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Newsletter of the Grassland Society of Southern Africa

NEW: Tree of the year

Eco-efficiency of irrigated dairy pastures in SA

Toilet training cows for positive environmental impact

Plans for new National Park in Eastern Cape

All the info on GSSA Congress 56

Advancing Rangeland Ecology and Pasture Management in Southern Africa

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In this issue

From our editor

Dear reader,

Welcome to Issue 3 of Grassroots for 2021.

We give feedback on the GSSA's 56th annual and 2nd virtual congress. The programme was packed with interesting research and the chat-box "alive" with conversations. Overall, the congress along with the two workshops received positive feedback from delegates. Congratulations to all the award winners and everyone participating in making it a successful event!

Highlights of this issue:

We pay tribute to one of the founder members of the GSSA, Dr Piet Roux, who passed away on 30 June 2021. Most of his life was dedicated to understanding Karoo ecology and he was an inspiration to many young scientists and farmers. Our hearts go out to his family.

Henk Smit has written an insightful article on the eco-efficiency of irrigated dairy pastures in South Africa. This study identifies opportunities to produce climate-smart dairy products in South Africa and is definitely worth the read! Make sure to scan the QR-codes for the two published articles on this subject.

Who would have ever thought it is possible to "potty train" a cow? Read all about exactly how and why researchers of the University of Auckland have engaged in such a "crazy" study. A new national park is on its way for the Eastern Cape and the City of Cape Town is implementing a "No Mowing" policy. We celebrate the "Tree of the year" and also learn why tree planting schemes can destroy rangelands and damage pastoral livelihoods.

Lastly, we welcome Dr Francuois Muller to the editorial team and thank Charné Viljoen for her valuable inputs over the past year.

Enjoy the read!

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. The leaves of *O. hirtellus* creates a woven effect – hence its common name "Basket grass". Photo: M. Burger (https://www.inaturalist.org/observations/88283855)

Oplismenus hirtellus (Basket Grass)

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This is a small perennial understory forest grass that often causes a thick mat in dense shade. The leaves create a woven effect when observed from above and hence its common name "basket grass".

Figure 2. The awn of *O. hirtellus* is longer than the spikelet. Photo: R Ward (https://www.inaturalist.org/observations/28997322)

The meaning behind the name

The genus name *Oplismenus* is derived from the Greek word *hoplimos*, which means "equipment used for war" – describing the spear-shaped awns of the grass. The awns of this grass are known to be longer than the actual spikelet. *Hirtellus*, a Latin word, describes the slightly hairy leaves.

Southern African distribution

O. hirtellus grows mostly in the eastern parts of South Africa (Lesotho, Eswatini, Limpopo, North West, Gauteng, Mpumalanga, KwaZulu-Natal, Western Cape and Eastern Cape).

It can easily be confused with the other common *Oplismenus* species found in South Africa (*O. undulatifolius*) and often plants with underdeveloped inflorescences are very difficult to distinguish. These two species grow in very similar environments as well as the same part of South Africa. Some of the differences between the two are summarized below:

	O. hirtellus	*O. undulatifolius*
Growth form	Prostrate	Trailing
Inflorescence	6-20 spikelets per inflorescence	2-6 spikelets per inflorescence
	Longitudinal racemes	Spikelets in clusters
Leaf-blade	Approx. 130 x 4 -20 mm	10-70 mm x 4-15 mm
Flowering season	January – June	January – July

Other features of *O. hirtellus*

- Locally common
- Purple sticky awns
- Leaves are open and in the shape of a lancet
- The leaf ligule is membranous with a fringe of hairs

Uses

- Due to its low leaf production, it is an unimportant grazing grass.
- The flowers are a good source of food for butterflies.
- Small seed-eating birds (like mannikins) enjoy their seeds and therefore this grass can make a great addition to a shady spot in the garden.

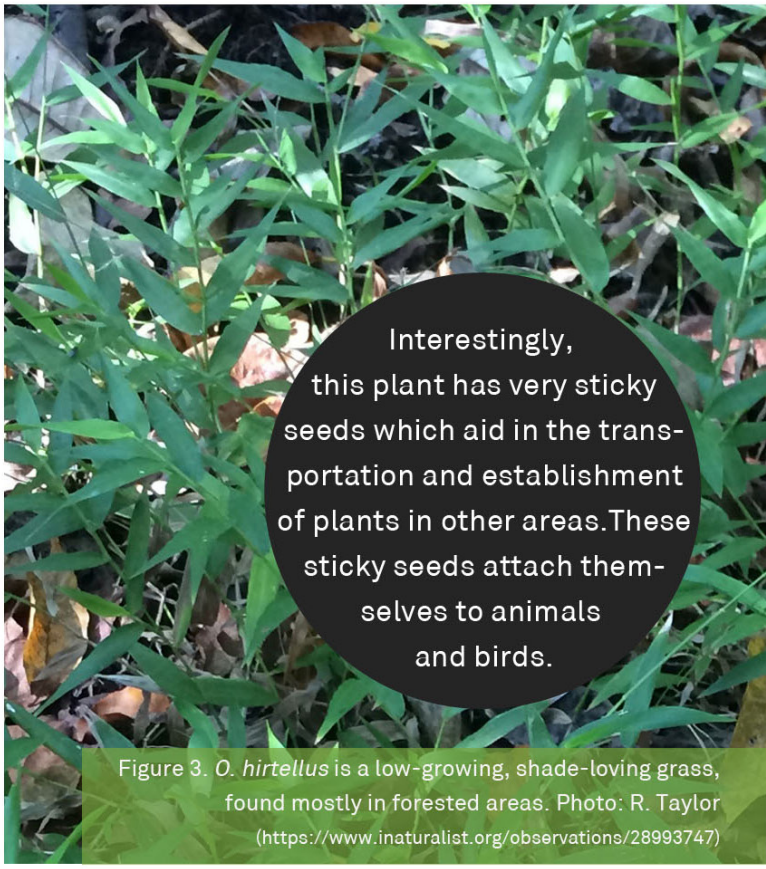

Figure 3. *O. hirtellus* is a low-growing, shade-loving grass, found mostly in forested areas. Photo: R. Taylor (https://www.inaturalist.org/observations/28993747)

- There is also a horticultural variety, which is a variegated pink, black and green type. This is often used as a good groundcover in gardens around the world.

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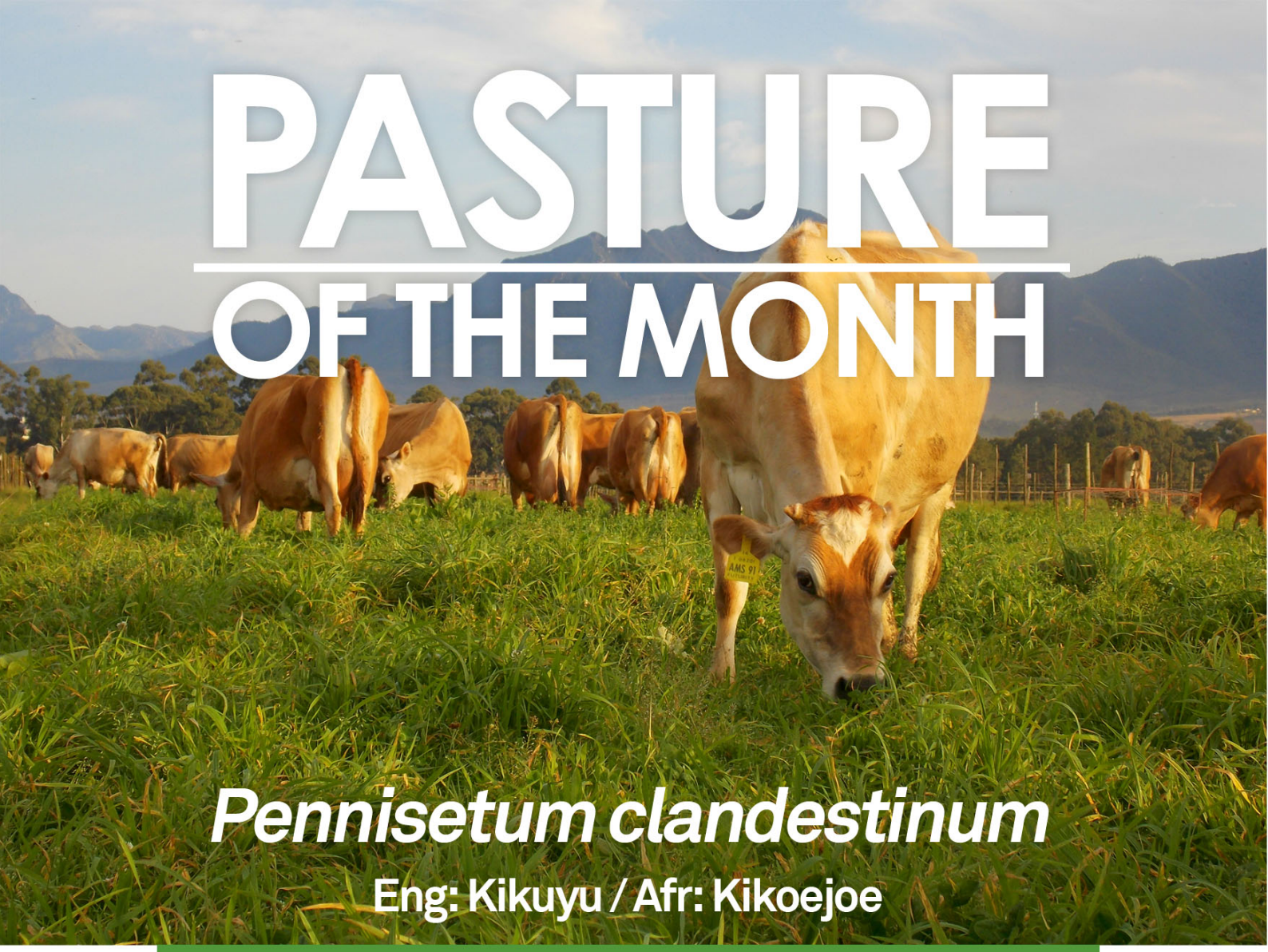

PASTURE OF THE MONTH

Pennisetum clandestinum

Eng: Kikuyu / Afr: Kikoejoe

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Kikuyu (*Pennisetum clandestinum*) is a common pasture grass in the milk production regions of South Africa. The name "kikuyu" originates from a tribe in Kenia where its shoots were first collected for distribution. It is also a popular lawn grass especially used for sports pitches.

Kikuyu is a perennial summer grass and well adapted to temperate, subtropical and tropical conditions. It can even withstand short periods of severe frost. Its creeping nature and ability to form a dense mat of stolons and rhizomes make it tolerant of intense defoliation. However, it can become an aggressive invader and is hard to eradicate.

Kikuyu produces high amounts of material (up to 20 t DM/ha/season under ideal conditions) but is relatively low in quality. Over the past two decades, various temperate grasses and legume species have been over-sown into existing kikuyu fields during autumn to improve their quality. Such species include annual ryegrass, perennial ryegrass, tall fescue and red- and white clover. These over-sown pasture systems not only improve forage quality but also the quantity and can result in an increased milk yield of 25 to 40%. The inclusion of legume species can also significantly decrease the need for expensive nitrogen fertilisation.

Other characteristics:

- No visible inflorescence.
- Long, white anthers and feather-like stigmas are visible during flowering.
- Leaf-sheaths overlap each other.
- Leaf-blade has a clear visible main vein.
- Flowers from August to April.

Figure 1. Kikuyu flowers from August to April. (Photo: Wikipedia)

Growth requirements:

- High water requirement (700 – 1600 mm per annum) and perform best under irrigation.
- Require high soil fertility and respond well to high N and P fertilisation.
- Heavier soils with a good structure are preferred over sandy soil.
- It can tolerate a soil pH (KCl) of 4.5 but performs best at a pH (KCl) > 5.

Figure 2. Kikuyu can be over-sown with temperate grass and legume species. (Photo: Malissa Murphy)

Uses:

- Summer pasture in intensive grazing systems
- Can be used as foggage for winter or can be ensiled
- Lawn grass
- Long term soil stabiliser

Figure 3. Kikuyu is a common pasture grass in the milk production regions of South Africa. (Photo: Barenbrug)

References:

- AgriFoodSA: https://agrifoodsa.info/news/where-find-kikuyu-grass-south-africa-and-why-it-beneficial
- AGT Foods: https://agtfoods.co.za/wp-content/uploads/2019/01/14.-Kikuyu.pdf
- Barenbrug: https://www.barenbrug.co.za/forage/products/subtropical-grasses/kikuyu-grass.htm
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- Van Der Colf, J. & Botha, PR. 2015. Production Potential and Evaluation of Establishment Methods to Over-sow Kikuyu with Grass and Legume Species. Grassroots Vol. 15 no. 2.

Figure 4. Kikuyu is a popular turf grass for sport fields. (Photo: Glendower Golf Club)

TREE OF THE MONTH

Figure 1. A mature Buffalo thorn tree.
Photo: Z.M. Smit

Ziziphus mucronate
(Buffalo Thorn – Blinkblaar Wag-'n-bietjie)

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The Buffalo thorn is a medium-sized tree that usually grows 3 – 10 m high with larger trees able to grow up to 20 m high. The species is common and widespread across most of Southern Africa but is absent from the winter rainfall areas of the Western Cape. It can be found in a wide range of habitats such as rocky outcrops along rivers and drainage lines, grasslands and forest margins. This species also grows in a variety of soil types. The common Afrikaans name, "Wag-'n-bietjie (Wait-a-while)", refers to the vicious nature of the thorns and having to "wait a while" to untangle yourself if you come into contact with the plant.

Figure 2. A common duiker foraging for dropped Buffalo thorn leaves.
Photo: Z.M. Smit

Diagnostic features and phenology

Figure 3. The distinctive thorns of the Buffalo thorn.

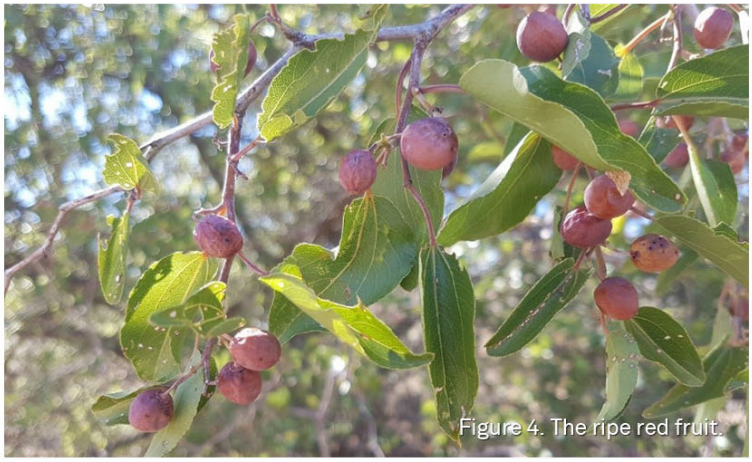

Figure 4. The ripe red fruit.

Figure 5.
An example of bright green leaves and small green to yellowflowers.
Photos: Z.M. Smit, http://treesa.org/ziziphus-mucronata/

- Distinctive pair of thorns at nodes, one thorn is straight while the other is curved backwards.
- The leaves are simple, alternate; ovate or broadly ovate, veined and shiny green above.
- The small flowers (4 mm) are borne in a cluster and are yellow to green.
- Young branches zigzag.
- The almost spherical fruit or drupes are red when ripe and leathery in appearance.
- Evergreen along coastal distribution range but winter deciduous in other regions.
- Dried fruit may remain on the tree long after the leaves have dropped. Flowers may be present from early spring to summer.

Ecological value and uses

The Buffalo thorn is an ecologically important tree species as it provides a food source for a large number of animals. The leaves are sought after by both game and livestock as browse. Many species are also known to feed on dried leaves dropping to the ground. The fruit is eaten by many birds and mammal species. The nectar-rich flowers attract an array of beetles, wasps, bees, flies and birds. Although the fruit is edible and was used by early settlers to make coffee and porridge, it is not regarded as very tasty. The fruit can also be fermented to make beer. Some African tribes use thorny branches to make kraals or hedges to protect livestock from predators. The wood of the tree is regarded as excellent timber. The roots, bark and leaves are often used to treat respiratory and skin ailments as well as a form of painkillers.

