one of the world's largest and most densely vegetated man-made urban forests. Johannesburg alone is recorded to have over 10 million trees. Jacarandas were introduced to Pretoria and later Johannesburg in the early 1800s, specifically as ornamentals to line the streets of the suburbs and central business districts.

Octogenarian residents who have lived in Gauteng their whole life might remember that jacarandas did not always flower in September. In the 1920s and 1930s, the trees only started to bloom in mid-November. Gradually over the decades, the date of bloom has advanced through October to the early weeks of September. This is referred to as a phenological shift and is being observed across a range of species globally as a result of climate change.

The most notable example is the Japanese cherry blossoms. Not only are the cherry blossoms a key tourist attraction, and the cherry festivals important cultural events, but this also represents the world's longest phenological record. Phenological analyses show that current cherry blossoming is occurring earlier than any time in the last 1 200 years.

We explored this change in the timing of jacaranda blossom in our paper published in the Journal of Urban Forestry and Urban Greening. Phenological shifts are species and location-specific – in some areas, and for some species, events are even being delayed as a result of specific climate drivers. There is very little phenological data for South Africa, and so very little phenological research has been conducted compared to the work in countries across Europe, Asia and North America.

Because jacaranda blossoms result in such a dramatic change in the urban landscape each year, they are often reported on in the news and, more recently, in social media posts.

We mined these sources to compile a list of flowering dates of jacaranda trees spanning 1927-2019. This record allowed us the chance to contribute to the global attempts at recording phenological shifts.

The records confirmed the advance in flowering dates, and from these, we quantified a mean rate of advance of 2.1 days per decade.

We then explored the climatic drivers of this advance, by comparing the flowering dates to meteorological data from across Gauteng. The advance in flowering took place against a backdrop of warming temperatures, ranging from 0.1 - 0.2 °C per decade for daily maximum temperatures and a more rapid 0.2 - 0.4 °C per decade for daily minimum temperatures. Rainfall changes during this time were less uniform.

If plants flower too early in the year, they are at risk of frost damage during the late winter months, and often do not complete their dormancy. Therefore, although phenological shifts represent an adaptation in plants and animals, these advances in flowering dates cannot continue indefinitely. At a critical threshold, the flowering season will become unsuccessful.

Understanding the role of climate

While phenological shifts are highly species and location-specific, the broad climate drivers are well understood. Spring blossoms are triggered, in most cases, by temperatures warming above a certain threshold, following the completion of a dormant period. That dormant period often requires a certain number of days below a threshold temperature or an accumulation of chilling units.

For some plants, the onset of rainfall is also important in triggering blossoms. While factors such as soil moisture, temperature and composition, sunshine hours, and the health of the tree can affect the mean flowering date, the shifts in flowering are driven by climate. The biometeorological science of phenology has developed over the past five decades, with methodologies to determine the climate drivers responsible for phenological shifts.

The strongest climatic driver of the phenological advance of jacaranda blossoms in the Gauteng city region was found to be daily maximum temperatures during the month of June – falling within the dormant period of the tree. This is not uncommon, as the dormant period is critical for resource management in the tree. It does mean that by the time the spring months of September and October come around, day to day tempera-

ture and rainfall will have less impact on when the trees flower. Over the period 1918 - 2019, June mean maximum daily temperatures have increased by 0.2 °C a decade, while the mean minimum daily temperatures have increased by 0.2 - 0.5 °C a decade.

Jacarandas occupy a peculiar position in South Africa: they are well-loved and noticeable trees but they are invasive aliens. Due to their status as invasive species, replanting of jacarandas is currently prohibited, although the species has certain urban areas in which restrictions are less strict. This means the population of trees is ageing. The trees can live for over 100 years, but for some of the original trees, their centenary has already passed.

Phenological shifts represent an adaptation strategy for the plant – they cannot move on their own to a cooler climate that more closely matches what they are traditionally accustomed to, and so they alter their annually recurrent biological events.

This cannot happen indefinitely, and as temperatures continue to increase, a more general risk of heat stress to the tree is heightened. This could mean that the years of purple spring seasons in Gauteng are limited.

The rate, direction, and climatic drivers of phenological shifts are specific to individual species. Therefore, we cannot extrapolate these results to all flowering trees in Gauteng, or even to all invasive species in the city region. However, the results of this study do provide a warning for the urban forest, and an urgent call for future research. Collating data from a range of sources, including traditional and social media, can contribute to a better understanding and modelling of these changes.

Figure 1: Jacaranda trees in Pretoria. (Shutterstock)

Varsity establishes new School for Climate Studies in a battle to fight climate change

Yoliswa Sobuwa

Current Address: Sowetan Live
Reprinted from: https://bit.ly/3l22Vt9

In the battle against climate change, which has contributed to water shortages, widespread crop failure and negatively affected both commercial and subsistence farming, Stellenbosch University (SU) has established a new School for Climate Studies.

The institution said the school will conduct research, coordinate curricula development and facilitate postgraduate training, advice and consultancy as well as technology transfer in the multiple fields of climate studies.

Prof Eugene Cloete, SU's deputy vice-chancellor: Research, Innovation and Postgraduate Studies, said this is the first school of its kind in SA that has the status of a faculty.

