



CoP

Land and Soil Management
Community of Practice



Trading farmland for nitrogen protection

By Adityarup “Rup” Chakravorty

Excess nitrogen from agricultural runoff can enter surface waters with devastating effects. Algal blooms and fish kills are a just a couple of possible consequences. But riparian buffer zones – areas of grasses, perennials, or trees – between farmlands and streams or rivers can help.



View of trees and switchgrass buffer plots from the field. The tubes in front are for sampling ground water depth. Photo credit Wes Childres.

“Riparian buffer zones are nature's hydraulic shock absorbers,” says Deanna Osmond, a soil scientist at North Carolina State University. They can reduce pollution and provide habitat for wildlife. Trees can hold stream banks together and provide food for animals. These buffer zones can also dampen the flow of agricultural runoff. This can lead to lower amounts of nitrogen reaching streams and rivers.

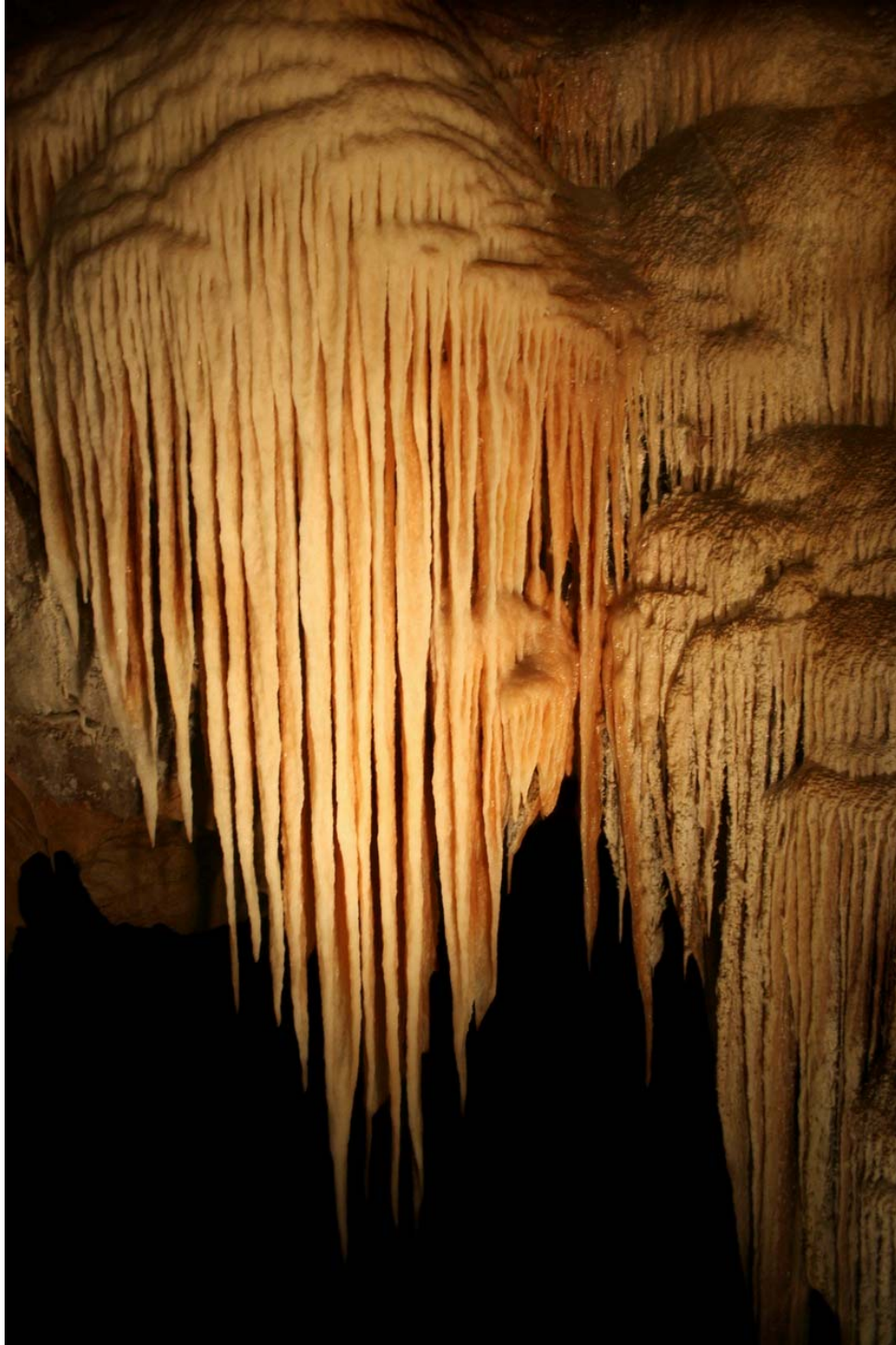
But what kind of vegetation makes buffer zones most efficient at removing nitrogen from runoff? That is the question that Osmond and her colleagues set out to answer.