References

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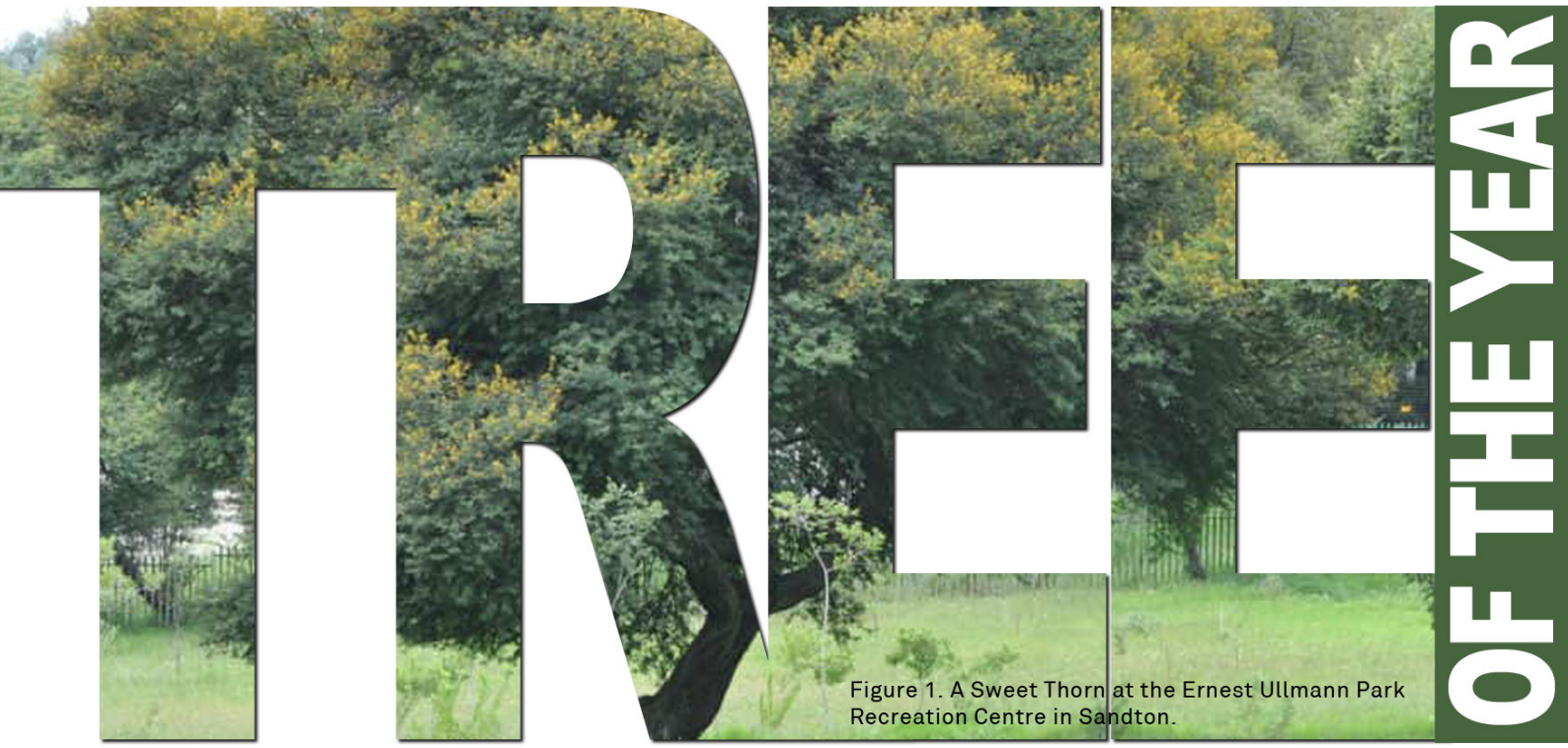

Figure 1. A Sweet Thorn at the Ernest Ullmann Park Recreation Centre in Sandton.

Arbor Week 2021

National Arbor Week in South Africa is celebrated annually during the first week of September. It is a time when people of all ages are encouraged to celebrate the beauty and importance of trees, particularly our beautiful indigenous tree species.

Authors: Lifestyle Home Garden | www.lifestyle.co.za/arbor-week-2021/

With this in mind, two trees are usually highlighted each year as **Tree of the Year** – one common and one rare species. This list has now been adapted to draw attention to three indigenous trees, i.e.

1. Common Tree of the year, which is a species or genus that is generally easier to grow and occurs more widely.

2. Tree for Promotion is a tree species or genus that is perhaps less widely adapted, yet is not uncommon and generally commercially available.

3. Tree for Appreciation is a tree species or genus that is generally more restricted in its distribution or requires very specific growing conditions.

So, without further ado, let's focus on the indigenous marvels that have been singled out for 2021.

Common Tree: *Vachellia karroo*

(Previously *Acacia karroo*)

Figure 2. A Sweet Thorn in flower at the Walter Sisulu Botanical Gardens in Roodepoort.

Common names: Sweet Thorn, Soetdoring, mookana, mooka, umuNga

- Description: Deciduous (in areas with cold, dry winters) tree
- Position: Full sun
- Size: Medium (up to 12m)
- Hardiness: Frost hardy
- Growth rate: Fast
- Flowers: Bright yellow, pom pom flowers are borne throughout summer.
- Fruit & Seed: Large, brown seed pods follow the flowers in autumn.
- Watering needs: Water young trees deeply and regularly. Drought resistant once established.
- Use: An excellent shade tree with a lovely canopy and a very ornamental specimen in the larger garden. The roots are invasive, so don't plant near walls and paving. The tannin in the bark is used to tan leather. The flowers produce an abundance of nectar and pollen for beekeepers.
- Environmental: The sweet-smelling flowers attract bees, butterflies and other pollinating insects. The caterpillars of 10 species of butterflies are dependent on the Sweet Thorn for survival. Birds like to nest in these trees as the thorns offer them protection from predators.

Interesting to know:
Throughout our history, this tree has been used extensively for all sorts of things from sewing needles and pins to creating fences for the houses of royal Zulu women.
It was also a welcome sight to travellers as it was a sure indication of water in dry areas.


Figure 3. Spekboom grows well in pots too!

Promotional Tree: *Portulacaria afra*

Common names: Elephant's food, Spekboom, iNtelezi, isiDondwane, isAmbilane, iNdibili, isiCococo, iGqwanitsha

- Type: Evergreen succulent shrub
- Position: Sun / Semi-shade
- Size: Will about 2m maximum in the normal garden situation
- Hardiness: Moderately frost hardy
- Watering needs: Low
- Growth rate: Moderate
- Flowers: Covered in small, pink, star-shaped flowers from late winter to early summer
- Fruit: Inconspicuous, however, the leaves are edible and widely ejoyed in salads or as a vegetable.
- Use: The Spekboom can be used in rockeries and beds or to cultivate screens and clipped hedges. They look very attractive in pots on sunny patios and balconies and also make handsome and hardy bonsai.
- Environmental: This little succulent tree enjoys international fame as a carbon sponge and is also planted as a soil binder against soil erosion. The little flowers provide nectar to a variety of insects.


Figure 4. A large Spekboom at the Pretoria Botanical Gardens.

Interesting to know:
The Pork bush can be a great standby and find for hikers as the high water content of the leaves can be used to quench thirst and so counter exhaustion and dehydration. The leaves can also be used to rub on blisters and corns on tired feet.

Tree for Appreciation: *Warburgia salutaris*

Common names: Pepper Bark Tree, Peperbasboom, isibhaba, manaka, shibaha

- Description: Evergreen, slender tree
- Position: Sun / Semi-shade
- Size: Medium (about 7,5m)
- Growth rate: Moderate
- Hardiness: Frost-sensitive when young.
- Watering needs: Moderate
- Flowers: Small, greenish-white flowers from mid-autumn to early winter.
- Fruit & Seed: Purple, leathery berries from mid-winter to early summer.
- Use: A very attractive specimen tree for small and large gardens, it can also be grown as a screen or hedge and successfully planted in pots.
- Environmental: *Warburgia* is highlighted as a tree of the year to promote its cultivation in gardens, as it is now an endangered species due to its overharvesting for medicinal purposes in the wild.


Figure 5. A Pepper Bark Tree at the Walter Sisulu Botanical Gardens.


Figure 6. Flowers on a Pepper Bark Tree at Walter Sisulu Botanical Gardens.

Interesting to know: The peppery stems and inner bark has a range of medicinal uses as expectorant and snuff against a variety of respiratory problems. Root bark is used as a cure for malaria.

All images courtesy of treesa.org.

Eco-efficiency of irrigated dairy pastures in South Africa: N_2O Emissions from managed soils and its implication for carbon footprint calculations

A synopsis of two published articles:
Smit et al. (2020). Grazing under irrigation affects N_2O-emissions substantially in South Africa. Atmosphere, 11(9), p.925.
Smit et al. (2021) Environmental impact of rotationally grazed pastures at different management intensities in South Africa. Animals, 11(5), p.1214.

Hendrik P.J. Smit[1], Thorsten Reinsch[1], Pieter A. Swanepoel[2], Christof Kluß[1] and Friedhelm Taube[1,3]

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Introduction

Nitrogen fertilization, irrigation and concentrate feeding are important factors in rotational pasture management for dairy farms in South Africa. The extent to which these factors affect environmental efficiency is subject to current and intense debate among scientists. Dairy farmers generally use high amounts of mineral fertilizer to promote herbage growth and maximize herbage yield per hectare, despite the high amounts of manure that is available. However, increments in herbage yield are not increasing linearly with additionally applied nitrogen (Viljoen et al. 2020). Fertilized agricultural soils serve as a primary source of anthropogenic N_2O emissions, a greenhouse gas with a global warming potential 265 times that of CO_2. In South Africa, there is a paucity of data on N_2O emissions from fertilized, irrigated dairy-pastures and emission factors (EF) associated with the amount of N fertilized. However, it is important to create region-specific EFs to quantify emission hotspots and subsequently promote mitigation strategies to ensure climate-smart dairy production. The growing concern over GHG and the effect of dairy production on the environment has led to the need to express the total emissions associated with milk. Product carbon footprint (CF) analysis has become broadly accepted as an assessment method. The N-fertilizer management is an important parameter to consider when calculating the CF of milk (Henriksson et al. 2011). This study could update South Africa´s greenhouse gas inventory more accurately and can promote ways to produce more environmentally friendly milk with low associated greenhouse gas emissions and therefore a lower carbon footprint. Accordingly, important questions were addressed: (1) What would be the response of N_2O emissions under managed soils in the southern Cape region of South Africa to N fertilization, under irrigation and intensive grazing practices, because of N levels exceeding plant requirements? (2) Can high stocking rates on intensively managed, highly fertilized and irrigated dairy pastures lead to high amounts of N returned through excreta to the soil and result in a high N surplus which could underestimate predicted N_2O emissions? (3) To what extent does mineral N-fertilizer usage in intensive rotationally stocked dairy pasture systems in South Africa affect the milk yield, CF, N-balance and N-footprint per hectare and per kg of milk produced?

Materials and Methods

Field trials were laid out as a randomized block design to evaluate five N fertilizer rates (0, 220, 440, 660 and 880 kg N ha^{-1} $year^{-1}$) as treatments on N_2O emissions from irrigated kikuyu-perennial ryegrass (*Pennisetum clandestinum-*

Lolium perenne) pastures. Plots were 15 × 15 m and replicated in 4 blocks. The study was conducted near the city of George in the southern Cape region of South Africa (33°58'38" S; 22°25'16" E; 201 m.a.s.l.). N_2O emissions were captured using the static chamber method (Hutchinson & Mosier, 1981). Gas measurements were performed for one year on a weekly basis unless in the case of a fertilization event, where it was done in three consecutive days after fertilization. Gas samples were analysed for N_2O through a gas chromatograph to determine daily fluxes (Smit et al. 2020). Cumulative fluxes were calculated by means of linear interpolation. Furthermore, three-year (April 2016 to June 2019) experimental field data was used to investigate the effect of mineral fertilizer levels, as management strategies, on the pasture yield and the PCF of produced milk. The additional N-excretion from grazing animals was considered and was calculated to be evenly distributed at 450 kg N ha^{-1} $year^{-1}$ for all treatments. Forage quality parameters were estimated using near-infrared reflectance spectroscopy (NIRS). The on-farm soil organic carbon (SOC) changes of the tested production systems were also estimated. The global warming potential (GWP) per hectare was calculated using the respective value for each trace gas (CO_2 = 1, N_2O = 265, CH_4 = 28) over a lifespan of 100 years (IPCC 2014) and expressed as CO_2eq. The efficiency of the different N fertilization strategies, in relation to climate change, was calculated on the basis of the functional unit ECM as proposed by Sjaunja et al. (1990). The farm-N-balance was calculated using a simple equation that deducts the nitrogen outputs at the farm gate from the sum of the nitrogen inputs.

Results and Discussion

Accumulated N_2O emissions ranged between 2.45 and 15.5 kg N_2O-N ha^{-1} $year^{-1}$ (Figure 1) and EFs for mineral fertilizers applied had an average of 0.9%. Therefore, the IPCC default value EF for N-deposition from animal excreta seems to be overestimated.

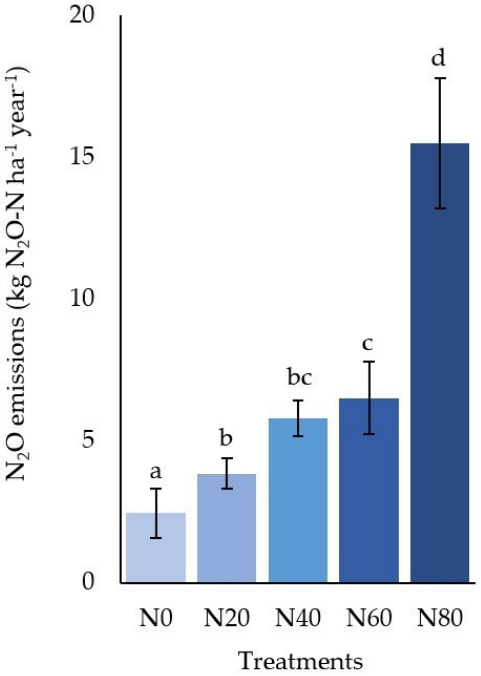

Figure 1: Accumulated N_2O-N emissions for the different N fertilization treatments (N0, N20, N40, N60, and N80) over the trial period. Error bars denote standard error of the mean. Different letters indicate significant differences between the treatments ($p < 0.05$). The N0, N20, N40, N60, and N80 refer to the fertilizer rates used as treatments and were 0, 220, 440, 660, and 880 kg N ha^{-1} $year^{-1}$, respectively.

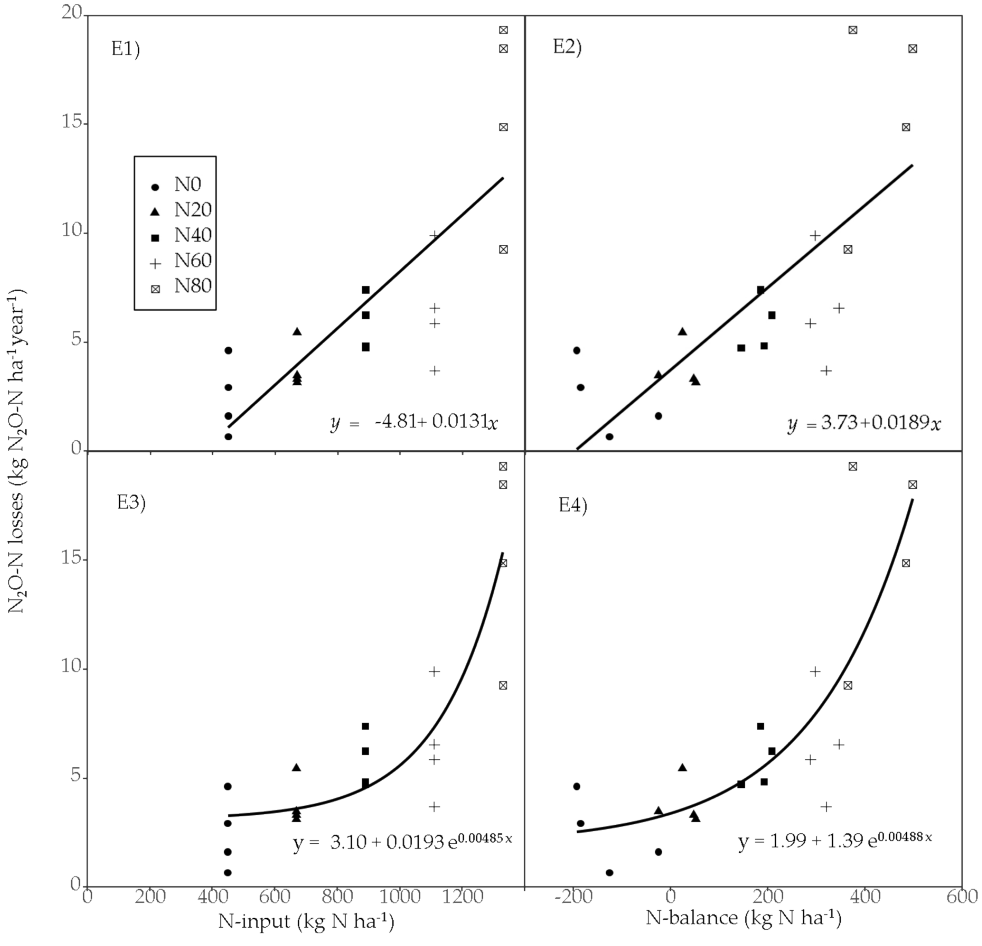

Figure 2: The linear relationship between accumulated N_2O-N losses (kg N_2O-N ha^{-1} $year^{-1}$) in relation to (**E1**) increased levels of N-input (kg N ha^{-1} year−1) as well as (**E2**) increased levels of N balance (kg N ha^{-1} $year^{-1}$). The nonlinear relationship between accumulated N_2O-N losses (kg N_2O-N ha^{-1} $year^{-1}$) in relation to (**E3**) increased levels of N-input (kg N ha^{-1} $year^{-1}$) as well as (**E4**) increased levels of N balance (kg N ha^{-1} $year^{-1}$).

The relationship between N_2O-N losses and N input can best be described by an exponential function (Figure 2) rather than a linear function, which indicated that excessive fertilization of N will add directly to N_2O emissions from the pastures. There was no positive effect on the growth of pasture herbage from adding N at high rates. The suggested EFs of the IPCC default value for grazing systems led to an overestimation of N_2O emissions (Table 1) when they were compared to the estimated values obtained from the current study. A better approach would be to replace EFs of the IPCC default value with regional EF values, which are dependent on the N balance. This leads to more accurate greenhouse gas inventories from managed soils on a regional scale, where other environmental threats (e.g. groundwater pollution and eutrophication) are also addressed.

Table 1: The predicted annual N_2O emissions are based on the Intergovernmental Panel on Climate Change (IPCC) emission factors (EFs) ($IPCC_{min}$ + $IPCC_{min+exc}$). The EFs are calculated based on the N_2O measurements (EF_{data}) and linear (E1–E2) and nonlinear (E3–E4) regression approaches for the different N fertilization treatments (N0, N20, N40, N60, and N80 expressed as kg N_2O-N ha^{-1} $year^{-1}$). The R square (R^2), root mean square error (RMSE), and the Nash–Sutcliffe model efficiency coefficient (NSE) are shown as a result of the comparison between measured and predicted annual N_2O emissions indicating the best fit of measured vs. predicted values. The N0, N20, N40, N60, and N80 refer to the different mineral fertilizer application rates used and were 0, 220, 440, 660, and 880 kg N ha^{-1} $year^{-1}$, respectively.