"South Africa is a major contributor to greenhouse gases on the African continent. It has become essential to move towards a greener economy. Stellenbosch University has the expertise to lead the way through research and innovation, and has already done cutting-edge research on, for instance, renewable energy. The institution is also leading the field in the move towards a carbon-neutral university," he said.

Prof Cloete said the development of new undergraduate and postgraduate climate studies curricula (modules) has already commenced. "We believe every student who graduates from SU should understand the importance of climate, and know how to make decisions in their respective workplaces to mitigate climate change by moving towards a green economy.

"SU is also in the process of developing a master's degree in climate studies to build high-level capacity in this field. The move towards a green economy will create many new careers in engineering, manufacturing, agriculture, renewable energy and research into the fundamental drivers of climate change."

The minister of higher education, science and innovation, Blade Nzimande, has welcomed the launch of the School for Climate Studies.

Nzimande said the establishment of an academic school focusing on climate change is a potentially promising step to enable academics and students to build a well-rounded body of scientific knowledge.

"According to International Panel on Climate Change, most of scientific community human activity has had definite causal effects on global warming and climate change, resulting in increasing temperatures, rising sea level and a range of other impacts.

"This threatens every aspect of human endeavour. And we all know that the effects of climate change will be worse in poor and developing countries like our country regardless of its contribution to greenhouse gas emissions," he said.

Nzimande said government hopes that SU will collaborate with other higher education institutions, especially the historically disadvantaged institutions, in promoting the new scholarship to face new problems confronting current and future generations.

Figure 1: Stellenbosch University has established a school of climate studies. (Image: Erhardt Thiel)

From the ashes: historical botanic photos destroyed in Cape Town fire resurrected

Table Mountain blaze destroyed university's plant conservation archives, but digitised 'then-and-now' images continue to shed light on changes in South Africa's landscape

Nick Dall

Current Address: The Guardian
Reprinted from: https://bit.ly/3x6Wl1j

The fire that started on the slopes of Table Mountain on April 18 this year quickly swept through the University of Cape Town campus. The world watched in horror as the African Studies Library was burned to the ground. In the weeks that followed, volunteers waded through the waterlogged basement of the razed building to see which rare books had survived.

What few people beyond the university realised at the time is that barely 100 metres away the Department of Biological Sciences had also suffered catastrophic losses. "We've lost everything," says Prof Timm Hoffman, the director of the Plant Conservation Unit (PCU), which was housed in a "highly flammable wooden turret" on the roof of the HW Pearson building.

One look at the blackened wreckage just over two months later confirms he is not exaggerating. "It's too painful," he says. "I was in that office for 20 years. I did my PhD in the room next door. I've probably spent more time in that building than I have in my own home."

"Photos are like little time machines. Each image is rich, rich, rich with information about the environment." - Prof Timm Hoffman

Figure 1: Two images taken more than 100 years apart show the increase in trees and shrubs in the savannas of South Africa, near Nelspruit. (Photograph: IB Pole Evans, 1920; James Puttick and Peter Carrick (2021)/Department of Biological Science /UCT)

In addition to seeing all of their books, computers, scanners, microscopes and other equipment go up in smoke, the PCU's entire collection of photographs was destroyed in the fire. The oldest photographs dated back to 1876. And these were not just any photos. "As an ecological historian, my entire discipline is based on historical photographs," says Hoffman. "Photos are like little time machines. Each image is rich, rich, rich with information about the environment."

By comparing then-and-now photos of the same landscape, Hoffman and his colleagues specialised in documenting how landscapes changed over time. "Comparing pics of the same landscape can tell you about the nature of the change, the extent of change and the rate of change," he says. "We use the past to understand the present so we can make predictions about the future."