Their recent study showed that – at least for some areas – it doesn't matter what kind of vegetation buffer zones are made up of. There appeared to be no significant differences in how efficiently they removed nitrogen from agricultural runoff.

<https://www.soils.org/discover-soils/trading-farmland-nitrogen-protection>

Bushfire clues dribble through cave dripwater

Scientists can analyse stalactite layers to trace climate changes over millennia – but must watch for fires. Belinda Smith reports.



Researchers discovered stalactites, such as these in the Jenolan Caves in Australia's Blue Mountains, carry signatures of bushfires that raged on the surface above.

Michael Brooke / Getty Images

Wildfires that raze vast swathes of forests also alter the chemistry of caves below – and may muddy the waters for scientists wishing to reconstruct our climate history.

Researchers from Australia and the UK analysed water dripping from the surface through to a cave in Western Australia found after a fire, the chemistry of the “dripwater” changes considerably. The work was published in *Hydrology and Earth System Science*.

<https://cosmosmagazine.com/chemistry/bushfire-clues-dribble-in-cave-dripwater>

Community-based wind erosion monitoring across Australia 3



DustWatch Report

June 2016

The winter recovery of groundcover is in full swing. The three areas that can possibly produce substantial dust emissions during this time of winter are the western Local Land Services area (red line in Figure 2, 3 and 4), the Victorian Mallee (blue) and the South Australian Murray Darling Basin (pink). All these areas have recovered well over the winter break and are getting close to 100 percent of the area above 50 percent groundcover (Figure 4). This is great news as it will provide good protection for the upcoming spring and summer.