Treatment	N0	N20	N40	N60	N80	R2	RMSE	NSE
$IPCC_{min}$	0.0	2.2	4.4	6.6	8.8	0.59	3.15	0.30
$IPCC_{min+exc}$	9.00	11.2	13.4	15.6	17.8	0.62	3.05	−1.07
EFdata	0.0	1.9	3.8	5.8	7.7	0.59	3.15	0.11
E1	1.1	4.0	6.9	9.7	12.6	0.62	3.05	0.64
E2	1.2	4.2	7.2	9.6	11.9	0.56	3.30	0.58
E3	3.3	3.6	4.5	7.3	15.3	0.77	2.36	0.72
E4	2.7	3.6	5.4	8.4	13.3	0.71	2.65	0.63

Estimated methane emissions resulting from ruminal enteric fermentation were on average the largest contributor (49%) to the total GWP per hectare over all treatments. More than half of emissions in the N60 and N80 treatments were the result of direct N_2O emissions from mineral fertilizer applied to pastures and as a result of irrigation. Mineral N fertilizers as inputs accounted for the third largest contributor (12%) of total GWP per hectare. Soil carbon sequestration had a positive effect in reducing the total GWP per hectare over all treatments (Table 2).

Table 2: The potential average milk yields, GWP, CF and N-balance for the various treatments (N0, N20, N40, N60 and N80) over the three years. SEM are shown in brackets.

Parameter	Treatment				
	N0	N20	N40	N60	N80
Milk yield (t ECM ha^{-1})	14.8 [a] (0.7)	16.6 [b] (1.1)	16.5 [c] (0.9)	17.5 [d] (1.3)	18.0 [e] (0.9)
GWP (t CO_2eq ha−1)	22.1 [a] (0.3)	25.3 [b] (0.4)	29.6 [c] (0.4)	36.6 [d] (0.1)	50.7 [e] (0.3)
GWP + soil carbon (t CO_2eq ha^{-1})	18.4 [a] (0.2)	21.2 [b] (0.2)	25.4 [c] (0.2)	32.2 [d] (0.2)	46.2 [e] (0.5)
CF + soil carbon (kg CO_2eq kg ECM^{-1})	1.3 [a] (0.1)	1.3 [a] (0.1)	1.6 [b] (0.1)	1.9 [c] (0.2)	2.6 [d] (0.2)
Farm-N-balance (kg N ha^{-1})	31 [a] (1.8)	241 [b] (3.8)	462 [c] (2.6)	677 [d] (5.0)	899 [e] (5.3)

[abcde] no common lower-case letters indicate significant differences between treatments

With increasing farm-N-balance per hectare, the GHG emissions were generally higher. This relationship could best be described as exponential. In contrast, the ECM ha^{-1} correlated linearly with the farm-N-balance. However, the lowest farm-N-balance (N0 treatment) did not result in the lowest CF and were similar between the N0 and N20 treatment.

The results from the current study indicated an improvement in the carbon footprint as the amount of N-fertilizer was reduced. The main source of N came from purchased mineral fertilizers. Consequently, the fertilizer and the extensively imported supplements were the most prominent factors influencing the farm-N-balance, respectively. In South African pasture-based dairy systems, cows graze pastures year-round, which makes high N returns to pastures more likely. Dairy cows excrete ~75% of their N intake, whereas less than ~25% is metabolized into the milk output from the pasture system (Luo & Kelliher 2010). Even if concentrates are fed at low levels there will still be a considerable amount of N returned through excreta. Therefore, excreta should be considered in fertilization management strategies. The CF of milk from pasture-based dairy farms can be further improved through management such as timing of fertilizer application, reducing the amount of fertilizer applied, and by incorporating forage legumes.

Figure 3: An example of the chambers used to collect gas samples in the current study.

Figure 4: Outeniqua Research Farm from the Western Cape Department of Agriculture where the research was conducted.

Conclusion

The study could be used as a pilot study to measure GHG emissions from prevailing forage crop systems in South Africa. This study indicated that the excess N applied in combination with excreta on pasture-based dairy farms have no beneficial effects on herbage yields and therefore contribute to negative environmental effects as well as the CF of milk. This study gave insight about the opportunities to produce climate-smart dairy products in South Africa. Regional developed values for the different parameters considered in the study should be used to update the accuracy of the calculated CF of milk from pasture-based systems in South Africa.

Funding

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Research to toilet train cows aims for positive environmental impact

University of Auckland-affiliated researchers have successfully demonstrated that cows can be toilet trained. It's no joke. Lindsay Matthews and Douglas Elliffe's research with German colleagues could help reduce water contamination and greenhouse gas emissions.

UniServices

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Cow urine is high in nitrogen. As it breaks down in the soil, it results in two problematic substances – nitrate and nitrous oxide. Nitrate from urine patches leaches into lakes, rivers and aquifers, where it pollutes water and contributes to the excessive growth of weeds and algae. Nitrous oxide, a long-lived greenhouse gas 300 times more potent than carbon dioxide, accounts for 12 percent of New Zealand's greenhouse gas emissions – and much of it comes from the agricultural sector.

If cows could be trained to urinate in a "toilet" at least some of the time, nitrogen could be captured and dealt with before it pollutes water or turns into nitrous oxide gas. Matthews and Elliffe's research detailing how has been published in the prestigious journal *Current Biology* and is profiled in *Science*.

"We've shown proof of concept that we can train cows and train them easily," said Elliffe, a University of Auckland professor of psychology. "Cattle urine is a major cause of our nitrogen problem. Any reduction in that would make a difference."

"People's reaction is, 'crazy scientists,' but actually, the building blocks are there," said Matthews, a University of Auckland honorary academic and director of an independent research company. "Cows have bigger urinations when they wake up in the morning, which demonstrates they have the ability to withhold urination. There's nothing in their neurophysiology that radically differentiates them from animals, such as horses, monkeys and cats, that show latrine behaviour."

Figure 1: Lindsay Matthews

Matthews has been around cows for a long time – he grew up on a dairy farm and did his PhD research on learning and preference in cows. In 2007, during a radio interview about the environmental impact of cattle excretion, the host suggested Matthews should toilet train them. It was a joke – but it got Matthews thinking.

In 2015, Matthews was working with Professor Lars Schrader at the Federal Research Institute for Animal Health in Germany when Schrader suggested toilet training to deal with ammonia emissions, which result from contact between faeces and urine. Previous international attempts to toilet train cows had seen little success, but Matthews thought that with his deep expertise, he might be able to do better. He brought in Elliffe, who has complementary skills in behavioural analysis, to help.

With their German colleagues, Mat-

Figure 2: Lindsay Matthews

thews and Elliffe worked with 16 calves at a farm operated by the Research Institute for Farm Animal Biology in Germany. First, they demonstrated that most calves could be trained to "hold it." If they began to urinate in the wrong place, the scientists would make their collars vibrate. While the vibration didn't hurt them, most of the calves soon learned to walk a short distance to a latrine pen.

Next, Matthews and Elliffe put the calves in the latrine pen, which was bright green to differentiate it from other pens, and rewarded them with a favoured food treat if they urinated there.

"This is how some people train their children – they put them on the toilet, wait for them to pee, then reward them if they do it," said Matthews. "Turns out it works with calves too. In very short order, five or ten urinations for some animals, they demonstrated they understood the connection between the desired behaviour and the reward by going to the feeder as soon as they started urinating."

The next progression was to increase the distance cows had to walk to the latrine. If "accidents" occurred in another part of the barn, scientists would squirt a little cold water at them. Most of the calves soon learned the ultimate toilet-training skill.

"Very quickly, within 15 to 20 urinations on average, the cows would self-initiate entry to the toilet. This is very exciting because it means they were paying attention to their bladder getting fuller," said Matthews. "By the end, three-quarters of the animals were doing three-quarters of their urinations in the toilet."

The calves received only 15 days of training and the majority learned the full set of skills within 20 to 25 urinations, which compares favourably to toilet-training time for three- and four-year-old children.

The next step for Matthews and Elliffe is to bring their research to the New Zealand context. In the Northern Hemisphere, cows spend much of their time in barns. In New Zealand, they spend most of their time outdoors. This makes toilet training more of a challenge. However, cows do gather for milking and receiving supplements, so it may be possible for them to use a latrine at those times. Installing latrines outdoors may be another possibility. Even if these changes result in a lower success rate, reducing urine patches would have significant environmental benefits.

"If we could collect 10 or 20 percent of urinations, it would be sufficient to reduce greenhouse gas emissions and nitrate leaching significantly," said Elliffe.

Figure 3: Image courtesy Research Institute for Farm Animal Biology.

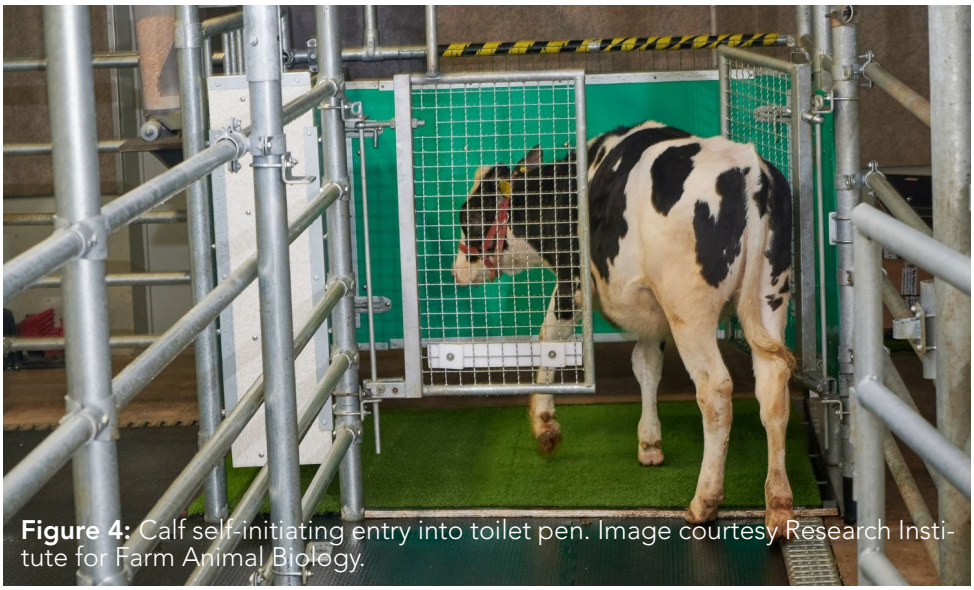

Figure 4: Calf self-initiating entry into toilet pen. Image courtesy Research Institute for Farm Animal Biology.

Another challenge will be to scale up so it's economically feasible to train millions of animals. This could be accomplished by using urination-detecting sensors and automatic reward systems.

Trained cows could be transitioned into not expecting a food reward after every urination, the researchers say.

With help from UniServices, Matthews and Elliffe have met with representatives of the New Zealand dairy industry, who are interested in the research as a potential way of avoiding the herd reductions that may otherwise be necessary to meet emissions targets.

A further application of the research may be to extract and reuse nutrients, such as nitrogen and phosphorus, from the collected cow urine. At the University of Auckland and elsewhere, there are researchers in fields such as chemistry and engineering working on closely related problems.

"This is new science, what we've done here, so there are many ways to push it," said Matthews.

This work was supported by the Volkswagen Foundation.

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Nestlé dairy farm on track to reaching net-zero carbon emissions

AgriOrbit

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Nestlé's first dairy farm earmarked to reach net-zero carbon emissions in 2023, is on track to reach its targets. The Skimmelkrans Farm, located in George in the Western Cape, produces some of the company's nutritious products such as Nestlé MILO and Nestlé NESPRAY.

"Producing quality milk is crucial to increasing the nutritional value of our products without compromising taste and health. It is for this reason that we invested in innovative and environmentally friendly practices to improve care and nutrition for the cows on the farm, which means better nutrition in the milk products produced," said Hoven Meyer, agricultural services group manager at Nestlé East and Southern Africa Region (ESAR).

"We have worked very hard to ensure that the Skimmelkrans project is not only successful in achieving net-zero carbon emissions but becomes a model which farms that are operated by Nestlé can effectively implement. In just over a year, we have started seeing some positive results through this project. We have seen an 11% increase in milk production per cow, achieved a 40% reduction in energy by using solar power, and a 45% increase in active carbon in the soil," added Meyer.

The results were validated by independent soil experts through testing, screening, and analysing the soil, which confirmed that Skimmelkrans Farm is past the halfway mark to reaching the net-zero carbon emissions goal. Further validation pointed out that if the farm keeps the momentum, it could achieve net-zero carbon emissions before 2023.

Skimmelkrans Farm has set itself apart through prudent soil work, water conservation, feed management, and manure processing, where the most significant reductions of greenhouse gases occur. During milking, cow manure is collected and separated into liquids and solids using a manure press. The separated liquids go back to the pastures as irrigation, while the solids are released into the soil as compost. The farm has used approximately 4 000 tons of chicken manure as organic fertiliser – replacing some chemical fertiliser with a high carbon footprint.

"We are proud of the progress to date and are motivated to work even harder in realising our goal of reaching net-zero carbon emissions at Skimmelkrans by 2023. This project is really pioneering regenerative agriculture practices that are key in our response to ensuring sustainable production and job creation.

"In South Africa, through our farmer support and partnerships, we procure our milk from around 140 local dairy producers, therefore creating over 4 000 permanent jobs," said Saint-Francis Tohlang, corporate communications and public affairs director at Nestlé ESAR. - *Press release, Nestlé*

Figure 1: Nestlé dairy farm on track to reaching net-zero carbon emissions

Wide open spaces: Eastern Cape landowners near the Lesotho border stand to benefit if plans for a new national park are realised

South African National Parks (SANParks) is working on establishing a high-altitude national park in the mountains of the Eastern Cape close to the Lesotho border and the spectacular Naude's Nek pass.

Tembile Sgqolana

Current Address: Daily Maverick
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If all goes according to plan, the Eastern Cape will be home to a new 30,000-hectare national park in the next five years.

The proposed national park, a collaboration between SANParks and the World Wide Fund for Nature (WWF), will become South Africa's newest national park and contribute significantly towards the conservation of grasslands and water security.

To establish the park, SANParks and the WWF will be looking to sign voluntary agreements with private and communal landowners using the biodiversity stewardship approach. This means the landowners will continue to own the land that will fall under the park, and they will get assistance in co-managing the area. If they decide to sell the land, it will be to SANParks at market value.

Funding for the long-term implementation of the park will be provided through the Department of Forestry, Fisheries and Environment, with income generated by SANParks through tourism, as well as some innovative conservation finance mechanisms that are being piloted, such as carbon payments.

The process is still in the planning and stakeholder engagement stage. So far, potential private and communal land for inclusion into the project has been identified through desktop assessment.

Figure 1: The beautiful view of the mountains and river in the Eastern Cape near the Lesotho border is earmarked for a national park. (Photo: Nick Helme)

Over the next two years, engagements with private landowners and chiefs will be held and data such as the number of villages, what the land is used for, its ownership status and valuation will be gathered. A biodiversity site assessment will be conducted before the park is officially declared.

SANParks general manager of park planning and development, Kristal Maze, confirmed they were engaging landowners and communities affected.

"This is still at a sensitive stage. We have engaged farmers' associations and Rhodes town residents, and we are still engaging Chief Montoeli Lehana of the Batlokoa Traditional Council and the community in Mount Fletcher," she said.

The process was still in the foundation phase and it depended on the landowners to make it a success, she said.

"The creation of this new park will play a significant role in buffering communities from the impacts of climate change. Impacts of climate change

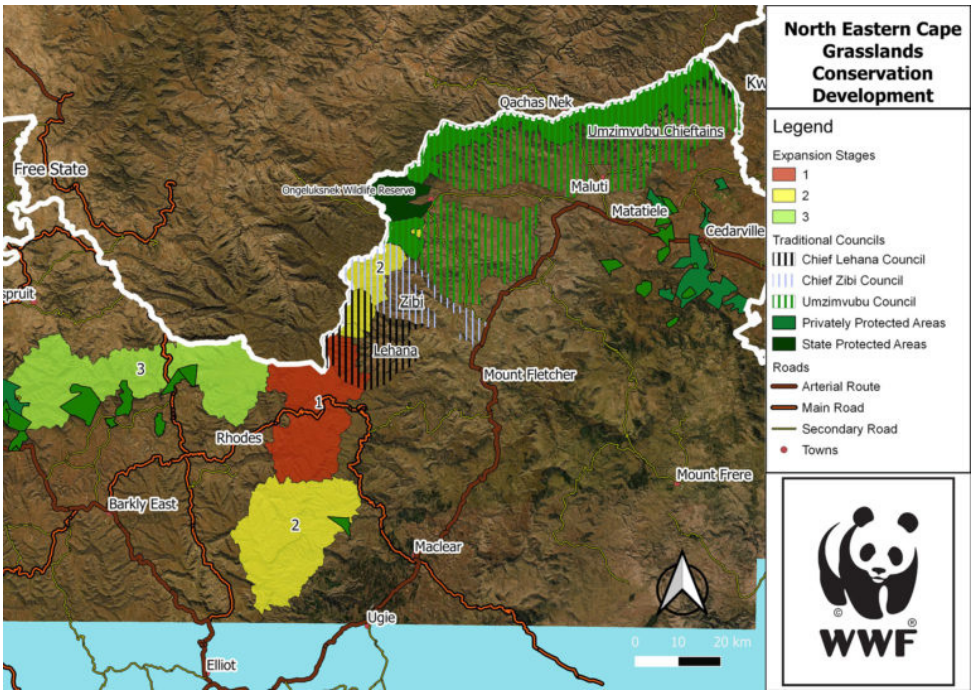

Figure 2: A map of the region earmarked for the park. (Image: Supplied)

Figure 3: A community engagement meeting with Mount Fletcher residents and WWF South Africa representatives. (Photo: Thembanani Ntsibande)

are evident across all ecosystems and communities. Temperature increases of more than 1°C have been observed in the past 50 years, accompanied by the intensification of extreme events such as droughts, heavy rainfall, coastal storm surges, strong winds and wildfires. Healthy ecosystems can provide resilience against the worst effects," said Maze.

Restoring the ecosystems in this area and maintaining them in good ecological condition meant they were better able to support natural adaptation and mitigation processes, offering increased protection to human communities and reducing the economic burden of climate disasters, she said.