Often their findings are not what you'd

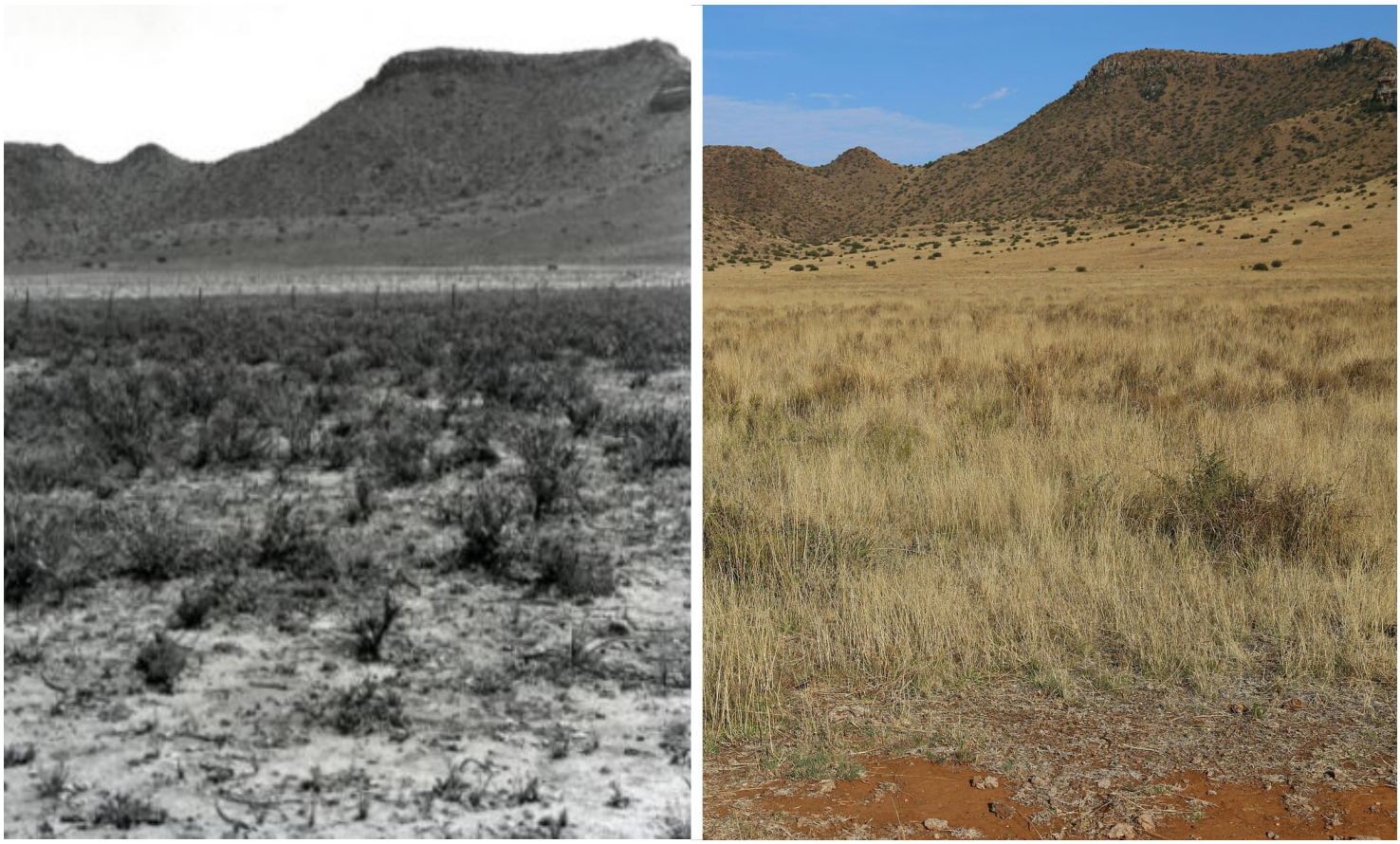


Figure 2: The increase in grass cover in the eastern Karoo is shown in these two photographs taken 58 years apart near Middelburg. (Photographs: Piet Roux (1960); Timm Hoffman and Gina Arena (2018))

expect. For example, for much of the 20th century ecologists believed the semi-desert expanse of the Karoo was expanding into the Free State grasslands as a result of overgrazing. But the PCU's work with repeat photography showed the opposite: the eastern Karoo has in fact become more grassy over the past 30 years as a result of an increase in rainfall and fewer animals grazing the veld.

Luckily, after joining the university in 2000, Hoffman invested in the digitisation of the photographic archive. Although he is yet to muster the courage to go through the digital databases – "I'm still grieving," he says – he estimates that 30,000 images have been digitised and that he has at least one image for 90% of his most important sites.

But only 10 % of another collection of 35,000 slides had been digitised. "If we'd invested in bigger, faster scanners we could have finished by now," he laments. "But I'm also very proud that we digitised at all. Not many ecologists are focused on digital archives. No one else has a collection like this in Africa."

The flagship of the PCU's digitisation efforts is rePhotoSA, a geolocated, online database of then-and-now landscape photographs of southern Africa, which was developed in conjunction with the Animal Demography Unit at the university. Of the 30,000 historic photos in the database, fewer than 10% currently have contemporary partners.

"As a botanist, I should have known the palm tree next to our building was a fire hazard. I should have cut it down myself." - Prof Hoffman

This is where citizen scientists come in, as the public are encouraged to add to the database of repeats. Finding an exact match is not always easy (guidelines help a lot) but can be hugely satisfying. Anyone with a collection of old landscape photographs is encouraged to get in touch.

The PCU was not the only department in Biological Sciences to be affected by the fire. The Institute for Communities and Wildlife (ICWild) was also severely damaged. Fortunately, hard drives containing much of its data on how animals such as baboons and caracals are able to adapt to urbanisation were housed in another part of the building.

In what Prof Tony Verboom describes as "a miracle", the Bolus Herbarium – situated directly below ICWild – and its adjoining botanical library suffered only minor water damage.

With more than 350,000 specimens, the Bolus has one of the world's most important collections of Cape flora, including about 12,000 type specimens – the single specimen upon which a scientific name is based.

"A type specimen provides the reference point for plant names. Without them our taxonomic classifications lose their roots in reality," says Verboom. "Believe it or not, we're still reeling from the loss of the Berlin herbarium in the second world war …"

While the fire caused untold damage, even Hoffman can see that it could have

Figure 3: The increase in trees and shrubs in the savannas of southern Africa is shown in two images taken more than 100 years apart near Nelspruit. (Photographs: IB Pole Evans, 1920; James Puttick and Peter Carrick (2021))

been a lot worse. "It's a serious wake-up call," he says. "We have to do everything we can to prevent a repeat."

This includes ensuring buildings are fire-safe, installing high-pressure fire hoses (instead of relying on the city fire department) and monitoring what kind of vegetation grows on campus.