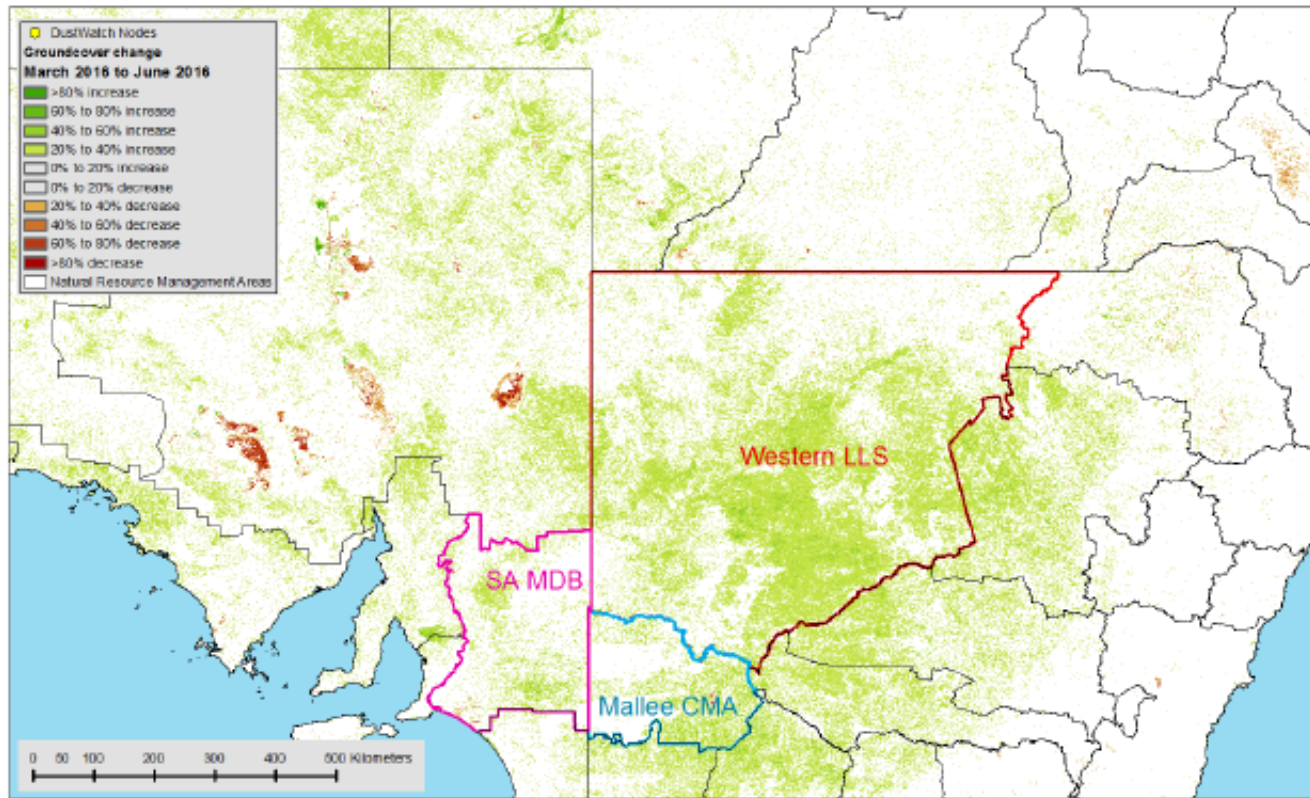


Figure 3: Groundcover change between March 2016 and June 2016 as determined from MODIS data.