"The ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services to support communities to adapt to life in a less predictable climate system. This involves an innovative approach that focuses on working with private and communal landowners in what will remain a working agricultural landscape," she said.

She said the overall objective was to establish an "ecologically, economically and socially sustainable consolidated protected area within the region through an innovative combination of land inclusion mechanisms and development options".

She said this new park is needed to:

- Significantly improve the protection of the grassland biome in an area that has been identified as a national conservation priority in the recent National Biodiversity Assessment as well as the National Protected Area Expansion Strategy.
- Protect ecological infrastructure of national significance for water security in the Eastern Cape Drakensberg Strategic Water Source Area (SWSA).
- Promote investment through the Expanded Public Works Programme in the restoration and maintenance of this SWSA to enhance water security and the flow of associated ecosystem services, while simultaneously providing job opportunities.
- Attract investment into the area, with substantial income enhancement potential and increase livelihood security, through increasing income opportunities, income levels, employment diversity and attracting year-round tourists to the northeastern Cape area.
- Increase local GDP through greater returns per hectare for farms, increased revenue for current service suppliers and new hospitality service providers.
- Promote the establishment of a regional destination for adventure and cultural tourism.
- Promote the establishment of the area as an international and national destination if the area is nominated for inclusion into the adjacent Drakensberg World Heritage Site, or as a Unesco "Geopark" site.

"Investments in the management, restoration and rehabilitation of ecosystems and their services are investments in the communities who depend on them. Ecosystem-based adaptation efforts can lessen flooding, improve water

and soil quality and contribute to livelihood opportunities. They deliver benefits for society and the environment at the same time, and are an important way of safeguarding development in the face of climate change," Maze said.

She said the establishment of the new park had been supported by funds from the Green Trust, WWF-SA and the National Parks Trust of SA.

SANParks acting CEO, Dr Luthando Dziba said not only was the area rich in biodiversity and endemic species, but it also lay within the Eastern Cape Drakensberg Strategic Water Source Area, a natural source of freshwater for people downstream.

"When declared, the park will also improve formal protection of South Africa's grasslands which have been identified as a national conservation priority. The proposed NE Cape Grasslands National Park will take a somewhat different form to traditional parks," he said.

Dziba said the landowners will have the opportunity to incorporate their land in the park on a voluntary basis.

"As such, they also stand to benefit from a range of financial incentives for private and communal land that is formally protected. The project aims to raise significant government funding for the restoration and maintenance of the landscape for water security, bringing much-needed employment opportunities to the area and, because of its rugged, unspoilt landscape, the area has rich potential for adventure and cultural tourism which could help to build a year-round tourism industry, further unlocking potential jobs," he said.

He said the declaration of a national park would also be a motivation for the inclusion of the area into the adjacent Drakensberg World Heritage Site.

Dr Morné du Plessis, CEO of WWF South Africa, said: "The beauty of this model is that biodiversity conservation and ecological management will be done in partnership with those who live and work in this area — while allowing them to continue deriving benefits from their land through sustainable agriculture and other compatible land uses. Ultimately, this is a win-win — for nature and for people. We can't wait to see this project coming to fruition."

Figure 4: An area earmarked for the park. (Photo: Nick Helme)

Restoring Overberg Renosterveld through Management Interventions

Overberg Renosterveld Conservation Trust

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This year we celebrate the launch of the UN Decade of Restoration. The main aim of this call to action is to prevent, halt and reverse the degradation of ecosystems around the world.

As one of the world's most biodiverse and yet threatened ecosystems, the Renosterveld of the Overberg deserves our focus around this.

South Africa is internationally mandated to conserve Critically Endangered ecosystems such as Overberg Renosterveld, that have suffered extensive habitat loss and have relatively little still surviving.

It is often said that ecological restoration is needed in areas where so much of a threatened vegetation type has been lost that national and international goals for conserving a certain percentage of a vegetation type are otherwise impossible to meet.

However, ecological restoration is challenging to undertake in Renosterveld vegetation, where small surviving patches of vegetation are now surrounded by high value productive agricultural lands.

Furthermore, once Renosterveld has been ploughed multiple times, changes in soil structure and loss of its original range of habitat niches mean that its former levels of habitat biodiversity have been lost forever.

However, we can restore Renosterveld through management interventions that improve the habitat condition and conservation value of what vegetation still remains.

The Overberg Renosterveld Conservation Trust (ORCT) is doing just this through an innovative project funded by WWF South Africa.

This work builds on two different projects that have been previously undertaken by the ORCT, namely the WWF Nedbank Green Trust Watercourse Restoration and the Table Mountain Fund Conservation Easement Project.

Figure 1 - 4: The Renosterveld of the Overberg is one of the world's most biodiverse and yet threatened ecosystems.

A conservation easement is a conservation servitude which encompasses a whole property to ensure conservation in perpetuity of Renosterveld vegetation there. This agreement is written into the title deeds of the farm and runs

Figure 5: *Moraea debilis*

Figure 6: Black Harrier

Figure 7: One of the main threats facing Overberg Renosterveld vegetation is overgrazing by domestic livestock.

with the land from one landowner to the next one.

Landowners on a property with a signed conservation easement can access additional support for conservation of the Renosterveld over which they are custodians. Support available can include assistance with fire management, control burns and post fire monitoring, alien clearing and regular monitoring of flora and faunal biodiversity.

This project, primarily funded by WWF South Africa has provided additional support in signing up additional Renosterveld under conservation easements and thus growing the percentage of Overberg Renosterveld that can be conserved in perpetuity.

Furthermore, it has provided additional funding for ongoing management needs of existing conservation easement sites. This ensures that landowners who have joined the programme continue to engage with conservation action and restoration activities on their land.

Those considering signing conservation easements have also been encouraged to join the programme by following in the footsteps of conservation success of those who have already done so.

Through this work being undertaken in Overberg Renosterveld, vital habitat is secured for conservation alongside implementation of key management interventions within the Overberg Wheatbelt Important Bird Area.

This helps to conserve and improve habitat for threatened birds such as the Black Harrier, Secretarybird and Southern Black Korhaan, as well as the many other endemic species found here, such as Cape Spurfowl, Greywinged Francolin, Agulhas Longbilled Lark, Agulhas Clapper Lark and others.

One of the key restoration interventions of the project has been to significantly reduce the footprint of and impact on Overberg Renosterveld of invasive alien Acacias such as Port Jackson (*Acacia saligna*). This has been achieved through mapping priority infestation sites and then implementing alien clearing work.

One of the main threats facing Overberg Renosterveld vegetation is overgrazing by domestic livestock. Overgrazing causes long term decreases in species richness and diversity in these ecosystems, and optimal grazing management is key to avoid further degradation of Renosterveld vegetation that may be irreversible.

One of the main solutions to this project has been through supporting passive restoration of overgrazed veld and reducing the likelihood of overgrazing taking place by providing financial support to farmers to put up fencing at key conservation easement sites to facilitate best practice livestock grazing management.

In some cases, such interventions are combined with implementing an ecological burn, which also restores old, degraded vegetation to its former glory, if undertaken correctly and protected from livestock post-burning.

Over the last three years, through the support of WWF South Africa we have been able to significantly expand the conservation footprint in Renosterveld in the Overberg, conserving more hectares of Renosterveld in perpetuity.

We have also been able to support willing and passionate landowners in their efforts to conserve and manage their veld in reaching their conservation goals.

We would like to acknowledge the WWF-SA Table Mountain Fund and WWF South Africa for supporting the ORCT's conservation easement project as well as the amazing farmers we are lucky enough to work with to conserve their Renosterveld. Please consider supporting the vital work of the Overberg Renosterveld Conservation Trust to help us manage and conserve more Renosterveld in perpetuity.

Tree planting schemes can destroy rangelands and damage pastoral livelihoods

Ian Schoones

Current Address: Pastres PI

Reprinted from: https://bit.ly/2ZduXJx

Next time you sign up for a 'carbon offset' scheme that promises to plant trees somewhere in the world to mitigate the effects on the climate, make sure you check the small print.

In the build-up to COP26 later this year, tree planting is all the rage and huge targets are being set. In 2011 the United Nations' Bonn Challenge proposed that 350 million hectares of land would be 'restored' through tree planting by 2030. National governments and regional blocs too have massive plans for more trees, including notorious projects such as the Sahelian 'Great Green Wall'. The AFR100 initiative, funded by multiple international donors including the World Bank, has committed to afforesting 100 million hectares in Africa over the coming decade.

Restoration myths

But is this always a good idea? Not necessarily. Many of the areas earmarked for tree planting are rangelands. Estimates vary but many millions of hectares of rangelands have been identified by the World Resources Institute based in Washington DC and the Crowther Lab at ETH Zurich for forest 'restoration'. This assumes that these are 'degraded' forests in need of rehabilitation, rather than highly productive, biodiverse ecosystems that support many livestock and people, and according to Joseph Veldman and colleagues such global restoration assessments may massively overestimate the climate mitigation of tree planting schemes.

In a 2019 paper, called 'the trouble with trees', William Bond and colleagues showed how the areas identified for tree planting overlap with grassy biomes (including rangelands), wildlife species richness and livestock production (see figure 2). In fact, as Veldman and colleagues show, 40% of the WRI map – some 1 billion hectares – was focused on grassy biomes, highlighting an 'inconvenient reality' for large-scale restoration plans. As Catherine Parr and colleagues argue, tropical grassy biomes remain poorly understood and are under threat. In particular, 'restoration' through tree planting in such areas would have major negative consequences for wildlife, biodiversity and pastoral livelihoods.

Grassland ecosystems and carbon dynamics

These forest restoration assessments – and the resulting interventions such as the African Forest Landscape Restoration Initiative – result from a basic misunderstanding of rangeland ecosystems that exist across more than half the world's surface. This is simply 'bad science'. Rangelands are what Bond calls 'open ecosystems', variegated mixes of trees and grasslands existing together in savannahs and parklands. These are maintained by grazing, fire and human actions, and are some of the most biodiverse areas on the planet. Carlos Martorell, an ecologist from UNAM in Mexico, explains this in a short film, presented at a recent IYRP (International Year for Rangelands and Pastoralism) event.

Figure 1: Many areas earmarked for tree planting are rangelands.

As Carlos explains, grasslands may also fix carbon more effectively than forests, although estimates vary wildly. In the geological past, the expansion of grasslands may have locked up so much carbon it resulted in a cooling of the atmosphere, precipitating an ice age. Grasslands have extensive root systems and high turnover with dead vegetation matter regularly incorporated into the soil, often assisted by grazers. Grasslands can be more reflective of solar ra-

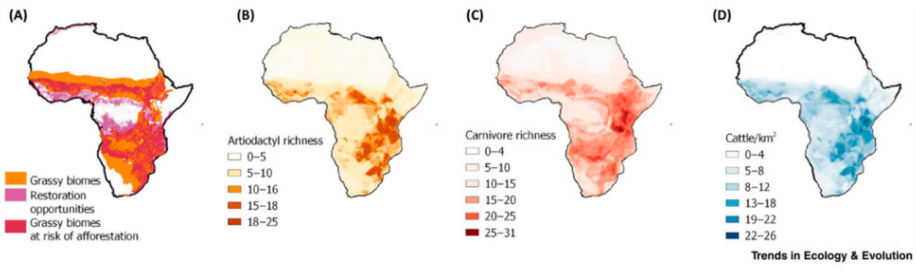


Figure 2: In a 2019 paper, called 'the trouble with trees', William Bond and colleagues showed how the areas identified for tree planting overlap with grassy biomes. Source: 'The trouble with trees: afforestation plans for Africa', *Trends in Ecology & Evolution*, 34(11): 963-965

Figure 3: Rangelands are what Bond calls 'open ecosystems', variegated mixes of trees and grasslands existing together in savannahs and parklands.

diation too compared to darker forests, and so may act to cool the earth. Yet carbon forestry schemes focus on the above-ground biomass, and tree biomass is much more visible and measurable than the poorly understood below-ground carbon dynamics among root networks and in the soil. In other words, these are not degraded lands in need of restoration to a 'natural' forest.

Forest obsessions

This obsession with closed forests has a long history, seeing grasslands as 'degraded' forests, and forests as the desirable protector of environments. Many of the current well-meaning attempts to advocate reforestation replicate colonial discourses, where foresters from northern climes influenced nascent forest departments across the world.

For example, the idea of the *taux de boisement normal* – the percentage of forest cover required by a 'civilised' nation – took hold in the French colonies from the 1800s, and since then tree planting has become part of what Diana Davis describes as a civilising mission to offset 'desiccation' and the assumed ravages of desert advance. Equally, the negative description of rangelands as 'wastelands' in India has framed attempts at environmental rehabilitation from the colonial era to today.

These basic misunderstandings of rangeland ecologies persist today, and are promoted by the likes of WRI along with multiple well-meaning projects and agencies through their advocacy of 'forest restoration'. These efforts reinforced and in turn commoditised by the panoply of carbon forestry projects under schemes such as REDD+ and through investment projects available through growing voluntary carbon markets, seen as central to meeting 'net-zero' commitments globally.

The problems with tree planting in rangelands

So what are the problems with tree planting, especially in pastoral, rangeland areas? Here are seven points (see also this excellent article by Forrest Fleischman and colleagues).

- Most tree planting projects focus on exotic, fast-growing trees. These are assumed to produce the most carbon the quickest. But fast-growing trees planted in rangelands can quickly become a problem. Ask any pastoralist in East Africa about the issues they have with the invasive *Prosopis juliflora*, which was originally introduced by aid programmes to provide fuelwood. Exotic tree planting also eliminates existing grassland ecosystem biodiversity, which has emerged over millennia through the interactions of vegetation and herbivores.
- Carbon projects require managed tree planting to claim carbon credits against an assumed degraded baseline. The easiest approach is the planting of large plantations. These are easy to manage and the carbon credits can quickly be calculated and cashed in. But plantations exclude people, livestock and wildlife and can seriously undermine plant biodiversity too. A rush to net zero through tree planting, Oxfam argues in a recent report, could have major implications for land rights and food security.
- Rushed planting of trees in unsuitable environments can lead to large losses of planted trees. The incentives to earn a quick buck on carbon credits can result in huge damage. Areas are cleared, trees are planted and then they die, with no benefits to anyone. In the odd calculations of carbon credits, this may have resulted in 'avoided deforestation', but the consequence is often the laying waste of environments.
- Tree planting in grasslands, aiming for a managed, stable forested area, runs counter the natural ecosystem dynamics of such areas. In tropical grassy biomes, the number of trees and grasslands fluctuate, with patches of each increasing and decreasing because of rainfall, fire and other factors. Imposing a regularised regime of management on such a setting, assuming baselines and calculating carbon gains makes no sense.
- Tree planting schemes where people and animals are excluded can result in the massive build-up of flammable herbaceous material. Without regulated 'cold burn' fires, the consequences of forest fires can be devastating, as seen around the world in recent months. This can result in huge losses of carbon – exactly the opposite of the plan.
- Water cycles may be disrupted by tree planting schemes, as fast-growing trees need a lot of water to grow. By contrast, grasslands have high levels of infiltration and are important in maintaining hydrological systems. Carbon schemes however do not put a price on water, so trees win out.
- The landscape value of tree plantations – serried rows of exotic trees – may be lower than that of long-established grassland systems, where cultures of livestock keeping and wildlife use have created a lived-in landscape. Rangelands may be anthropogenically created, but they are not necessarily degraded and in need of rehabilitation.

Enhancing dynamic ecologies: putting people first

Trees are natural elements of grassland landscapes and of course, have many benefits for people and environments, providing shade, fruits, browse, leaf litter and so on. In some cases, new planting may be desirable, but more often encouraging regrowth of existing trees as part of variegated landscapes makes

much more sense as a route to capturing and sequestering carbon to meet the climate challenge. As Susie Vetter explains:

"Tree planting should enhance and diversify local livelihoods, avoid the transformation of tropical grasslands and savannahs, promote landscape heterogeneity and biodiversity, and distinguish residual carbon stocks from those derived from reforestation and afforestation."

Pastoralists know a lot about highly dynamic rangeland environments.

As guardians of these rich, open ecosystems, excluding pastoralists and their animals in the name of carbon offsetting and forest rehabilitation, can be disastrous, both for people and for the environment.

So-called 'nature-based solutions' need to involve people first, otherwise, they will fail.

So, rather than thinking you can offset your high-carbon lifestyle in a 'green' way by buying into a carbon offset tree planting scheme, think again.

It could do more damage than good.

This blog is part of our series on climate change, biodiversity and livestock.

You can see more and follow the PASTRES project on Twitter, Facebook and Instagram

Figure 4: Cultures of livestock keeping and wildlife use have created a lived-in landscape.

Bush encroachment: Making the best of a bad situation

Livestock farmers are dependent on grasslands as grazing for their animals. Yet grasslands are increasingly vulnerable to encroachment by bigger, woody plants. Preliminary results by ARC researchers indicate these woody plants may be helpful for usage in nutrient-rich animal fodder.

Julius Tjelele

Current Address: Agricultural Research Council
Reprinted from: https://bit.ly/2ZqjCWJ

For more than 60 years, research evidence showed that savannas and grasslands are altered by bush encroachment. Bush encroachment is where trees and shrubs invade grasslands and/or increase in density at the expense of grasses, forbs and herbs. The drivers for the invasion are largely man-made, due to the restriction of fires or overgrazing, for example. However, climate change contributes as well.

Bush encroachment contributes to, among others, soil erosion and a decline in forage productivity, grazing capacity and biodiversity. This has dire consequences for the growing population of the world, particularly for livestock farmers interested in grasses that provide a substantial proportion of forage for livestock production. However, there is good in every bad situation and woody plant expansion is no exception.

Although there have been numerous studies on bush encroachment, the rate and extent at which it is still increasing raises more questions. A bold statement made by Professor David Ward in a paper published in 2005, titled "Do we understand the causes of bush encroachment?" is still relevant today.

The gist of this popular paper is how the farming community can create opportunities from bush encroachment; how they can make the best of a bad situation.

There has also been a number of brush management strategies, which are aimed at improving forage quantity and quality as well as improving the economic viability of rangelands encroached by woody plants. These methods vary from mechanical to chemical and a fire-browsing combination, to the use of the encroaching woody trees and shrubs as fodder for livestock.