"As a botanist, I should have known that the palm tree next to our building was a fire hazard," he says. "I should have brought my chainsaw and cut it down myself."

While the steps outlined above are important, Hoffman and Verboom agree that the biggest non-negotiable for academics the world over is to create secure, cloud-based backups of all their data.

"When the fire struck we'd already started photographing all the samples in the herbarium," says Verboom. "But now we're going full steam ahead. A photo isn't the same as a physical specimen. But it's a lot better than nothing."

Figure 4: Samples from the Bolus Herbarium library, which suffered only minor damage in the fire. (Photograph: Courtesy of Bolus Herbarium)

The Table Mountain fire: what we can learn from the main drivers of wildfires

Brian Van Wilgen &
Nicola Van Wilgen-Bredenkamp

Current Address: Stellenbosch University
Reprinted from: https://bit.ly/3iNtvn0

The fires that started on 18 April 2021 on the slopes of Table Mountain in South Africa destroyed several buildings on the campus of the University of Cape Town. These included the Jagger Library, as well as the restaurant at Rhodes Memorial, the historic Mostert's Mill, and several residential houses.

This was a tragic event that will affect many people for a long time.

Many questions have been raised as to why this happened, and whether anyone should carry the blame.

Based on our research into fynbos fire ecology and management over the past four decades, we believe that rather than attempting to apportion blame, South Africans should be examining the causes of destructive wildfires, and what can be done about them.

Wildfires are the inevitable consequence of three factors coming together at the same time: weather that is conducive to the establishment and spread of a fire; enough fuel of the right type and arrangement to carry the fire, and a source of ignition to start it.

Simple as this may seem, there are many misconceptions and poor understanding around each of these elements.

Figure 1: Wildfires are the inevitable consequence of three factors coming together at the same time: an ignition, the weather and fuel. (Brenton Geach/Gallo Images via Getty Images)

The weather

The Cape summer and autumn historically have suitable weather for fires to occur, so a fire at this time of the year isn't unusual. However, global climate change is exacerbating the situation.

Data from the South African Weather Service Cape Point monitoring station show clearly that average temperatures have been rising steadily over the past six decades. As a result of this, the percentage of days with above average temperatures in April has doubled since 1960.

The steady increase in hot, dry weather will dry out the vegetation, making it more likely to catch fire, and for fire to spread. This phenomenon is not restricted to the Cape and has been widely reported in other parts of the world.

The fuel

The natural fynbos vegetation that historically clothed the slopes of Table Mountain is highly inflammable.

That situation has also been exacerbated by the introduction of alien trees, which increase the fuel available to burn, and that burn with a much higher intensity than the natural fynbos.

For example, our work after the destructive fires in the South African coastal town of Knysna in 2017 showed that plantations of alien trees, and natural fynbos that had become invaded by these trees, burnt with much higher severity than uninvaded fynbos.

Alien trees don't only increase the risk of uncontrollable fires, they also eliminate the natural biodiversity and reduce water runoff. This is particularly true if they become invasive, that is if they spread across the landscape without assistance, where they can form dense stands that crowd out the native fynbos and use more water than the vegetation that they replace.

In response to this, and in line with national legislation, South African National Parks has been clearing plantations of invasive pine trees from the Table Mountain National Park since the establishment of the park in 1998.

These operations have been conducted in the face of substantial opposition from the citizens of Cape Town, because the invasive trees are aesthetically pleasing and provide shade. Many people also believe (incorrectly) that they bring rain and provide the best cover to protect the soil.

Not all alien trees are invasive. It's mainly invasive alien trees – those that are able to spread unaided across the landscape – that are targeted for control. The pine trees that have been removed from the Table Mountain National Park are invasive. The situation is further complicated because the trees in the line of most recent fires – mainly alien Mediterranean stone pines – are not invasive, so don't have to be controlled in terms of South African law.

In addition, mature stone pines, including those at Rhodes Memorial, are protected by heritage legalisation and cannot be damaged or removed. These trees were planted over 200 years ago, and are valued icons of the city's history. Whether or not, or to what degree, the stone pines contributed to the intensity and spread of the recent fires is not yet known.

What is known is that many buildings and historic infrastructure caught alight some distance from the fire front due to embers that were carried a long distance – an occurrence termed "spotting" by firefighters.

Some (as yet unknown) plants, which include alien pines and palms, would have provided the fuel for those embers. Under these circumstances, even carefully maintained firebreaks would not have stopped this spotting.

Source of ignition

Research in other parts of the world has clearly demonstrated a strong link between human population density in an area, and the number of fires that occur.

Cape Town is now home to almost 5 million people, many of them poor and homeless. That fires will be started, either accidentally or deliberately, is therefore almost a given and very difficult to effectively prevent.

Urban densification, crime, and homelessness are broad social issues about which organisations like South African National Parks can do very little.

Going forward

Very little can be done locally about climate change – it is a global issue that must be addressed on a global scale.

The risks of human ignitions will remain a constant factor. That leaves two things that could be improved.

First, buildings should be fire-proofed as far as possible by using fire-resistant building materials and clearing gutters and other points where plant material accumulates. Secondly and most importantly, vegetation needs to be managed, especially tall alien trees that can significantly increase the risks of damaging fires.