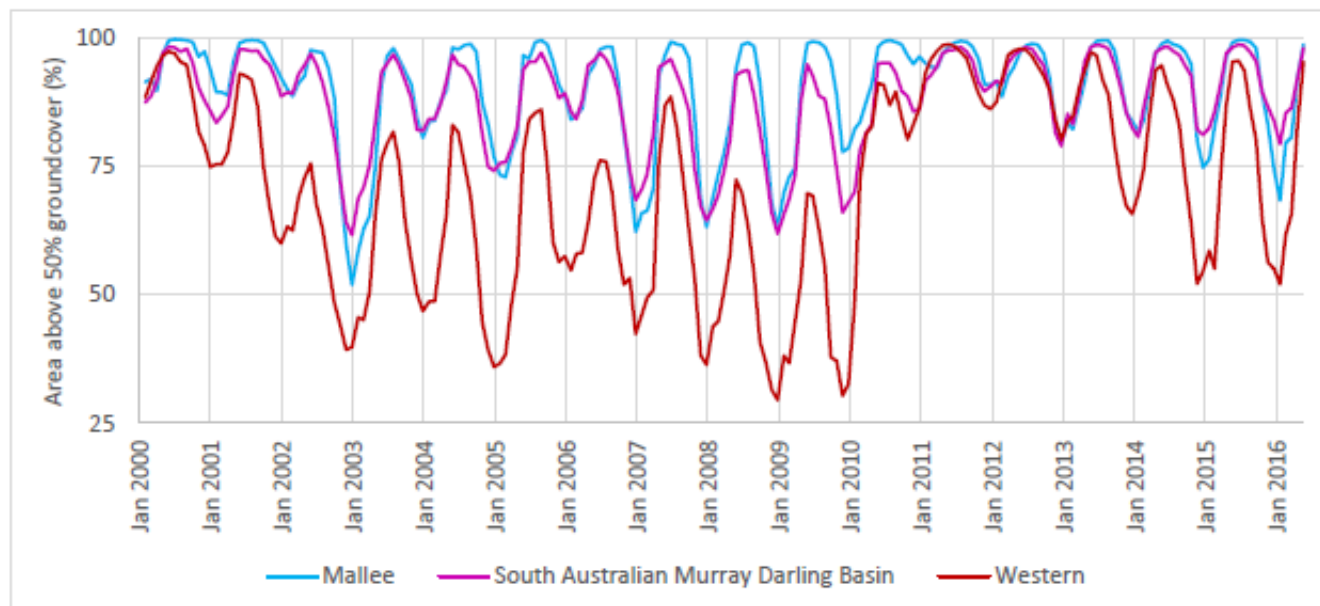


Figure 4: Groundcover trend for the Western LLS and Mallee and SA-MDB CMA as determined from MODIS data.

13–21 August 2016

national science week

An Australian Government Initiative
Inspiring AUSTRALIA

HOME | FIND AN EVENT | BLOG | SCHOOLS | GET INVOLVED | REGISTER AN EVENT | FAQ | CONTACTS

Festivals • Activities
Events & more
all across Australia

Your location

LATEST NEWS


[Tiny fossil treasures of Queensland](#)

[Biohacker Dr. Ellen Jorgensen is Coming to Perth this National Science Week!](#)

[National Science Week in the ACT](#)


CONNECT WITH SCIENCE WEEK

SCINEMA SCIENCE FILM FESTIVAL



See the winning entries from SCINEMA 2016 on Australia's Science Channel in National Science Week. Register now.

WILDLIFE SPOTTER - CITIZEN SCIENTISTS NEEDED!



Help save threatened species and preserve Australia's iconic wildlife! Become a citizen scientist and assist researchers by looking for animals in wilderness photos taken by automated cameras around Australia.

[FIND AN EVENT](#)

[FIND A MUSEUM](#)

[ALAN ALDA & SCIENCE WEEK](#)

<http://www.scienceweek.net.au/>

Managing uncertainty: How soil carbon feedbacks could affect climate change

There is more than twice as much carbon in the planet's soils than there is in its atmosphere, so the loss of even a small proportion of that could have a profound feedback effect on the global climate.

Yet in its most recent report, in 2013, the Intergovernmental Panel on Climate Change (IPCC) used models that paid less attention to soil carbon potentially entering the atmosphere than had earlier reports, concluding that there simply wasn't enough evidence about how warmer global temperatures might impact soil carbon stocks.

A new Yale-led paper makes the case that developing meaningful climate projections will rely on understanding the role of "soil carbon turnover" and how it might potentially trigger climate feedbacks in a warming world.

Writing in the journal *Nature Climate Change*, a team of scientists calls for more collaboration between modelers and soil scientists to improve the scientific understanding of the mechanisms that control the creation, stabilization, and decomposition of carbon in the soil.

Journal Reference:

1. Mark A. Bradford, William R. Wieder, Gordon B. Bonan, Noah Fierer, Peter A. Raymond, Thomas W. Crowther. **Managing uncertainty in soil carbon feedbacks to climate change.** *Nature Climate Change*, 2016; 6 (8): 751 DOI: [10.1038/nclimate3071](https://doi.org/10.1038/nclimate3071)
<https://www.sciencedaily.com/releases/2016/08/160802125603.htm>

Earth home to a trillion species

A new study relying on the most comprehensive datasets yet suggests there may be much more diversity than previously thought. Phil Ritchie reports.



Strands of the *Streptomyces coelicoflavus* soil bacteria and chains of round *Streptococcus* bacteria in a soil sample. New techniques have shown many more organisms than previously thought. – Science Photo Library/Getty Images

A new study has dramatically increased estimates of the number of species of life on Earth to one trillion – and we have discovered less than 1% of them.

The study by two biologists from the US's Indiana University, Kenneth Locey and Jay Lennon, was the largest of its kind ever undertaken. It combined the largest available datasets with ecological models and new ecological rules for how biodiversity relates to overall numbers of organisms.

<https://cosmosmagazine.com/biology/earth-home-trillion-species>

Soil microbes could speed up thaw of permafrost



Among the best preserved kitchen-middens in the world, the Qajaa site has until now been preserved by permafrost in one of the most Northern World Heritage sites.