Using a bad situation to your advantage

The discussion around making the best of a bad situation, emanates from millions of hectares of former valuable grazing lands in South Africa being encroached by woody trees and shrubs. This is likely to increase in the future.

Researchers from the ARC's animal production, range and forage sciences department conducted studies exploring the potential use of woody or shrubby plants as fodder for livestock. It included the formulation of a diet for ruminants using bankrupt bush.

The results from ARC researcher Dr Gilbert Pule showed a relatively high crude protein content (7%) in the wet season after fire (unpublished data). In the same study, condensed tannins were 0.1% and 0.16% during the dry and wet

Figure 1: An experimental site encroached by bankrupt bush. Agricultural Research Council research shows that there may be nutritional value in some of the plants that invade rangelands that are not burnt regularly or overgrazed. Photo: Supplied/Food for Mzansi

season respectively. This suggests that this woody encroacher plant has the potential to be used as a forage resource by farmers.

Bodyweight maintained on bankrupt bush

Preliminary results from researcher and PhD candidate Motswapo Phoko, from the same department at the ARC, are very promising. She formulated diets for Nguni steers using various inclusion levels of bankrupt bush. The results indicate no significant differences in body weight and body condition score for the feeds including various levels of bankrupt bush and the control (commercial diet). On average, the experimental animals (Nguni steers) gained 0.96 kg/day for the duration of the trial, which took place over 90 days. This shows the potential use of bankrupt bush as feed for ruminants.

There has also been other research work on the use of *Vachellia* species (formerly known as *Acacia*) as a non-conventional feed resource to improve meat quality traits, growth rate and body weight. A study by Idamokoro et al. (2016), for instance, showed that a *V. karroo* supplementation improved growth and meat quality in goats.

Effective management

A number of interacting brush control methods are required to deal with the increasing rate and extent of bush encroachment.

The choice of a particular method will depend on a number of factors, including labour, cost and return on investment.

The potential is also there to use encroaching woody species for additional fodder, particularly in resource-poor farming areas and during the drier months of the year when forage availability is limited.

To this end, I suggest that farmers and landowners consider methods that are environmentally friendly and, most importantly contribute to closing the feed gaps.

For further details and collaboration with the ARC's animal production, range and forage sciences department, contact Dr Tlou Julius Tjelele at jtjelele@arc.agric.za.

Figure 2: A growing encroachment problem: A grazing area taken over by bankrupt bush. Photo: Supplied/Food for Mzanzi.

On the verge of a breakthrough

Nettalie Viljoen

Current Address: News24: People's Post

Reprinted from: https://bit.ly/3vAYk4k

"Grow, don't mow." With a musical ring to it, this slogan – focused on capturing Capetonians' attention on the City of Cape Town's "No Mowing Policy" – tends to, well, grow on you.

As a media release sent out by the City last month explains, Cape Town lies within the greater Cape Floral region in which the rare Fynbos and Renosterveld vegetation groups are found.

Although the City currently maintains 17 nature reserves and various conservation sites, these protected sites represent but a small percentage of the area where fynbos occurs across the city.

Hence the City's 'No Mowing Policy'.

At present, the City has 63 listed areas where mowing is suspended during the growing season which starts in July/August and ends in November, annually.

These areas include public open spaces, greenbelts and road verges.

This allows for annuals, perennials and geophytes to flower, mature and seed during spring.

Someone who has an in-depth understanding of how campaigns like these contribute to conservation efforts is Peta Brom, an urban ecologist at the University of Cape Town's (UCT) Department of Biological Sciences.

Brom says several botanists have recorded sensitive and endangered species of plants in road verges.

"The Grow, Don't Mow campaign, will help us to identify the places where these grow and to develop better management strategies which will catch these occurrences," she adds.

Sowing the seed

And that is but one of the many benefits that flow from this campaign.

Figure 1: Peta Brom, an urban ecologist at the University of Cape Town's Department of Biological Sciences.

According to the findings of Brom's recently completed PhD research thesis, delaying mowing until the end of November promotes a follow-on population from the seed stock.

To understand how she came to this conclusion, a brief explanation of her research paper topic is required.

Brom shares she was interested in how wild pollinators were responding to urban land-use patterns across a number of environmental gradients in the Cape context.

"Internationally, we know that some guilds of pollinators, particularly larger-bodied insects and cavity nesters, are thriving in cities because they are able to exploit the resources provided by gardeners."

For her research purposes, Brom focused on monkey beetles. In 2018 and 2019, she surveyed them and the flower communities present in vacant lots and city parks, as well as some natural areas and farms for comparative purposes.

"Over those two years, I visited 142 locations from almost all parts of the city during spring, which is when the beetles are active in their adult phase."

Because she was documenting flowers, Brom noticed in 2018 that while contractors were sometimes mowing around the indigenous bulbs and daisies growing on road verges while they were in flower, they would return as soon as the plants stopped flowering. In other words, before the seeds would have had a chance to mature.

"This meant that there would be no follow-on population from the seed stock. For bulbs, the flowers return for a few more years; for the rapidly reseeding daisies, it often means that the patch is completely lost."

In 2019 and 2020, Brom set up observation plots in nine parks: five in the northern suburbs and four in the southern suburbs.

She monitored the phenology (observable phases of a life cycle) of the flowers from bud to seed-broadcast (mature seed) to determine how long to wait for the flowers to complete their reproductive cycle.

"The answer was that the main season concluded in mid-November, and the City has taken this on board. This year's no-mow signage for designated parks says 'flowering and seeding'. That's a big win for urban biodiversity."

Bug in the system

Her research also focused on the symbiotic relationship that exists between pollinators and plants.

Brom explains that pollination is a service provided to plants by many different species of animals, including bees, butterflies, flies, mosquitoes, beetles, birds, bats and even mice.

"These animals and plants have co-evolved to be matched to each other's preferences and needs. For example, monkey beetles are important for flowers in the vygie, daisy and iris families."

However, not all pollinators have the ability to travel long distances between patches of vegetation. Brom says more mobile organisms, such as wetland birds, need patches at less regular intervals.

"Honeybees can fly about 5 km to find a good stand of Eucalyptus, but monkey beetles and sweat bees (Halictids) need patches of flowers more regularly throughout the landscape. This is where road verges, residential gardens and parks come in."

She says they form stepping stones – patches of suitable habitat between which organisms can move – which are crucial to the future existence of certain insect species.

"Overall, insect biomass is in decline. And the losses counted as threatened species pale in comparison to the overall loss in biomass happening in the background, even for species that are currently considered 'least concern'.

A group of scientists in Germany measured it. Germany lost 75% of its insect biomass over 30 years," she says.

Brom says there are cascading effects of this; everything that eats insects, everything that the insects pollinate, is affected.

"Scientists are warning us that we are heading for the sixth mass extinction event – a fact that in my mind is as serious as climate change, if not more so."

But, she has a message of hope.

Brom says because cities have been overlooked as an opportunity to be managed with nature in mind, there are lots of easy things that can be done to improve the ecological functioning of natural and green spaces.

Changing mowing schedules to allow indigenous wildflowers to flourish is one. Another is through the decisions made in home gardens.

"Knowing the historical vegetation type of your area and planting locally indigenous is the first step. Fynbos Life Nursery, Veld and Sea, Goodhope Nursery, are excellent resources to help you navigate planting decisions."

For Brom, one of the biggest takeaways from her research is that urban landscapes are an under-researched opportunity for the management of biodiversity.

"But it can only be achieved in partnership with the public and if there is general buy-in from the affected neighbours," she concludes.

Follow Peta Brom on Instagram @doorstepecology.

Pictures: Fynbos photographed like you've never seen it before

Robyn Simpson

Current Address: Cape (Town) Etc
Reprinted from: https://bit.ly/3b606Bk

Nothing speaks of Cape heritage more so than the wonder of fynbos. From mountaintop to sea's edge, our spectacular province is enrobed with a bounty of different fynbos species — each maintaining their own, unique characteristics.

Hiking is an activity that I hold dear to my soul, writes Cape {town} Etc's Robyn Simpson.

There are few mountains in Cape Town and her surroundings that I have not given a crack. One of the things that keep me transfixed is all that is fynbos.

Growing up in Natal, something I found absolutely fascinating about the Western Cape is its flora — drastically different to the rolling hills of sugarcane that I had become so accustomed to.

Fynbos blows my mind. It's hardy enough to withstand the harshest Cape conditions yet elegant enough to sit comfortably in a vase. The species holds strong on the roughest mountain edges, but up close, can be appreciated for the most delicate lace-like details.

Fynbos is the plant of all plants. Intricate to the eye, powerfully resilient, and ever-stimulating to the curiosity of the mind.

Ecologist and nature photographer, Andrew Baxter has managed to capture Fynbos in a way I've never seen before. Radiant shots highlighting intense detail and a kaleidoscope of colours that are almost psychedelic.

The idea behind the series Floristic Fireworks evolved when Andrew was photographing the amazing *Leucospermums* – Protea Pincushions – at Kirstenbosch Botanical Gardens late one evening.

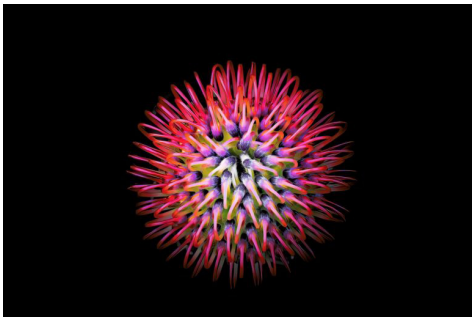
"In the low-light, the bright flowers resembled actual fireworks. In fact, some people have wrongly assumed that the images of *Leucospermum tottem* are actual fireworks!" says Baxter.

"Twilight is magic hour for me in the gardens – no need to contend with harsh light and unmanageable contrast.

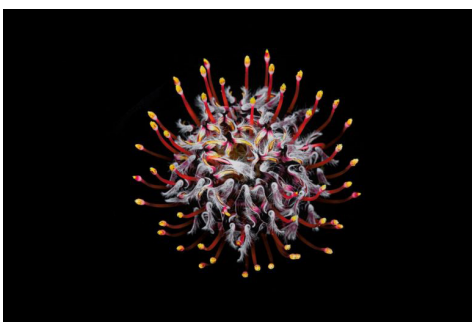
"It's wonderful to see familiar faces practising their 'dark' art in the late afternoon. The trick is to use the last of the sun to backlight the flora for extra effect," he adds.

"These images have been shared widely around the world and it gives me great joy to think that Cape Town is not only the most beautiful city in the world but that the fynbos flora on Table Mountain and at Kirstenbosch is so universally appreciated," concludes Baxter.

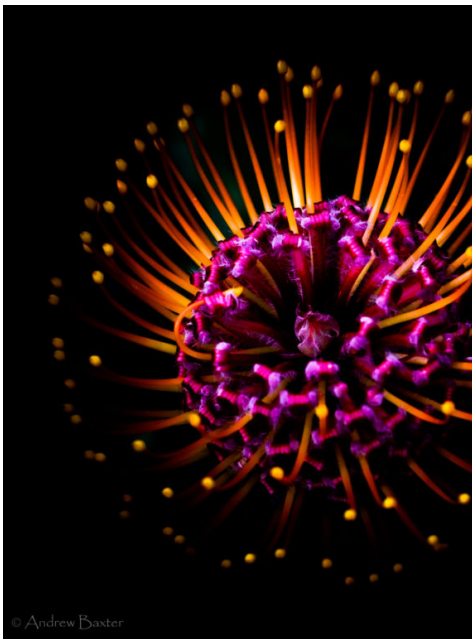
Take a look at the Floristic Fireworks by photographer Andrew Baxter.





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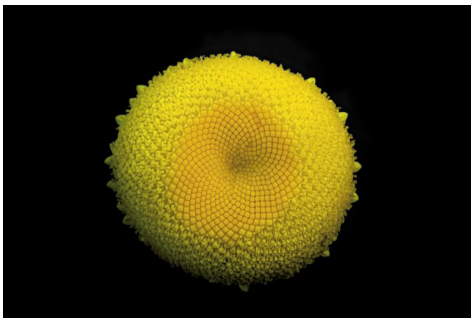
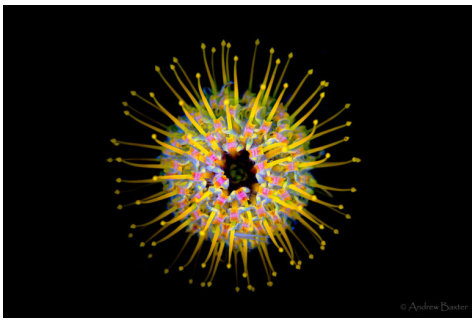





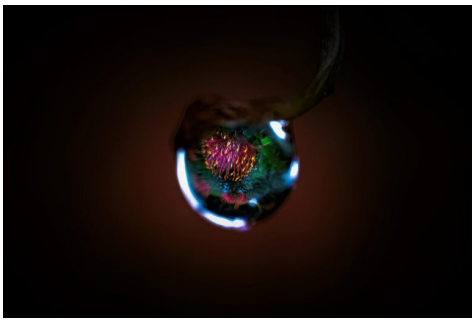
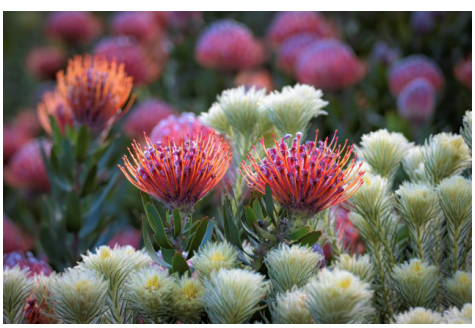
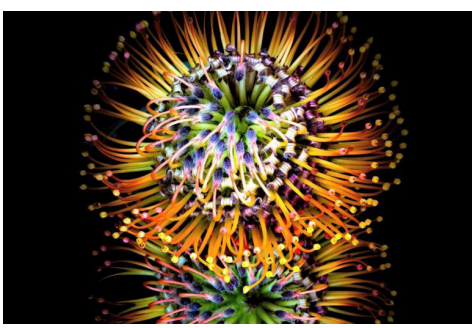

SA just formally lodged much more ambitious climate-change plans at a cost of R4 trillion

Phillip de Wet

Current Address: Business Insider South Africa

Reprinted from: https://bit.ly/3jwy2vu

South Africa has promised the world to dump a lot less carbon dioxide, and other greenhouse gasses, into the atmosphere, on the assumption that richer countries will make good on commitments to provide the money for climate-change mitigation and adaptation.

Because South Africa's new plan won't be cheap: it will require around R4 trillion in various types of financing by 2030 to achieve.

SA lodged an update on its nationally determined contribution (NDC) under the Paris Agreement with the United Nations on Monday, a submission that "updates and enhances" commitments from 2016 – and now "reflects our highest possible level of ambition, based on science and equity, in light of our national circumstances".

The targets are dramatically different from those SA set five years ago. For 2025, annual greenhouse gas emissions are set at 398 to 510 metric tons of carbon dioxide equivalent, and for 2030 those numbers drop to 350 to 420 metric tons. That covers all South African industry and activity but not unpredictable wildfires, which can add another 5 to 30 metric tonnes to the total.

That will see South Africa move to declining emissions a full decade earlier than previously anticipated, in 2025 rather than in 2035, with the new target for 2030 set 32% lower than previously.

At the very least, the new numbers suggest, South Africa will be emitting 12% less greenhouse gas than its previous best-effort estimate. It could do better still; another update to the commitments due in 2025 "will consider whether the level of ambition for 2030 can be increased further, in the light of national circumstances, technology developments, and the availability of international support," South Africa says.

The new targets are a "fair contribution to the long-term mitigation goal" of the planet, South Africa says, and are built on the assumption that foreign money will be forthcoming to help meet them. That is an ongoing theme, with warnings that the ambitious targets "will require substantial multilateral support" for measures "including a very ambitious power sector investment plan".

The submission shows that South Africa will be looking for a somewhat more than $271 billion – the equivalent of over R4 trillion – to mitigate and adapt to climate change, in various forms of financing, including domestic loans for green projects. That total is made up of:

- $13 million "to build evidence-based support for policy implementation", including provincial and municipal forums.
- $8 million to develop tools and strategies around climate-change planning, such as long-term adaptation scenarios.
- $3 billion to $4 billion to implement the National Climate Change Adaptation Strategy (NCCAS), which includes building flood protection, setting up early-warning systems for small farmers, and getting cities ready for trouble.
- $16 billion to $267 billion for "climate change adaptation investment pipeline projects" that are not formally further defined, but covers a wide array of renewable generation and energy efficiency projects.

"It is anticipated that a growing number of South African cities and towns will be exposed to the impacts of weather-induced hazards such as flooding, heatwaves, droughts, wildfires, and storms," the document reads.

"This is partly due to the projected increase in the frequency and intensity of weather-related hazards, but also due to the high socio-economic vulnerability inherent within communities, as well as poor land-use practices, growing informality, and a failure to rapidly deploy resilient infrastructure associated with accommodating a growing urbanising population."


Source: Getty

Drowning in the literature? These smart software tools can help

Search engines that highlight key papers are keeping scientists up to date.

David Matthews

Current Address: Nature
Reprinted from: https://go.nature.com/3GhdBME

Every time Eddie Smolyansky had a few moments to himself, he tried to stay abreast of new publications in his field. But by 2016, the computer-vision researcher, who is based in Tel Aviv, Israel, was receiving hundreds of automated literature recommendations per day. "At some point, the bathroom breaks weren't enough," he says. The recommendations were "way too much, and impossible to keep up with".

Smolyansky's 'feed fatigue' will be familiar to many academics. Academic alert tools, originally designed to focus attention on relevant papers, have themselves become a hindrance, flooding the inboxes of scientists worldwide.

"I haven't even been reading my automated PubMed searches lately because it really is overwhelming," says Craig Kaplan, a biologist at the University of Pittsburgh in Pennsylvania. "I honestly cannot keep on top of the literature."

But change is afoot. In 2019, Smolyansky co-founded Connected Papers, one of a new generation of visual literature-mapping and recommendation tools. Other services that promise to tame the information overload, integrating Twitter feeds and daily news as well as research, are also available.