Burning the fire-adapted and fire-dependent fynbos vegetation under milder weather conditions, and at appropriate intervals, to reduce fuel loads could also reduce the risk of runaway fires. This is currently impeded by very risk-averse wildfire legislation that needs to be carefully re-examined.

Dr Chad Cheney, a park planner at Table Mountain National Park, also contributed to this article.

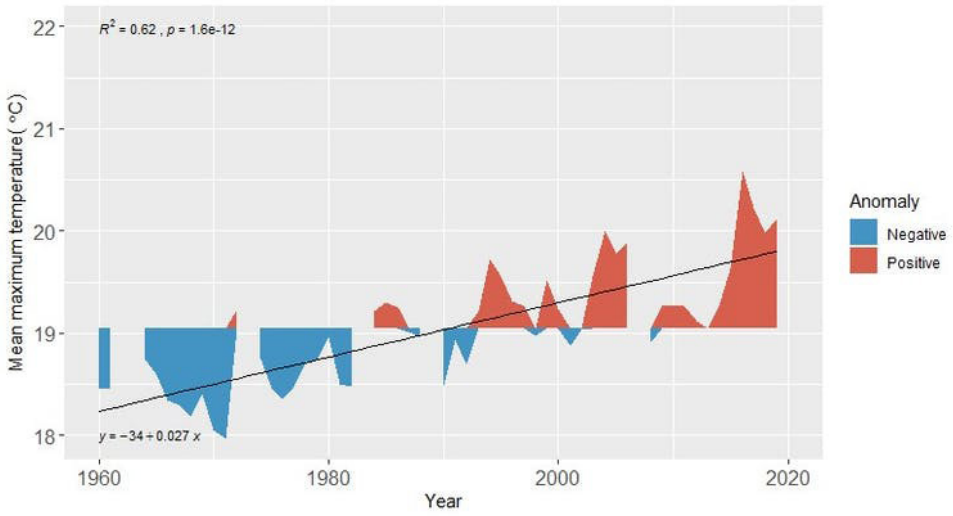


Figure 2: Average maximum temperatures between 1960 and 2019 at Cape Point showing which years had temperatures above (red) and below (blue) the long-term average. (Provided by the lead author)

New guide on how best to get rid of invasive alien plants

With the invasion of water-intensive exotic plants being one of the top threats to the health of our critical water source areas and thus our water security, it is imperative that we all play a part in managing this threat. To this end, it is important that we work in partnership to enable and empower land users, landowners, local communities, and private companies to take ownership of, and action in, addressing this risk to the health of their land, the ecosystems, water supply, their property, and livelihoods.

Ruth Beukman

Current Address: Freshwater & Policy Lead WWF-SA
Reprinted from: https://bit.ly/3yaLuKS

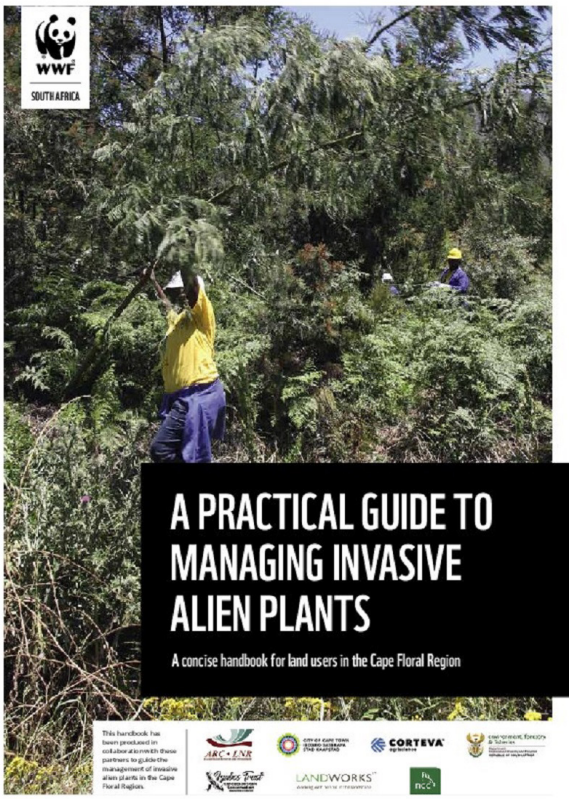
Landowners are required by law to take the necessary steps to control and eradicate invasive alien plants, but this is often more easily said than done – which is one of the reasons why WWF and its partners have published a new guide on the subject.

Available for free download in English and Afrikaans, A practical guide to managing invasive alien plants: A concise handbook for land users in the Cape Floral Region, will be of value to landowners, land managers and clearing contractors, providing context, examples, and practical guidelines.

The Cape Floral Region is a renowned biodiversity hotspot and the world's smallest plant kingdom with the highest species variety. Yet, large parts of this special landscape are heavily infested with fast-spreading and thirsty exotic plants and trees.

Most species of invasive alien plants found in South Africa come from Australia and South America. Without their naturally occurring pests, whether insects, fungi, or diseases, they grow undeterred and multiply rapidly.

The Madeira vine from South America, for example, smothers indigenous trees like the protected milkwoods while Port Jackson, pine, wattle, and gum trees use far more water than indigenous vegetation. These 'alien' species also crowd out local species and compete for water and nutrients. And, as we've witnessed with the Cape Town fires recently, some case wildfires to burn more intensely and spread more easily, putting people and property at risk.