BO ELBERLING

Heat produced by Arctic soil microbes could increase the thaw of permafrost and the release of carbon to the atmosphere, according to a paper published this week in *Nature Climate Change*.

The process also could degrade evidence of early human activity in the Arctic, preserved in organic middens in the permafrost.

<https://cosmosmagazine.com/climate/soil-microbes-could-speed-up-thaw-of-permafrost>

What happens to all the charcoal after a bushfire?



Wildfires can devastate a forest, but the burnt organic matter they leave behind can provide soil benefits for centuries.

iStock

Bushfires have a big impact on the environment, but maybe less obvious is the impact on the soil in the devastated area. This year's Leeper Memorial Lecture at the University of Melbourne sets out to answer the question. The build-up of burnt and partially burnt organic matter after a bushfire changes the nature of the organic matter in soil, and increases its potential to capture carbon.

<https://cosmosmagazine.com/climate/what-happens-to-all-the-charcoal-after-a-bushfire>

Another layer to be added to soil museum

By Express News Service

Published: 05th August 2016 03:29 AM



TIRUVANANTHAPURAM: The State Soil Museum at Parottukonam, the largest of its kind in the country, is set to turn more application-oriented.

An entire new floor of exhibits will soon be added to the museum which is best known for its interesting collection of soil and rock samples from across Kerala. The new facility will be ready by March 2017, State Soil Survey and Soil Conservation director Justin Mohan said. The state government has okayed a Rs 50 lakh project for adding the new features to the museum which currently occupies an entire floor of the Central Soil Analytical Laboratory at Parottukonam

<http://www.newindianexpress.com/cities/thiruvananthapuram/Another-layer-to-be-added-to-soil-museum/2016/08/05/article3563241.ece>

Crop diversity enhances disease suppressive potential in soils

Ariane L Peralta, Yanmei Sun, Marshall D McDaniel, Jay T Lennon
doi: <http://dx.doi.org/10.1101/030528>

Biodiversity is thought to regulate a wide range of agroecosystem processes including plant production and disease suppression. Farmers have used crop rotations, a form of biodiversity, for thousands of years and this may be due, in part, to early observations of 'disease prevention' in the form of increased yield. However, the evidence for a mechanistic link between crop rotations and disease suppression has not yet been elucidated. Disease suppressive soils are characterized by the biocontrol properties provided by resident soil microorganisms. Biocontrol

properties include antibiosis via production of antifungal or antibacterial compounds known to suppress the growth of soil-borne pathogens. In this study, we investigated the impact of long-term crop diversity (via rotation) on microbial communities and disease suppressive functional potential in soils. We hypothesized that plant and microbial biodiversity provide disease suppressive functions in soils <http://biorxiv.org/content/early/2016/08/04/030528>

China's great flood really happened, say geologists

Sediments in Yellow River gorge support oral histories that go back to the founding of Chinese civilisation. Bill Condie reports.



Jishi Gorge upstream the landslide dam. The grey silt deposits dozens of metres above the water level are lacustrine sediments.

Wu Qinglong

According to legend, a great flood engulfed China more than 4,000 years ago, when a landslide dammed the Yellow River in Jishi Gorge.

The waters from this catastrophe were only controlled when Emperor Yu, according to some accounts, cut through a mountain ridge with a divine battle-axe.

These massive engineering feats established the first Chinese dynasty, according to oral tradition.

[https://cosmosmagazine.com/geoscience/geologist-find-evidence-for-chinese-flood-](https://cosmosmagazine.com/geoscience/geologist-find-evidence-for-chinese-flood-legend?utm_source=Today+in+Cosmos+Magazine&utm_campaign=8e50b1d27f-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-8e50b1d27f-179982353)

[legend?utm_source=Today+in+Cosmos+Magazine&utm_campaign=8e50b1d27f-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-8e50b1d27f-179982353](https://cosmosmagazine.com/geoscience/geologist-find-evidence-for-chinese-flood-legend?utm_source=Today+in+Cosmos+Magazine&utm_campaign=8e50b1d27f-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-8e50b1d27f-179982353)

Permafrost: A whole other problem

Scientists map soils to see just how much melting the planet can handle. James Mitchell Crow reports.