Figure 1: Illustration by The Project Twins

Origin story

Instead of serving up a daily list of new articles by e-mail, Connected Papers uses a single, user-chosen 'origin paper' to build a map of related research, based partly on overlapping citations. The service recently surpassed one million users, Smolyansky says.

The maps are colour-coded by publication date, and users can toggle between 'prior', seminal, papers and later, 'derivative', works that build on them. The idea is that scientists can search for an origin paper that interests them, and see from the resulting map which recent papers have made a splash in their field, how they relate to other research, and how many citations they have accrued.

"You do not have to sit on the hose of papers and look at every paper that comes out for fear of missing it," says Smolyansky. The tool is also helpful when scientists want to dive into an entirely new field, he adds, providing an overview of the essential literature.

Another visual-mapping tool is Open Knowledge Maps, a service offered by a Vienna-based not-for-profit organization of the same name. It was founded in 2015 by Peter Kraker, a former scholarly-communication researcher at Graz University of Technology in Austria.

Open Knowledge Maps creates its maps based on keywords rather than a central article and relies on text similarity and metadata to work out how papers are related. The tool arranges 100 papers in similar subfields into bubbles whose relative positions suggest similarity; a search for articles on 'climate change', for example, might yield a related bubble about 'risk cognition'.

Maps of these bubbles can be built in about 20 seconds, and users can change them to include the 100 most

recently published papers of relevance, or other resources. Open Knowledge Maps includes not only journal articles, but also content such as data sets and research software. Its users have created more than 400,000 maps so far, says Kraker.

Amie Fairs, who studies language at Aix-Marseille University in France, is a self-proclaimed Open Knowledge Maps enthusiast. "One particularly nice thing about Open Knowledge Maps is that you can search very broad topics, like 'language production', and it can group papers into themes you may not have considered," Fairs says. For example, when she searched for 'phonological brain regions' — the areas of the brain that process sound and meaning — Open Knowledge Maps suggested a subfield of research about age-related differences in processing. "I hadn't considered looking in the ageing literature for information about this before, but now I will," she says.

Yet despite her enthusiasm for the service, Fairs still tends to find new papers through alerts from Google Scholar, the dominant tool in the field; it's easier to go "down the rabbit hole", she explains, following a chain of papers that cite each other.

Click to recommend

Google Scholar recommends papers depending on which articles users have authored and list in their profiles. The algorithm isn't public, but the company says that the recommendations are based on "the topics of your articles, the places where you publish, the authors you work with and cite, the authors that work in the same area as you and the citation graph". Users can manually set up extra e-mail alerts based on keyword searches or particular authors.

Aaron Tay, a librarian at Singapore Management University who studies academic search tools, gets literature recommendations from both Twitter and Google Scholar, and finds that the latter often highlights the same articles as his human colleagues, albeit a few days later. Google Scholar "is almost always on target", he says.

Besides published articles, Google Scholar might also pick up preprints as well as "low-quality theses and dissertations", Tay says. Even so, "you get some gems you might not have seen", he says. (Scopus, a competing literature database maintained by the Amsterdam-based publisher Elsevier, began incorporating preprints earlier this year, a spokesperson says. But it does not index theses and dissertations. "There will be titles that do not meet the Scopus standards but are covered by Google Scholar," he says.)

Google Scholar does not disclose the size of its database, but it is widely acknowledged to be the biggest corpus in existence, with close to 400 million articles by one estimate (M. Gusenbauer Scientometrics 118, 177–214; 2019). Open Knowledge Maps, meanwhile, is built on top of the open-source Bielefeld Academic Search Engine, which boasts more than 270 million documents, including preprints, and is curated to remove spam.

Connected Papers uses the publicly available corpus compiled by Semantic Scholar — a tool set up in 2015 by the Allen Institute for Artificial Intelligence in Seattle, Washington — amounting to around 200 million articles, including preprints. Smolyansky acknowledges this size discrepancy means that "very rarely" Google Scholar will find "some niche 1970s paper" that Semantic Scholar does not.

Semantic Scholar's alert system called an adaptive research feed, builds a list of recommended papers that users can train by liking or disliking the articles they see. To decide which papers are similar to those, it uses a machine-learning model trained on mutual citations, and on which articles Semantic Scholar users have viewed sequentially. It counts some 8 million monthly users.

No more FOMO

Feedly, launched in 2008, also uses upvotes and downvotes to learn which new academic research is most relevant to the user, and benefits from an AI assistant that can be trained on specific keywords or topics. But Feedly isn't aimed specifically at researchers — it aims to be an all-encompassing dashboard to monitor news, RSS feeds (which provide a way of alerting users to new content on websites), the online forum Reddit, Twitter and podcasts. A free version is available, but extra features, such as the ability to follow more than 100 sources and hide adverts, cost US$6 or more a month (unlike most of the other tools mentioned here, which are entirely free; another paid option is ResearchGate +Plus, which boosts users' visibility and offers advanced statistics).

ResearchRabbit, which fully launched in August 2021, describes itself as "Spotify for papers". Users get started by saving relevant papers to a collection. With each added paper, ResearchRabbit updates its list of recommended articles, mirroring how the music-streaming platform makes recommendations based on the songs users add to their playlists. The company behind it, based in Seattle, Washington, hasn't revealed exactly how it assesses relevance, although it says it focuses on precise recommendations rather than floods of alerts. "We only want to send the most relevant papers to our users," says chief executive Michael Ma.

Amber Brown Ruiz, a special-education and disability-policy doctoral student at Virginia Commonwealth University in Richmond, finds ResearchRabbit alerts to be more personalized than Google Scholar, which sometimes feeds her papers that are superficially similar to her own work but turn out to be far outside her discipline.

Ruiz also uses Connected Papers to find new articles. She finds it to be less automated than Google Scholar, which sends fresh papers by e-mail, "but you can manually go in and figure out which articles are the newest", she says.

What all these tools have in common is that they use some sort of artificial intelligence to craft their recommendations. But some scholars enjoy the human touch, valuing recommendations from colleagues and contacts on Twitter, for example. ResearchGate, the long-standing platform that brands itself as a kind of social network for scientists, says it offers the best of both worlds (ResearchGate is in a content-sharing partnership with Springer Nature, which publishes *Nature*).

Founded in 2008, ResearchGate both e-mails recommendations of papers and serves them up through a rolling feed when users are logged in. (Users can also see a chronological newsfeed of papers posted by their ResearchGate contacts.) Although it doesn't make its algorithm public, it uses information about a user's publications and which publications they have viewed on the platform to understand their interests. It then calculates related articles on the basis of shared citations and extracted topics and keywords. ResearchGate currently includes some 149 million publication pages and has 20 million users.

"The secret sauce of ResearchGate is the combination of an active social network and a huge research graph," says Joseph Debruin, ResearchGate's director of product management, who is based in Los Angeles, California.

Five years after realizing he was drowning in new papers, Smolyansky is finally able to shake off that scientific 'fear of missing out'. "You do not have to have that FOMO feeling," he says.

GSSA Congress 56

Charné Viljoen

Current Address: Stellenboch University
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The 56th annual congress of the GSSA was a roaring success. The Western Cape won the bid to host the congress in 2021. The organizing committee decided that an in-person congress would give a sense of normal and Surval Boutique Olive Estate was selected as the venue in Oudtshoorn. Amazing tours were lined up and a special session dedicated to the Karoo area was put forward.

Delegates with comorbidities were considered and it was decided that it would be the delegates choice to attend in-person or virtual and that the congress format will be hybrid. This seemed to be a good idea since those who were anxious to see people were satisfied, and those who were scared seeing people were also satisfied. Then COVID-19 came looming again, this time with stricter lockdown levels. As the congress date came closer, we were forced to go virtual.

Presenters sent their videos in ahead of time to be checked for quality and time limits and posters were submitted to be uploaded onto Twitter and we were ready for our second virtual congress. The delegates were happy with the way Zoom was used and scored 4.5 out of 5 in the survey. Many thanks to Clive Pringle, the audiovisual technician. Many things were learned from the first virtual congress held in 2020.

The congress was well attended and according to our Dryfta site, a total of 153 delegates attended the full congress. An additional 18 delegates registered as day delegates. The distribution of full congress delegates according to country can be seen in Figure 1, with South Africa being most represented. The Eastern Cape, followed by Gauteng, Western Cape and KwaZulu Natal made out the majority of delegates from South Africa (Figure 2).

Research Skills Workshop (RSW)

The topic of RSW was "Scientific and Popular Science Communication" and was held on Monday, 26 July 2021. The presenters were Dr Marina Joubert, Dr Ethel Phiri and Dr Palesa Mothapo. It was well attended by 36 delegates from various levels of scientific backgrounds. It was a practical workshop, where group work via breakout rooms was done and presented to the group. The RSW presenters then gave feedback to all the groups.

Policy and Practice Workshop (P&P)

The topic of the P&P was "Towards a better understanding of the biodiversity stewardship guideline in SA". A live discussion, from experts in the field, was presented on Friday 30 July 2021. It was well received with many questions and discussion points. A total of 31 delegates were in the meeting.

Congress 56

The programme was packed with very insightful and thought-provoking talks. The proceedings can be viewed on the Dryfta site. The chatbox on Zoom was very busy and it was wonderful to see the presenters interacting with the delegates. The presenters were able to answer more questions than would have been possible in the question and answer session.

The three special sessions received a lot of attention and interaction. It was also great to get some international perspective on New Zealand dairy systems. The posters also received many impressions on Twitter. Please use the hashtag #GSSACongress56 to view these posters.

We generally received very good feedback, with overall satisfaction being 4.5 out of 5. Delegates were especially satisfied with the invited Keynotes, the Zoom platform, the programme and the fact that the information was available via the website and email. In conclusion, I am very happy and extremely grateful for the way the congress turned out to be. Overall a great success. I am looking forward to the 57th annual congress in 2022.

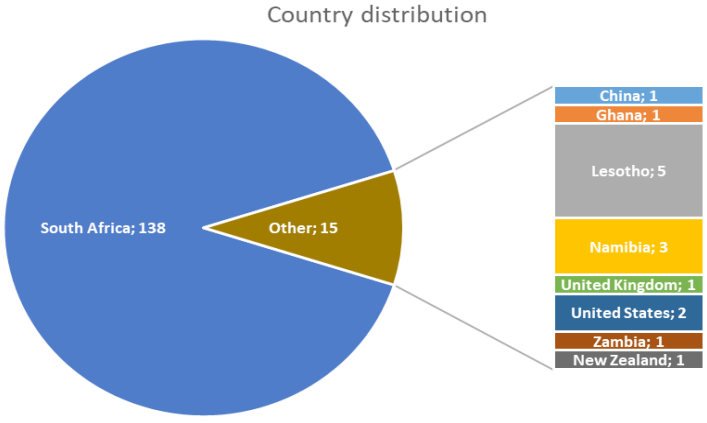

Figure 1: The distribution of full congress delegates according to countries.

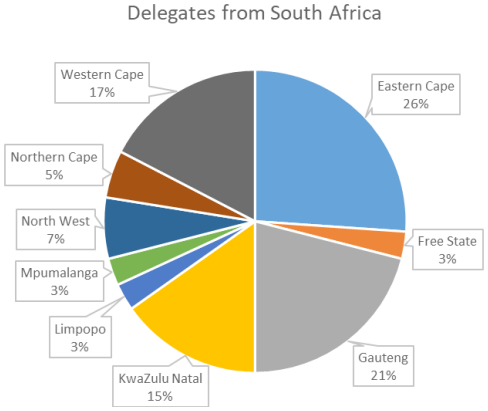

Figure 2: The provincial distribution of delegates from South Africa.

Presidential address: 56th Annual Congress of the Grassland Society of Southern Africa 2021

KP Kirkman

Current Address: University of KwaZulu-Natal
E-mail Address: kirkmank@ukzn.ac.za

I have the privilege of delivering my second presidential address to the Grassland Society of Southern Africa, 21 years after the first. What has changed? What hasn't changed? Well, in January 2000, we had just survived the non-existent Y2K catastrophe that threatened to send us back to the pencil and paper age. In 2021, we are in the middle of a global pandemic that is not showing any signs of slowing down, there are regular reports of cyber-crimes increasingly impacting various industries and multinational companies, and anthropogenic impacts on climate and the environment are becoming increasingly evident.

South Africa is not the only country in the region to have been rocked by unprecedented civil unrest, violence and looting, which has highlighted several significant schisms in our communities and the political arenas. In 2000, I stated that the only factor influencing the environment in which we operate as a Society that can be predicted with certainty is that the rate of change will accelerate. Looking back over the past 21 years, it certainly has, in many ways.

In 2000, I pointed out the difficulty of defining a "Grassland Scientist" or "Grassland Science" in the context of the diverse disciplines, focus areas and professional backgrounds of the members of the Grassland Society of Southern Africa. In 2021, this is becoming more apparent when perusing memberships lists, and also when examining the topics and the institutional affiliations of authors of the 17 papers published in 1999 and the 32 papers published in 2020 in the African Journal of Range and Forage Science. Firstly, the number of papers has almost doubled, which implies a healthy growth of science in our discipline. Secondly, the number of authors per paper has increased by more than 50%, indicating greater multi-disciplinary input and greater teamwork. Thirdly, the profile of local southern African institutions to which the authors are affiliated has changed. While authors from universities were consistently close to 60% of the local authorship in both years, contributions from agricultural institutions have declined markedly, while authors from environmental and conservation institutions as well as non-governmental organisations were not represented in 1999 but contributed significantly in 2020.

This implies a shift in scientific focus away from agriculture to broader environmental and conservation issues in the research reported from a broader range of institutions and organisations in South Africa, which are typically multi-disciplinary in nature. Interestingly, the proportion of international (from outside southern Africa) authors increased from 16% in 1999 to 40% in 2020. So, with that context as background, it is probably more difficult now to define a "Grassland Scientist" and "Grassland Science" now than it was in 1999.

So, why the perceived move away from papers by authors affiliated to agricultural institutions to those by authors affiliated to environmental and conservation organisations? Is it due to lack of capacity for funding in the agricultural sphere, or have we got all the answers relating to veld management and pasture production in an agricultural context? Looking at the most-read articles and the most cited articles in the African Journal of Range and Forage Science, papers on grazing management and bush encroachment comprise the top three on both of these lists. Both of these topics have a strong agricultural application, considering that the majority of grassland/savanna area in southern Africa is under some form of livestock farming. Maybe we shouldn't lose focus on the agricultural application of our science.

Activities of the Society highlighted in my 2000 Presidential Address included the organisation of Prestige Farmers Days and specialist symposia to stimulate debate among scientists and practitioners. These were reported and distributed in the form of special publications as well as in the Bulletin of the Grassland Society (now Grassroots). It has been a long time since the Society organised or was involved directly in symposia or farmers days that facilitate and encourage interaction between scientists and agricultural land users, even prior to the restrictions imposed by the pandemic.

The society currently runs online webinars and courses, but mainly aimed at members and the scientific community rather than at land users. Are we becoming insular? Is it easier to debate among ourselves rather than taking our science to the users of that science? Are we training scientists with the requisite practical and field skills to distil scientific principles into management strategies and recommendations for

agricultural and conservation scenarios?

With the proliferation of new research techniques and instrumentation, remote sensing, sophisticated statistical models and information overload, there is a very real danger of losing touch with the ecosystem in which we work and losing the ability to apply science in practice. Looking at tertiary education in southern Africa and indeed further afield, there is a tendency to promote university education over more technically, practically based education. So, graduates tend to be more theory-based than field-skills orientated. Within universities, there is an additional move towards reducing field and practical based training. Extended field trips are rare because of costs. Weekend field trips disappear because of costs and conflicting time demands. Practical training is reduced to a few afternoons in a semester. The academic system at universities ensures that academic staff are rewarded for publishing in reputable (theoretical) journals and are not rewarded commensurably for imparting practical field skills to students and training students in solving problems at the landscape level. The proliferation of easily accessible information and web-based applications requires different and new skills and creates a dilemma for educationists. For example, do students still need to learn the detailed theory and practice

Prof Kevin Kirkman

of grass identification when scanning a grass inflorescence and submitting it to a web-based app that may result in a correct identification? Students consequently question why they are being taught "outdated" plant identification skills, however, if the app does not have the species you are looking for, then what do you do? When the plant identification experts who developed the app retire, who will have the skills to replace them if these skills are not taught? How do we balance teaching essential, classical skills with the ability to exploit the information explosion?

The high proportion of published papers emanating from universities indicates a healthy academic system, however, the high number of postgraduate students as first authors also points to, but not exclusively so, reporting on short-term studies structured around degree requirements. Recent national initiatives in South Africa have enhanced capacity for long-term monitoring of the environment across many ecosystems, including grasslands and savannas, but what has happened to long-term experiments? Should they not also be supported by some national initiative? For example, long-term grazing experiments are few and far between, and yet papers on grazing management are included in the most read and the most cited paper in our journal.

Rangeland ecology has advanced in recent decades, from the Range Model, through State-and Transition Models, Non-equilibrium Theories and Resilience thinking. All of these additions to our state of knowledge point to adaptive, flexible approaches to managing resources, whether in agricultural or conservation scenarios. Do we apply this thinking in the design of long-term experiments? Most experiments are designed and applied in a rigid manner with statistical analyses in mind to ensure the acceptance of publications in reputable journals. Including adaptive treatments in experiments brings a whole new level of complexity to the design and interpretation, and adds many years of assessment to the experiment.

For example, adding a full season rest to a grazing system every four years in a rigid design might take 12, 16 years or even longer to properly evaluate the impacts of the rest. However, incorporating rest irregularly based on adaptive principles may take much longer to evaluate. Where are the long-term grazing experiments that will allow the incorporation of adaptive principles based on current rangeland theory? What is the alternative?