Critically, though, the mountainous regions of the Cape Floral Kingdom are also important water-supplying areas generating fresh water for millions of urban dwellers, food-producing farms and other industries and communities.

More about the guide

The guide was a collaborative effort, put together with the help of subject experts in government, the City of Cape Town, private businesses, and other NGOs. It is a practical nine-chapter manual with colour-coded sections for easy reference. The numerous authors are experts in the field and have many years of combined experience in dealing with alien plants within their respective professions.

The information is based on the latest policies and legal requirements and consists of guiding principles of best practice methods to empower land users to develop a management plan to control these landscape damaging alien plants. It also includes a section on how to successfully rehabilitate land that has been cleared.

Another WWF practical guide, produced in 2019, covers the basics for establishing a community-run indigenous nursery for those who wish to propagate and grow their own indigenous Cape species to be planted back along riverbanks and reintroduced into landscapes.

A CALL FOR
DONATIONS

GRASSLAND SOCIETY OF SOUTHERN AFRICA
IN AID OF REBUILDING THE UCT PLANT CONSERVATION UNIT ARCHIVES

On 18 April 2021, a wildfire gutted many important institutions at the University of Cape Town including the Plant Conservation Unit. All the hard copies of thousands of historical and repeat landscape photographs were lost. While a large portion of the images exists in digital format, about 25 000 still need further processing. Any donation would contribute significantly to the ongoing development of the rePhotoSA database and to make it more accessible to all people interested in natural landscapes in Southern Africa.

The Grassland Society of Southern Africa calls for donations to support the rebuilding of this important asset to rangeland ecology in the region.

If you want to support this cause,
please follow this link to make a donation:
http://www.pcu.uct.ac.za/pcu/donate

29 July 2021
TIME: 5pm
PLACE: ZOOM

Addressing the threat of invasive plants

PLANT CONSERVATION WEBINAR

WITH RUPERT KOOPMAN, GUY PRESTON, NOLWETHU JUBASE & DONOVAN KOTZE

We're talking about one of the biggest threats to our plant life: invasive alien plants. We will explain the challenges presented by invasive plants, and how we're addressing the threats across the country.

SANBI
Biodiversity for Life
South African National Biodiversity Institute

C·R·E·W

WWW.BOTANICALSOCIETY.ORG.ZA

BOTANICAL SOCIETY OF SOUTH AFRICA

Wits Community mourns the loss of one of the world's greatest scientists

Wits University

Reprinted from: https://bit.ly/36YcG3h

Wits University is saddened by the passing of Professor Bob Scholes, one of the world's leading scientists on Climate Change.

Professor Bob Scholes passed away on the evening of Wednesday, 28 April, following a hike in Namibia with friends and colleagues. He was 63 years old.

"The Wits University community is shocked and saddened by the sudden loss of such a giant in the field of climate science, not only in South Africa but in the world. Professor Scholes was a true leader, a conscientious and dedicated scientist and a teacher to all," says Professor Zeblon Vilakazi, Vice-Chancellor and Principal of Wits University.

Professor Scholes was a Professor of Systems Ecology at Wits University. He was a Director of the Global Change Institute (GCI) at Wits and a Distinguished Professor at Wits. He was also an A-Rated scientist. He was among the top one per cent of environmental scientists worldwide, based on citation frequency, and published widely in the fields of savanna ecology, global change, and earth observation.

Professor Scholes has led several high-profile studies and held high profile positions in the fields of climate change and environmental studies globally. He has been one of the lead authors in the assessment reports of the Intergovernmental Panel on Climate Change (IPCC) on present and future impacts of climate change and how we can adapt to, or reduce it. He has also been a member of the steering committees of several global earth observation bodies.

"We in the Faculty of Science are deeply saddened by Professor Bob Scholes' untimely passing. He was doing what he loved the most, which was being in the great African outdoors that he has dedicated so much of his life to preserving for future generations," says Professor Nithaya Chetty, Dean of the Faculty of Science at Wits University.

"There is much to do to continue with the legacy that Bob leaves. Bob will want for us to do nothing more than to continue with his work, even if we pause only for a moment to contemplate his leading contributions to Wits, South Africa and the world. Bob will be sorely missed. He is, in many respects, irreplaceable. Despite this, we must all dig deep to find a way to move on. Bob will want that."

Bob leaves behind his wife, Professor Mary Scholes and their son Stirling.

"Stirling and I are saddened by the sudden loss of Bob. He died doing what

he loved. He was a loving husband and father. We are grateful for all of the support that we are receiving," says Mary Scholes.

The Wits Community extends its sincere condolences to the family, friends and colleagues of Professor Scholes and those who knew him well.

Tributes

Read this tribute [PDF] by Michel Verstraete, Visiting Professor at the Global Change Institute at Wits University.

Tribute by Professor Guy Midgley, Distinguished Professor in the Department of Botany and Zoology at Stellenbosch University:

"The Stellenbosch University community of ecologists and global change scientists is deeply saddened to hear of the passing of Professor Bob Scholes, Director of the Global Change Institute at the University of the Witwatersrand. Many of us have worked with Professor Scholes, some of us over several decades, and we feel this loss to the national and global environmental research community keenly. His was a talent and intellect that is irreplaceable. His contributions to science in general, to the development of South African ecological and global change science in particular, to several policy related fields, and to the international collaboration and assessment areas were enormously valuable to all of us. Our most sincere condolences go to Professor Mary Scholes and their son, Stirling."