Nobody knows how severe the effects of thawing permafrost will be. – Galen Rowell/Corbis

We do a reasonable job of measuring greenhouse gas released from manmade sources. But emissions from natural sources are harder to quantify, adding uncertainty to climate models.

“For me, the most problematic unknown is thawing permafrost,” says Bo Elberling from the University of Copenhagen in Denmark, who studies the greenhouse gases released from melting permafrost in northeast Greenland.

<https://cosmosmagazine.com/climate/permafrost-whole-other-problem>

Cartagena 2016: Changing Infrastructure, Changing Soils

Chris Kelsey // August 4, 2016



abrazando el suelo

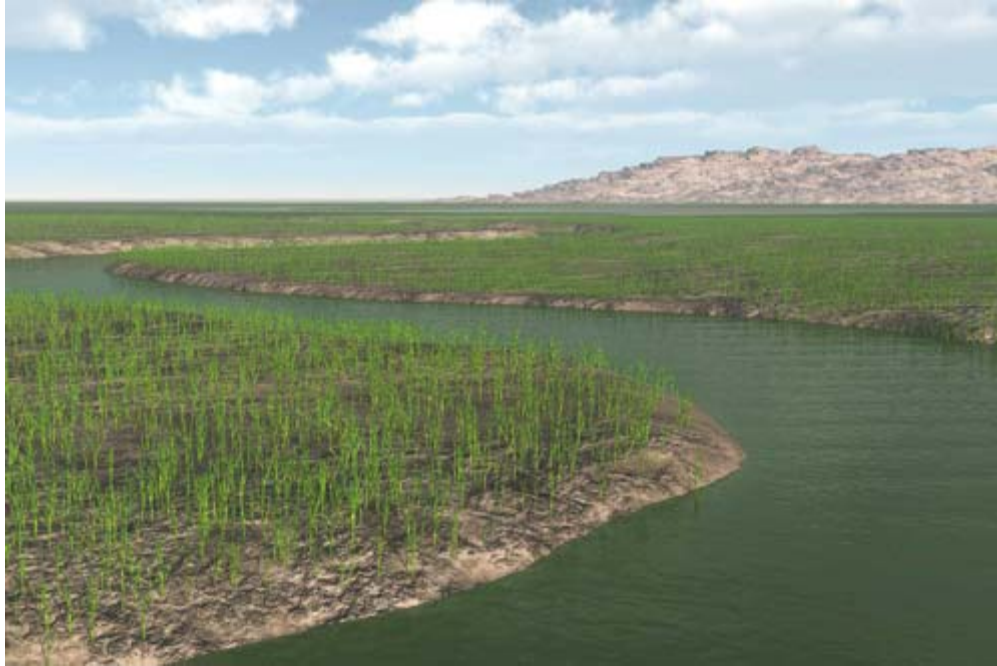
VIII
CICES
Cartagena 2016



Changing infrastructure changes soils, and our responses to the geotechnical challenges of our soils—the solutions we choose—determine the sustainability and long-term economics and successful performance of our infrastructure. This is a central point to Cartagena 2016.

This **8th Iberoamerican Congress on Erosion and Sediment Control** (VIII CICES – Cartagena 2016) will be held 15 – 17 August 2016 and include expert manufacturers, researchers, and other stakeholders in erosion and sediment control, coastal protection, geosynthetics, transportation, and affiliated sectors. <http://www.geosynthetica.net/cartagena-2016-changing-infrastructure/>

Evidence from China shows how plants colonized the land



Early Devonian riverine landscape with plant community dominated by *Drepanophycus*, an early vascular plant. *Drawing by Zhenzhen Deng*

Press release issued: 8 August 2016

New fossil finds from China push back the origins of deep soils by 20 million years, new research published today has uncovered.