Current issues facing the world include climate change, ecosystem degradation and decline in ecosystem services. A perusal of scientific literature, both in our journal as well as internationally, reveals a significant focus on these issues, and in our field, with a particular focus on the impacts of climate change on grasslands and savannas. This includes bush encroachment as well as impacts of nutrients, drought, carbon dioxide and temperature on ecosystem dynamics. Experiments aimed at addressing these issues are relatively easy to set up and run, and produce results in a relatively short time. Consequently, there is a proliferation of such experiments. As valuable as they might be, do we have the experience and "field-cred" to apply this new knowledge to management of veld for livestock, when there is obvious uncertainty around grazing management even without considering climate change? Are we in a position to be able to monitor and understand the impacts of applying such new knowledge, when we are not really monitoring and understanding the current situation? Maybe a "back to basics" approach is called for.

Let's look at some other predictions from 2000. I predicted that our journal and bulletin (now called Grassroots) would be published electronically. This has happened, but in 2000 there was no thought of virtual congresses, webinars and virtual meetings. In 2000 I commented on the proliferation of scientifically dubious information. This has undoubtedly increased over the last 21 years with a proliferation of dubious predatory journals and social media experts. As scientists, we need to develop and impart skills of scientific discernment. In 2000 I commented on the decline in institutional support for the GSSA and other professional societies. This decline in support has continued and is being felt by the society in various ways, particularly in the organisation and running of the annual congresses. Solutions will need to be sought for the continued sustainability of our annual congresses.

A phenomenon that was not predicted at all in my 2000 address was the rise and the role of social media. The GSSA has developed an important presence on various social media platforms which serves to raise the profile of our Society and the science underpinning the Society, disseminating important scientific and other information, and maintaining a "GSSA community" online. The poster session at the 2020 virtual congress was presented in public social media space. This was very successful, resulting in significant interest from outside the attendees and society members. This approach is being followed again for the 2021 congress and is likely to continue even when congresses revert to physical meetings. This social media presence will undoubtedly play an increasingly important role.

In 2000, I made a call for greater mobility of scientists, looking at more flexible modes of employment and sharing of expertise between institutions, so that the impact of scientists could be spread more widely and so that scientists could focus on science. This has not developed to any significant degree but remains an opportunity.

So, in concluding the reflective look at the last 21 years, the GSSA has advanced in many ways. The journal has improved significantly and increased it impact ratings. This reflects positively on the state of our science in southern Africa. Our popular publication "Grassroots" has gone from strength to strength and is widely read online. Congresses have continued to grow in size and stature, attracting an increasingly diverse group of attendees from various fields and disciplines. What direction should the GSSA take for the next 21 years?

My suggestions are to firstly continue building on existing strengths. Continue the impressive growth of the African Journal of Range and Forage Science and extend the reach of the Grassroots publication. Increase and formalise the use of the various social platforms to develop an awareness of our science, our Society and our members. Continue adding value to members in the form of regular webinars and courses as a means of stimulating debate and developing skills.

Secondly, develop webinars aimed at disseminating information to land users and stimulating debate about the application of scientific principles in practice. Develop online courses for land users on topics that are important, such as grazing management, fire management and grass identification.

Lastly, I suggest that the Society increases its presence in terms of influencing the education of scientists in our general field, influencing research direction by highlighting research needs and increases its sphere of influence in the practical application of science among all land users, particularly agricultural land users.

Grassland Society of Southern Africa

CONGRESS 56 AWARD WINNERS

Best platform presentation

Christiaan Harmse

Co-author: Hannes Gerber

Determining the impacts of climate variability on vegetation and animal production in the Western Upper Karoo Shrublands

Best Platform Presentation by a Young Scientist

Annerine Myburgh

Co-authors:

Caroline Lehmann, Thami Shezi, Michelle Greve

Getting a grip on grasslands: assessing plant diversity in the under-sampled and threatened grasslands of South Africa

Norman Rethman Planted Pastures Award

Erika van Zyl

Co-authors:

Chris Dannhauser, Peter Oosthuizen, Phumzile Msunthsa

A review: the value of grazing maize for sheep as overwintering alternative in the summer rainfall areas of South Africa

Best Standard Poster Presentation

Derryn Nash

Co-author: Donna Berjak

The performance of *Lolium multiflorum* varieties under irrigation on Cedara Research Station, KwaZulu-Natal in 2020

Best Research Proposal Poster Presentation

Jabulile Leroko

Co-authors:
Ethan Britz, Lilburne Cyster, Clement Cupido, Francuois Müller

Seed germination of *Brachiaria* grass species under different temperature and osmotic stress conditions

Most prolific adjudicator

Robyn Nicolay

Adjudicated 93 posters and presentations!

Winner of the quiz (and lucky draw)

Jacqueline Wetselaar

GSSA Council 2021/2022

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Vice President: Charné Viljoen
Immediate Past President: Kevin Kirkman
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Honorary Secretary: Robyn Nicolay
Scientific Editor: Pieter Swanepoel
Publications Editor: Malissa Murphy

Website Editor: Charné Viljoen & Ntuthuko Mkhize (temporarily)
Public Relations Officer: Ntuthukko Mkhize
Additional Member: Assistant editor Grassroots: Francuois Muller
Additional Member: Assistant editor Grassroots: Marnus Smit

Additional Member: Yvette Brits
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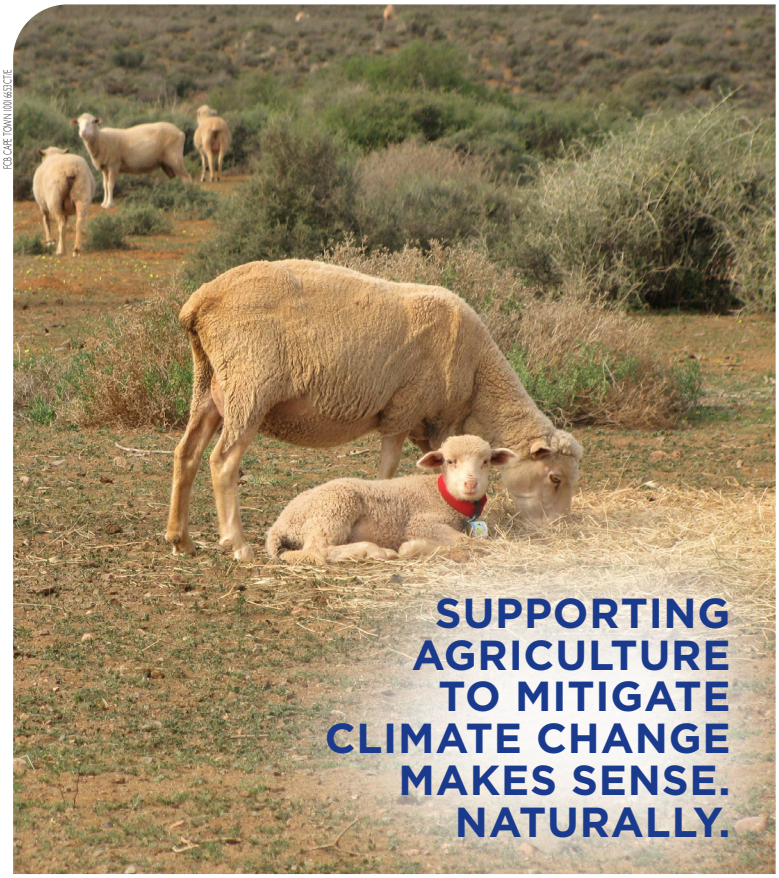

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Rachel Carson: The quiet woman who ignited the environmental movement

Her vision laid bare corporate greed and government collusion in the poisoning of the world.

Don Pinnock

Current Address: Daily Maverick
Reprinted From: https://bit.ly/3nmFpqn

Following the publication of Rachel Carson's damning book *Silent Spring*, agribusiness in the US should have immediately stopped spraying deadly poisons over fields, forests and towns.

She has conclusively proved that chemical corporations were guilty of a massive die-off of insects, birds and vital soil organisms. Even cats were being killed and farmworkers were dying as deadly chemicals rained down from repurposed World War 2 planes fitted with spray nozzles.

Instead, the chemical industry attacked the messenger, calling her hysterical and "probably a communist". They upped marketing campaigns, paid scientists to praise the insecticides and herbicides DDT, chlordane, heptachlor, dieldrin, aldrin and endrin. Then they increased production.

Carson's ideas would win in the end, but she would not have much time to savour her victory. Three years after her book's publication in 1961 she died of breast cancer, quite possibly caused by what she had warned against: strontium 90 from atomic bomb tests.

Silent Spring is both scrupulously scientific and highly readable. Nobody but Carson had the literary skills to turn a 400-page book about chlorinated hydrocarbons into an international bestseller. She had spent more than six years documenting human misuse of powerful, persistent chemical pesticides that were being allowed before the full extent of their potential harm to the whole biota was known. Even today, its findings are horrifying.

Figure 1: World-renowned marine biologist, author and environmentalist Rachael Carson. (Photo: Wikimedia)

Figure 2: Rachel Carson

'Silent Spring' Is Now Noisy Summer

Pesticides Industry Up in Arms Over a New Book

By JOHN M. LEE

The $300,000,000 pesticides industry has been highly irritated by a quiet woman author whose previous works on science have been praised for the beauty and precision of the writing.

The author is Rachel Carson, whose "The Sea Around Us" and "The Edge of the Sea" were best sellers in 1951 and

Rachel Carson Stirs Conflict—Producers Are Crying 'Foul'

fending the use of their products. Meetings have been held in Washington and New York. Statements are being drafted and counter-attacks plotted.

A drowsy midsummer has suddenly been enlivened by the greatest uproar in the pesticides industry since the cranberry scare of 1959.

Miss Carson's new book is entitled "Silent Spring." The

Figure 3: A clipping of an article in the New York Times.

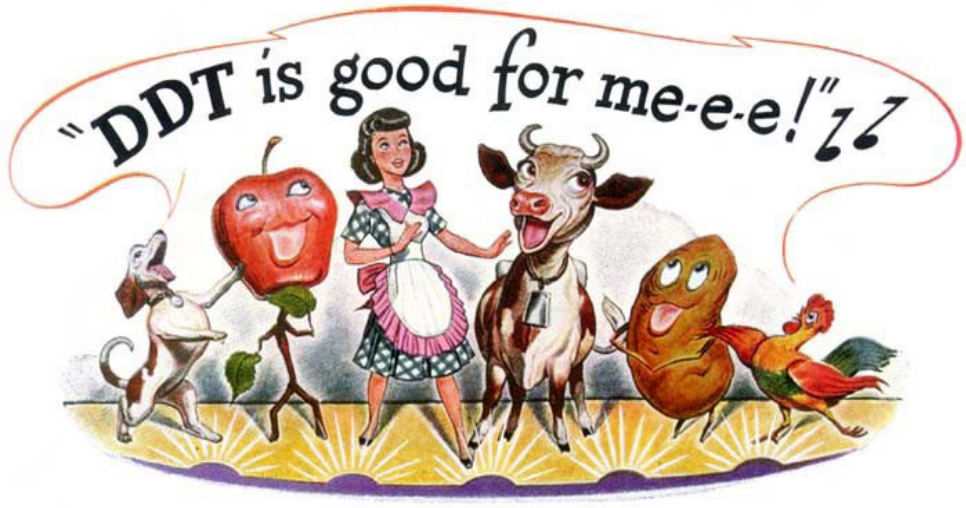


Figure 4: Post-war American corporations were booming and needed to sell goods. Hence, marketing campaigns like these were doing the rounds.

Cover article of April, 1945, *Nebraska Farmer* extolling the virtues of DDT.

Figure 5 & 6: These were the ideas that drove the chemical companies in their lucrative campaign to spread hydrocarbon poisons across America.

A *New York Times* reviewer wrote that Carson "tries to scare the living daylights out of us and, in large measure, succeeds. Her work tingles with anger, outrage and protest."

In revisiting the impact of *Silent Spring* more than half a century later, two threads are interesting to pursue. The first is the context in the US at the time of its release in 1961. That's best viewed through the lens of a single individual: Edward Bernays.

His uncle was Sigmund Freud and his cousin Anna Freud, Sigmund's daughter, who came to dominate Western psychology after her father's death.

The Bernays family moved from Vienna to the US in the 1890s. Edward studied agriculture but soon moved to journalism. During World War 1 he joined the government as a consultant on "public information", after which he set up private practice in New York as a "public relations counsel", a profession unheard of at the time. He was to become hugely influential in both industry and government, specialising in what he called "engineering consent" — marketing propaganda.

The masses, he said, were dangerous. Citing his uncle, he described them as irrational and subject to herd instinct. However, skilled practitioners could use crowd psychology and psychoanalysis to control them in desirable ways. He described this as public relations, "the science of managing information released to the public by an organisation, in a manner most advantageous to the organisation". He was hired by corporations and politicians and became immensely wealthy.

Post-war American corporations were booming and needed to sell goods. Bernays showed them how to shift their marketing from needs to making consumers "slaves to their desires". Among his many campaigns, he pioneered smoking by women and orchestrated a CIA-engineered coup that overthrew the democratically elected government of Guatemala which had expropriated the US-owned United Fruit Company.

The idea that the masses were politically dangerous and needed to be controlled by "superior" men was perpetuated through the teachings of his cousin, Anna Freud, within the psychiatry movement and was reflected in immensely popular books like *Atlas Shrugged* and *The Fountainhead* by Ayn Rand.

The hero of *Atlas Shrugged*, John Galt, is a ruthless captain of industry who struggles against stifling regulations that stand in the way of commerce and profit. To many of Rand's readers — especially corporate executives — Galt's supreme self-reliance devoted to the pursuit of self-interest under capitalism seemed to embody the core American beliefs.

These were the ideas that drove the chemical companies in their lucrative campaign to spread hydrocarbon poisons across America. They knew best and an upstart like Rachel Carson — a woman to boot — was to be ridiculed out of existence. She was, moreover, bad for business.

Velsicol, which manufactured chlordane, threatened to sue her publisher for libel. Pesticide advocates claimed that without chemicals, agriculture would collapse. In 1963, Monsanto published The Desolate Year which described a starving world without chemical pest control.

Two scientists, later found to be paid by the chemical industry, attacked Carson's criticisms of DDT even while studies were proving that mosquitoes everywhere were acquiring resistance to it because of its overuse in agriculture.

Allegations that Carson was just a hysterical woman appeared both in the pages of chemical and agricultural trade journals as well as in the popular press. A reviewer in *Time* criticised her "emotion-fanning words" and characterised her argument as "unfair, one-sided and hysterically overemphatic". He traced her "emotional and inaccurate outburst" to her "mystical attachment to the balance of nature".

Despite this, *Silent Spring* became a bestseller. It caught the attention of President John F Kennedy who called for an investigation that substantiated Carson's findings. Congressional hearings took place at which Carson testified.

The Toxic Substances Control Act which followed was *Silent Spring*'s greatest legal vindication. It banned or severely restricted all six compounds indicated in the book and assumed responsibility for testing new chemicals.

The second thread interesting to pursue following the publication of the book was its part in corroding public faith in the trustworthiness of corporations, particularly the chemical indus-

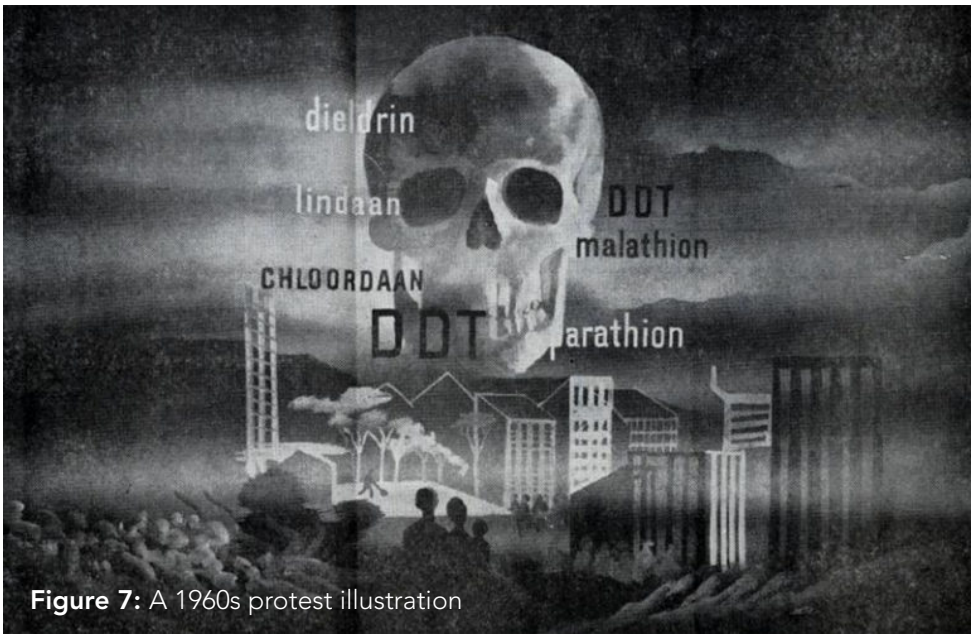


Figure 7: A 1960s protest illustration

Figure 8: A 1960s protest illustration

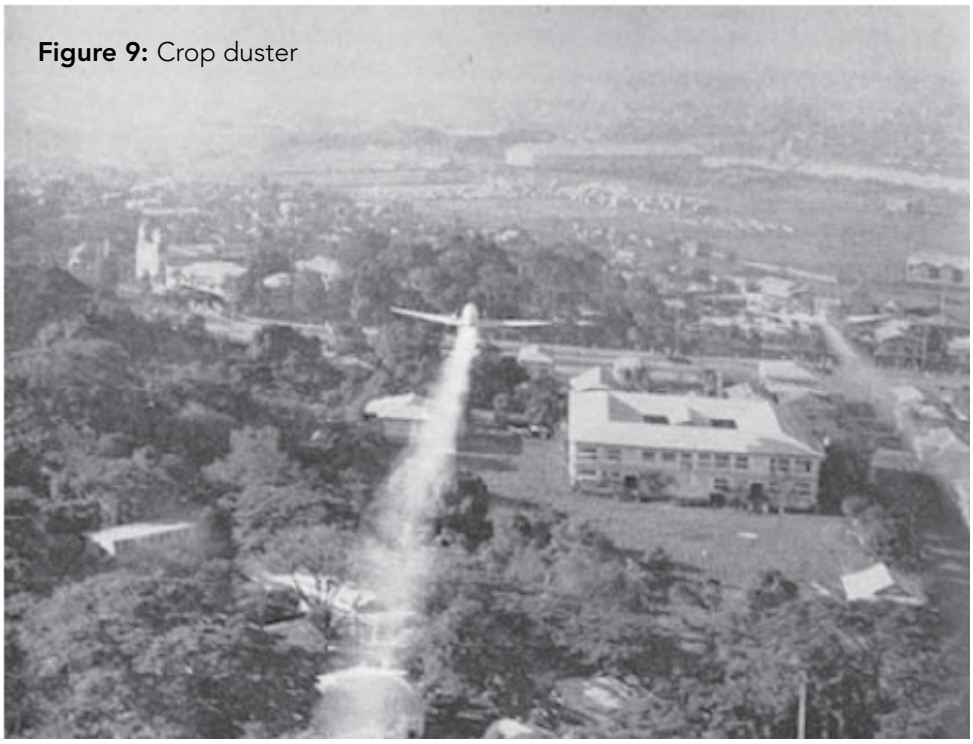


Figure 9: Crop duster

Figure 10: Rachel Carson

try. It also called into question a major item of faith in the 20th century — the authority of scientific experts. Carson showed how experts trusted their own creations too greatly and how they themselves were implicated in a vast complex of private and public interests designed to produce profits for chemical manufacturers and the growing agribusiness sector.