Tribute by the Directors - Stephan Bormann, Gerald Haug, Jos Lelieveld, Ulrich Pöschl - and the members of the Max Planck Institute for Chemistry, Mainz, Germany:

"We are deeply saddened by the sudden passing of Bob Scholes, distinguished Professor and Director of the Global Change Institute at the University of the Witwatersrand in South Africa. With him the scientific community has lost a brilliant researcher and a truly caring scholar. Our deepest sympathy and sincere condolences go to Bob´s wife, Mary Scholes, Distinguished Professor, School of Animal, Plant and Environmental Sciences at the University of the Witwatersrand, and their son, Stirling. Mary has served as chairperson of the Scientific Advisory Board of our Institute from 2012 until 2018."

Watch

Bob Scholes Tribute – Standing For All Things Wild:
https://youtu.be/v-wl6ai82Kg

Upcoming events

26 - 30 July 2021

GSSA 56th Annual Congress & Workshops.
Please see the programmes on page 53 to 55.

12 - 13th & 16 - 17th August 2021 (Virtual)

African Conference for Linear Infrastructure and Ecology (ACLIE)
The second ACLIE is co-hosted by the Endangered Wildlife Trust (EWT), Grevy's Zebra Trust (GZT) and Ewaso Lions (EL). The theme is "Connecting for Resilience". Visit http://bit.ly/3ehhtBG for more details.

5 - 10 September 2021

SAWMA 2021: 50th Anniversary Conference
Berg-en-Dal, Kruger National Park.
For more information see
https://sawma.co.za/conference-2021/
or contact Elma Marais at elma@mweb.co.za.

7 - 9 September 2021 (08:30 - 15:00 | Virtual)

Fynbos Forum 2021
Fynbos Forum 2021 will be hosting exciting keynote speakers, thematic sessions, mini-symposia on an online platform. We would like to encourage participation from all our members and previous conference delegates!
Visit https://fynbosforum2020.co.za/

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

Upcoming events

21 - 30 September 2021 (Virtual)

International Conference on Ecology & Transportation
The title of the conference will be "Transforming Transportation Ecology in the Global Village", reflecting the changing landscape of science and practice in transportation ecology.
Visit https://icoet.net for more information.

23 - 29 October 2021

IGC & IRC
Joint XXIV International Grassland (IGC) and XI International Rangeland (IRC) congresses to be held in Nairobi, Kenya. The theme is 'Sustainable Use of Grassland/Rangeland Resources for Improved Livelihoods'. Information is available here: http://rangelandcongress.org/

1-5 November 2021 (Virtual and free)

The Conservation Symposium
is a platform to facilitate the sharing of ideas and lessons, and for the co-creation of solutions to contemporary conservation issues in Africa.
https://conservationsym2021.dryfta.com/

5 - 9 September 2022 (Hybrid event)

MEDECOS Conference XV
MEDECOS 2021 has been postponed until 2022.
It will be held at Club Mykonos, Langebaan, Western Cape and the theme is"Partnerships for Global Change".
See http://medecos2020.org/ for more details or contact Mrs Madaleen Schultheiss at Vetlink (conferences@vetlink.co.za).

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

2021 Research Skills Workshop

Scientific and popular science communication

26 July 2021

Facilitated by:


Dr Palesa Mothapo


Dr Ethel Phiri


Dr Marina Joubert

2021 Research Skills Workshop

PROGRAMME

08:30 | Welcome & ice-breaker activities
Dr Mothapo & Dr Phiri

08:45 | How to read and extract information from a paper
Dr Mothapo

09:15 | 10 essential steps to writing a winning proposal
Dr Phiri

09:45 - 10:00 | TEA

10:00 | How public science communication can advance and enrich your research
Dr Joubert

11:00 | Writing an abstract - group work in breakaway rooms
Dr Phiri

13:00 - 13:30 | LUNCH

13:30 | Presentations and summaries from breakaways
Dr Mothapo & Dr Phiri

14:30 - 14:45 | TEA

14:45 | Presenting impactful results - the graphical abstract
Dr Mothapo

15:15 | Group work - creating a graphical abstract
Dr Mothapo & Dr Phiri

15:45 | Group presentations
Dr Mothapo & Dr Phiri

16:30 | CLOSING

Tuesday, 27 July 2021	
8:00 to 10:00	Opening of the 56th Annual Congress of the Grassland Society of Southern Africa
10:00 to 10:15	Research Proposal Poster Session
10:15 to 12:30	Livestock and game management
12:30 to 13:30	Standard Poster Session
13:30 to 14:30	Combined Session: Fire ecology and climate change
14:30 to 16:45	SPECIAL SESSION I: Exploring the impacts of the climate variability and change on extensive livestock production systems in the Little Karoo and the Southern Nama Karoo

Wednesday, 28 July 2021	
08:00 to 10:00	Planted pastures
10:00 to 10:15	Research Proposal Poster Session
10:15 to 12:15	SPECIAL SESSION II: Carbon in Grasslands – A pathway to climate mitigation?
12:15 to 13:15	Standard Poster Session
13:45 to 16:00	Rangeland ecology and management