Most importantly, *Silent Spring* launched the modern global environmental movement. The ecological interconnections between nature and human society that it described went far beyond the limited concerns of the conservation movement at the time and into the protection of soil, forests, water and other natural resources.

People could also see "engineering consent" for what it was: an attempt to dupe people for corporate profit. Scientists were no longer to be believed without question because some could be bought.

There were also vested interests in government that would permit the environment to be trashed for profit, whatever the cost to ordinary people.

A new generation found their perspectives widened and their activism inspired by Carson's powerful work. And that work is ongoing. The world today is awash in a sea of chemicals never before seen in nature.

The increase of endocrine disruptors in food and water has raised suspicions that they are responsible for a multitude of perplexing new problems: genital deformities in increasing numbers of newborn boys, earlier puberty in girls, declining sperm count in adult males, rising rates of prostate and testicular cancer, and problems in sexual development and reproduction.

Other possible health effects include abnormal brain development, obesity and diabetes. Plastic poisons the seas.

The chemicals are not the same as the ones Carson indicted in *Silent Spring*, yet they are produced, sold and used on an unsuspecting public by the same interconnected complex of profit-driven companies and government authorities.

Carson's words still apply: No witchcraft, no enemy action produced our stricken world. People have done it to themselves.

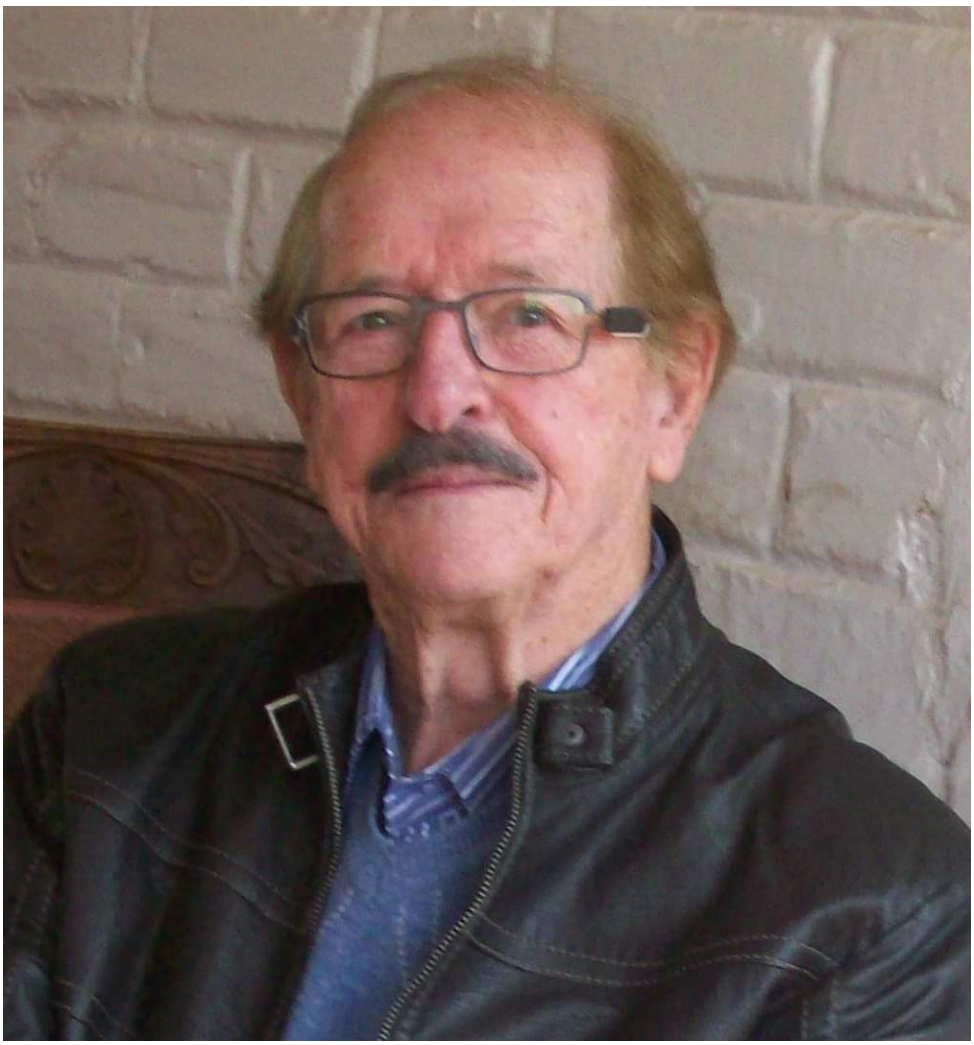
In Memoriam: Piet Roux

8/5/1927 – 1/7/2021

Loraine van den Berg

Current Address: Grootfontein Agricultural Development Institute

Dr Piet Roux (94), a founder member of the Grassland Society of Southern Africa, passed away on 30 June 2021. Dr Roux was born in Cradock in 1927 and matriculated in 1944. In 1955 he started his career in the Department of Agriculture at the Karoo Regional office in Middelburg, Eastern Cape. From 1978 until his retirement in 1987 he was the Director of the Karoo Region.



In 1968 he obtained a doctorate at the former University of Natal investigating the ecology of *Tetrachne dregei*. Being both an avid botanist, as well as an agriculturalist and environmentalist, Dr Roux contributed tremendously to our current understanding of Karoo ecology.

His vegetation survey data, collected over many years, currently form the basis for long term monitoring of vegetation change in the Karoo. He was involved in the development of grazing systems as well as vegetation survey techniques contributing to sustainable farming as a whole.

Dr Roux was a mentor to many young scientists, but also inspired farmers with his willingness to share his knowledge. Till the end, he was continuously identifying new projects to investigate some of his "suspicions" and shared them with the scientific community. His impact as a rangeland scientist, agriculturalist and mentor will not be forgotten.

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Quarterly digital newsletter of the

Grassland Society of Southern Africa

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For more information: info@grassland.org.za

The Story of a South African Park

Shaping Addo is dedicated to the rangers and researchers of Addo, whose dedication and hard work turned a remnant herd of traumatised elephants into an inspirational conservation success story.

Caxton Reporter

Current Address: Kempton Express: Thembisan
Reprinted From: https://bit.ly/3nrc8ef

More than a century ago elephants in the Eastern Cape were systematically hunted – until just 16 were left.

Today there are 650 elephants in the Addo Elephant National Park, the densest concentration of wild elephants anywhere on the planet.

While elephants are undoubtedly still the park's top drawcard, the past four decades have seen the emphasis shift from protecting a single species to conserving five biomes and the wild animals that occupy them. And today, Addo can boast the Big Seven … elephant, lion, leopard, buffalo, rhino, as well, in the marine protected area, the great white shark and southern right whale.

Shaping Addo expertly delves into the history of the park, detailing the positive impact that changing conservation practices have had on its development. Drawing on decades of groundbreaking research, author Mitch Reardon provides a fascinating insight into the lives and habits of the animals – terrestrial and marine, and examines individual species, the relationship between them, and the carefully crafted management strategies required to ensure the survival of all species.

The book is an engrossing account of how a seemingly insignificant sanctuary was transformed into an astonishingly successful mega-park, and the most ecologically diverse protected space in South Africa. *Struik Nature*, *R320*.

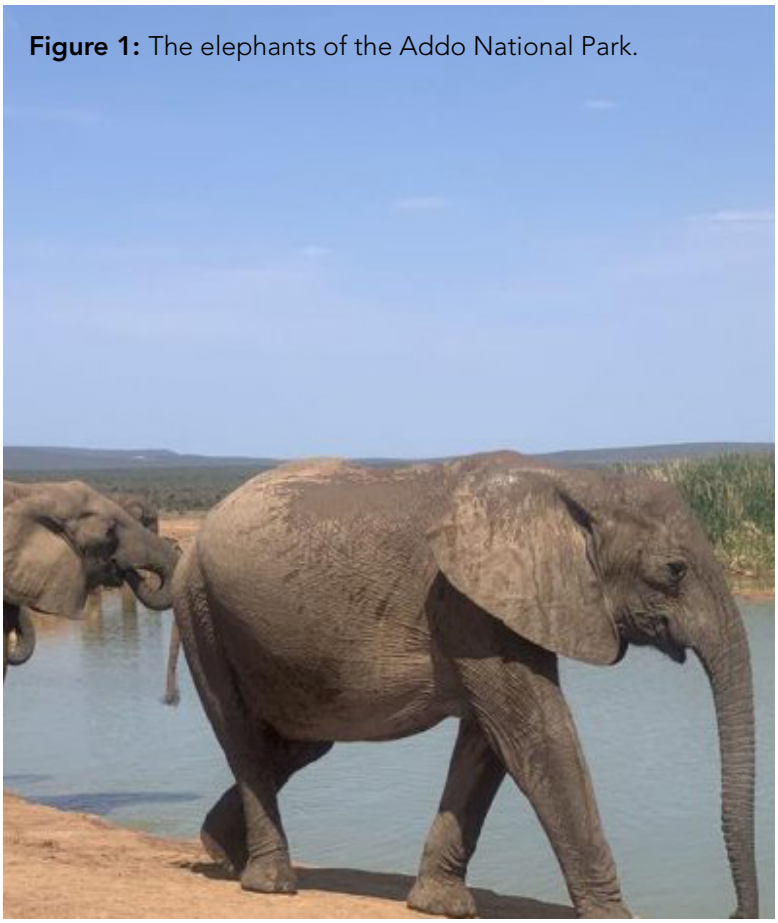

Figure 1: The elephants of the Addo National Park.

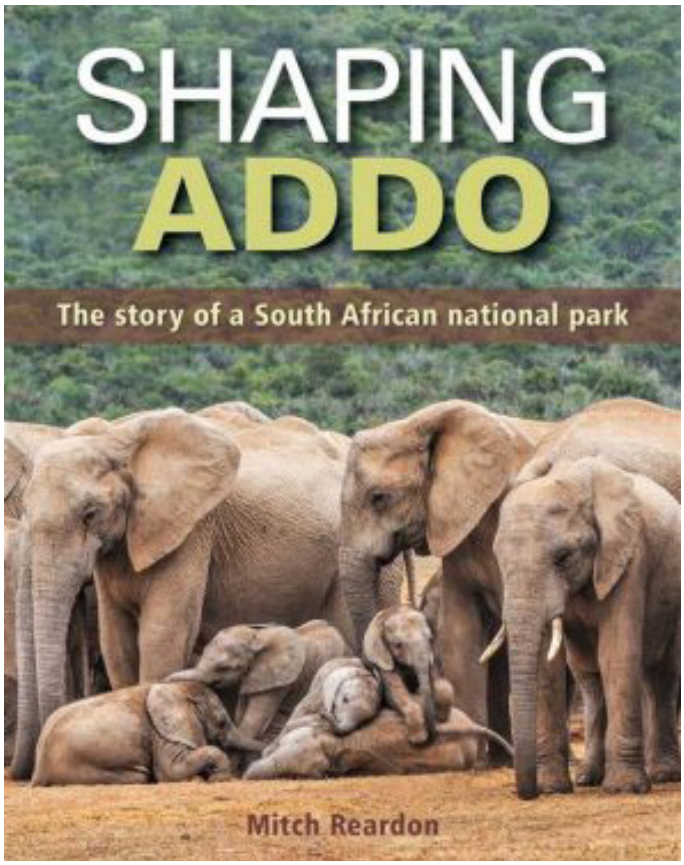

Figure 2: Shaping Addo is available from Struik Nature at R320.

IMPACT FACTOR 1.293

African Journal of Range & Forage Science

CITESCORE 3.5 SCOPUS

CALL FOR SUBMISSIONS TO

AFRICAN PASTORALISM AND RANGELANDS IN THE CONTEXT OF GLOBAL OBJECTIVES

A special issue of the
African Journal of Range & Forage Science

ABSTRACTS DUE 31 OCTOBER 2021
AUTHORS WORKSHOP 30 NOVEMBER 2021
FULL PAPERS DUE 15 MAY 2022

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Go check out the following

Websites, Webinars & Podcasts

Bush Expert Information Management System (BEIMS)

BEIMS is a cloud-based, easily accessible online information management system which provides access to the Bushmon and EcoRestore databases. Bushmon contains information on current research restoration projects while EcoRestore is a Bush Encroachment Restoration Decision Support System containing expert advice on the control of bush thickening.

Visit www.bushmon.co.za

Working on Grass

Working on Grass is an environmental and agricultural services company with a passion for sustainable and regenerative land use. It is based in South Africa and was started by well-known author and environmentalist Frits van Oudtshoorn. We offer a range of products and services related to environmental management. These include advisory services, seed, ornamental grasses, training and various other products. Working on grass is affiliated with Africa Land-Use Training, which is an accredited training provider since 2007.

Visit www.workingongrass.co.za

WORKING ON GRASS

Project Vulture

Environmentalists, conservationists and researchers are waging a desperate fight to save these birds. Project Vulture was developed as an platform to bring the efforts of these dedicated individuals and organisations together.

Visit https://projectvulture.org.za/

PROJECT VULTURE

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: www.joburgsucculentsociety.com

Johannesburg Succulent Society
FOR THE LOVE OF PLANTS

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://www.birdlife.org.za/blsa-conversations/?fbclid=IwAR0OphkAK1Omx5vxSu2omJfBI1fHIAaZoEnBwAF7d9PMoEWF3bJZ61pQusc#1622816346779-1e6331a3-6b23

Go check out the following

Websites, Webinars & Podcasts

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

Living on faith in a changing climate – by Clement Cupido

The short film is about the impact of climate change and the subsequent prolonged droughts on marginalised pasturalist communities living in Namaqualand.

Watch it at https://youtu.be/zHVLaM_ninU

3 Rules for a zero-carbon world – Nigel Topping, Countdown, TedTalk

Every human and natural system -- from oil extraction to the flight of a flock of starlings -- can be seen as a set of repeating patterns. These patterns can be disrupted for good or for bad, says Nigel Topping, the High Level Climate Action Champion for COP26, the UN's climate change conference set to take place in November 2021 in Glasgow, Scotland. He shares three rules of radical collaboration that could positively disrupt the patterns of the global economy and help humanity tackle the world's greatest threat: climate change.

Watch it at:
https://www.ted.com/talks/nigel_topping_3_rules_for_a_zero_carbon_world?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare

A new way to restore Earth's biodiversity – from the air – Susan Graham, TEDMonterey

Land restoration is about more than planting trees, says environmentalist Susan Graham. Check out how her team combines drone technology with ecology-trained AI to restore degraded land and revive complex, biodiverse ecosystems -- whether it's on a small island or across an entire continent.

Watch it at:
https://www.ted.com/talks/susan_graham_a_new_way_to_restore_earth_s_biodiversity_from_the_air?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare

Upcoming events

1-5 November 2021 (Virtual and free)

The Conservation Symposium

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/

8-11 November 2021, 10:00 – 13:00 (Virtual)

12th Annual Rural Development Conference

The Virtual Rural Development week will showcase successful projects and case studies to provide any potential participants in this sector with the critical practical knowledge to get started or improve existing initiatives. Along with the opportunity to establish useful networks, glean from the NGOs, investors and developers involved in successful micro to medium sized projects who will come together to share valuable concepts, experience and innovation.

You can view the complete line-up of speakers here or to find out more, please email info@millasa.co.za or call 082 368 6404 (Also Available on WhatsApp).

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

Upcoming events

11-12 November 2021

4IR AgriTech Conference

Protea Hotel Stellenbosch, Cape Town / Virtual
We provide you with valuable insights from specialists who will discuss the opportunities offered by disruptive digital technologies to increase productivity, and access to services and markets in the agricultural sector and share their innovation and business plans. Technology companies, incubators, researchers, the business community, leaders of public and private institutions, policymakers, financial institutions, and the donor community will network to learn and network with each other.

For more information visit www.mathematraining.co.za/ or email info@mathematraining.co.za.

29 Nov – 1 Dec 2021 (Hybrid)

2nd Drone Users Conference: Conservation & Agriculture

The Endangered Wildlife Trust, United Nations Development Programme, and the Western Cape Government's Department of Agriculture, will be hosting the 2nd Drone Users Conference: Conservation & Agriculture, taking place at Elsenburg, Stellenbosch, Western Cape. The conference incorporates drones and technology in the fields of Conservation, Agriculture, Sustainable Land Management and Natural Resource Management.

Visit: https://dronesatwork.co.za/

2nd DRONE USERS CONFERENCE:
CONSERVATION & AGRICULTURE

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

Deadlines for

Newsletter of the Grassland Society of Southern Africa

Grassroots

submissions 2021 & 2022:

Issue 4: Extended to 20 November 2021

Issue 1: 01 February 2022
Issue 2: 01 May 2022
Issue 3: 01 August 2022
Issue 4: 01 November 2022

Please visit
www.grassland.org.za/publications/grassroots/submit-to-grassroots-now
for submission guidelines.

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