Thursday, 29 July 2021	
08:00 to 11:15	Conservation and restoration
11:15 to 11:30	Research Proposal Poster Session
11:30 to 13:00	Bush encroachment
13:00 to 14:00	Standard Poster Session
14:00 to 16:15	SPECIAL SESSION III: Herding into the future – key lessons for future range management and biodiversity

Monday. 26 July 2021

Research Skills Workshop: Scientific and popular science communication

Friday. 29 July 2021

Policy and Practice workshop: Towards a better understanding of the Biodiversity Stewardship Guideline in SA

To register or view the full program and abstracts click here

2021 POLICY & PRACTICE WORKSHOP

Towards a better understanding of the Biodiversity Stewardship Guideline in SA

FACILITATORS
MELVIN SWARTS & COLIN FORDHAM

30 JULY 2021 | 9 A.M.- 12:20 P.M.

Biodiversity stewardship is an approach to entering into agreements with private and communal landowners to protect and manage land in biodiversity priority areas, led by conservation authorities in South Africa. It recognises landowners as the custodians of biodiversity on their land.

09:00 | Welcome

09:05 | Revitalization and expansion of the Land Reform and Biodiversity Stewardship Initiatives
Natasha Wilson (SANBI)

09:35 | Cape Nature approach to Biodiversity Stewardship
Megan Simons (Cape Nature)

09:55 | Private Nature Reserves Verification and Validation Project in the Western Cape
Kevin McCann (Conservation Outcomes)

10:15 - 10:30 | Discussion

10:30 - 10:45 | TEA BREAK

10:45 | Riparian Buffers Project
Jackie Dabrowski (Confluent Environmental)

11:05 | The Anysberg Corridors
AnneLise Schutte-Vlok, Jan Vlok, Marius Brand (Cape Nature)

11:25 | The Riverlands - Pella Protected Areas Expansion in the Dassenberg Coastal Catchment Partnership (DCCP)
Khungeka Lindani (Cape Nature)

11:45 - 12:15 | Discussion and the way forward

Closing

Go check out the following

Websites, Webinars & Podcasts

FynArt Photo Competition

Participate in the FynArt Photo competition and share your passion for fynbos plants and animals. Registered participants of the online event can submit their favourite photos and stand a chance to win great prizes! Voting for photo submissions per category is open to registered and non-registered members (will require an email address and security check). Visit https://fynbosforum2020.co.za/fynbos-forum-contest/

Johannesburg Succulent Society

The objectives of the Johannesburg Succulent Society are to promote knowledge, the cultivation and propagation of succulent plants, and to contribute towards the protection and conservation of all indigenous plants in their habitats. Visit: https://www.joburgsucculentsociety.com/

The Art of Range

The Art of Range is a podcast about rangelands for people who manage rangelands. The goal is education and conservation through conversation. Find us online at www.artofrange.com

Conservation Conversations with BirdLife South Africa

These weekly webinars hosted through Zoom will hopefully bring some entertainment and education to your household as we embrace the new virtual reality that we all find ourselves in thanks to the restrictions brought on by the recent COVID-19 pandemic. Each talk will last approximately 45 minutes to an hour with a 15-30 minute Q&A session with our presenters afterwards. These sessions will give you a chance to learn about the incredible conservation work taking place across South Africa and beyond while also sharing some of the conservation success stories which BirdLife South Africa has been privileged to drive. Visit: https://bit.ly/3zy0EtP

Conservation Agriculture – Value Addition through Experience and Research

Conservation Agriculture Western Cape and the Soil Health Support Centre invites you to the Jack Human Conservation Agricultural Week. The webinar and both practical days will be available online from Wednesday 4 August at 09:00 until Friday 20 August at 23:00. Book tickets via Quicket: https://bit.ly/3BNgQth

Restoring grasslands in South Africa – GLOBAL IDEAS

The grasslands on the lower slopes of the Drakensberg escarpment are key to South Africa's water resources. Overgrazing is degrading the land. Two women run an organization that promotes measures to restore the ecosystem and help local people prosper. Visit: https://youtu.be/rsDlRhkKT1Y

3 Strategies for effectively talking about change – John Marshall, COUNTDOWN – TED Talk

Which sounds more urgent: "global warming" or "pollution blanket overheating planet"? In this actionable talk, communications strategist John Marshall explains why we need to rethink how we talk about climate change -- and offers small but mighty language adjustments to get people to more intuitively understand and care about this existential threat. Visit: https://bit.ly/3rvSIXg

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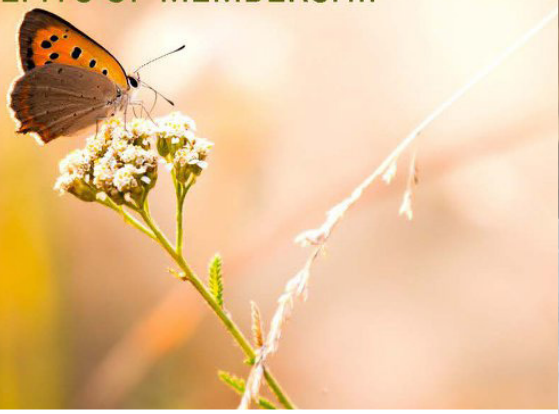

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