This is a key part of the stepwise conquest of the land and transformation of the continents, researchers from the universities of Peking and Bristol have discovered. <http://bristol.ac.uk/news/2016/august/soil-.html>

The giant earthworm - the farmer's friend



The Giant Gippsland Earthworm from Victoria, Australia, can grow to three metres in length.

The Giant Earthworm project

Jack Koci, research officer for [Australian Centre for International Agricultural Research](#) (ACIAR), took part in the Australian National Soil Science Conference in Melbourne last week. Here he writes about a field trip to visit a giant earthworm that is improving soil structures.

Beneath the evergreen dairy pastures of South and West Gippsland, in the Australian state of Victoria, giants lurk in the dark. The mysterious creatures are rarely seen, but often heard, startling passers-by with a loud, gurgling noise, similar to that of an emptying bath tub.

<https://cosmosmagazine.com/biology/the-giant-earthworm-the-farmer-s-friend>

**Discover Volcanism – Hawaii
February 2017 – a trip for all geology
enthusiasts!**

-19 February 2017



This nine-day (8 night) field trip on the Big Island of Hawaii will expand your knowledge in the field of plate tectonics, hot spot volcanism and the geologic features and hazards associated with living on an active volcano. We will discuss volcanic edifices, eruption styles, magma evolution and see various types of lava flows, lava lakes, tree molds and lava trees, fault scarps, rifts, craters and calderas.

We will use our observations and new-found knowledge to discuss methods on how to effectively communicate geologic concepts. We will spend time with National Park and USGS Volcano Observatory staff. We will also have time to look at modern reef development (snorkeling) and local agriculture based on the volcanic soils. We will visit sites of natural hazards, including the 1946 & 1964 tsunamis.

<http://geoetc.com/hawaiiifeb17/>

Making the most of phosphate

Crops need to improve efficient take-up of this vital but diminishing element. Elizabeth Finkel reports.



Granules of a fertiliser containing potassium and phosphorus. – Getty/Science Photo Library

The big black letters, “NPK”, on any bag of fertiliser stand for three things plants just cannot do without: nitrogen, phosphorus and potassium. Nitrogen we take from the air. Potassium reserves in rocks should last for centuries. But phosphorus, also largely mined, is another matter. By some projections, mines could run out by the end of the century.

<https://cosmosmagazine.com/biology/making-most-phosphate>

Analysis: Action needed to preserve the nation's soils

Philip Clarke

Friday 5 August 2016 9:30

Everyone loves a good headline – and recent reports on the state of the nation's soil have provided some rich pickings. “Only 100 harvests left in UK farm soils”, “APPG uncovers more dirt on UK soils”, “Drought could degrade best agricultural land by 2050s” – these are just some of the headlines to have graced the pages of Farmers Weekly in recent months. But what is the real cause of soil degradation? We examine the issue, the role farming has [...]

<http://www.fwi.co.uk/arable/analysis-action-needed-to-preserve-the-nation-s-soils.htm>

Soil-testing kit that gives results in 30 minutes

08 Aug 2016, 6:00 am

By AGATHA NGOTHO @agathangotho



The and held soil kit, used for testing soil, August 1. Photo/ BRIAN SIMIYU

The low food production in Kenya has been partly attributed to declining soil fertility due to soil acidity, which occupies 13 per cent of the country's land area, according to soil experts.

Agriculture CS Willy Bett said most soils are becoming increasingly acidic due to the use of one fertiliser, especially DAP, for a long time.

According to a report published in the Agriculture and Ecological Research International Journal, soil acidity is associated with aluminum, iron, hydrogen and manganese toxicities in the plant root and deficiencies of calcium, magnesium and potassium, which lower soil fertility and productivity. http://www.the-star.co.ke/news/2016/08/08/soil-testing-kit-that-gives-results-in-30-minutes_c1397916

Norseman earthquakes see town declared Australia's shakiest town

By Rhiannon Shine

Updated 23 Jul 2016, 4:27pmSat 23 Jul 2016, 4:27pm



Photo: Norseman resident Sheila Tiefenbacher is worried about earthquake damage to her collection of china dolls. ([ABC News: Nathan Morris](#))

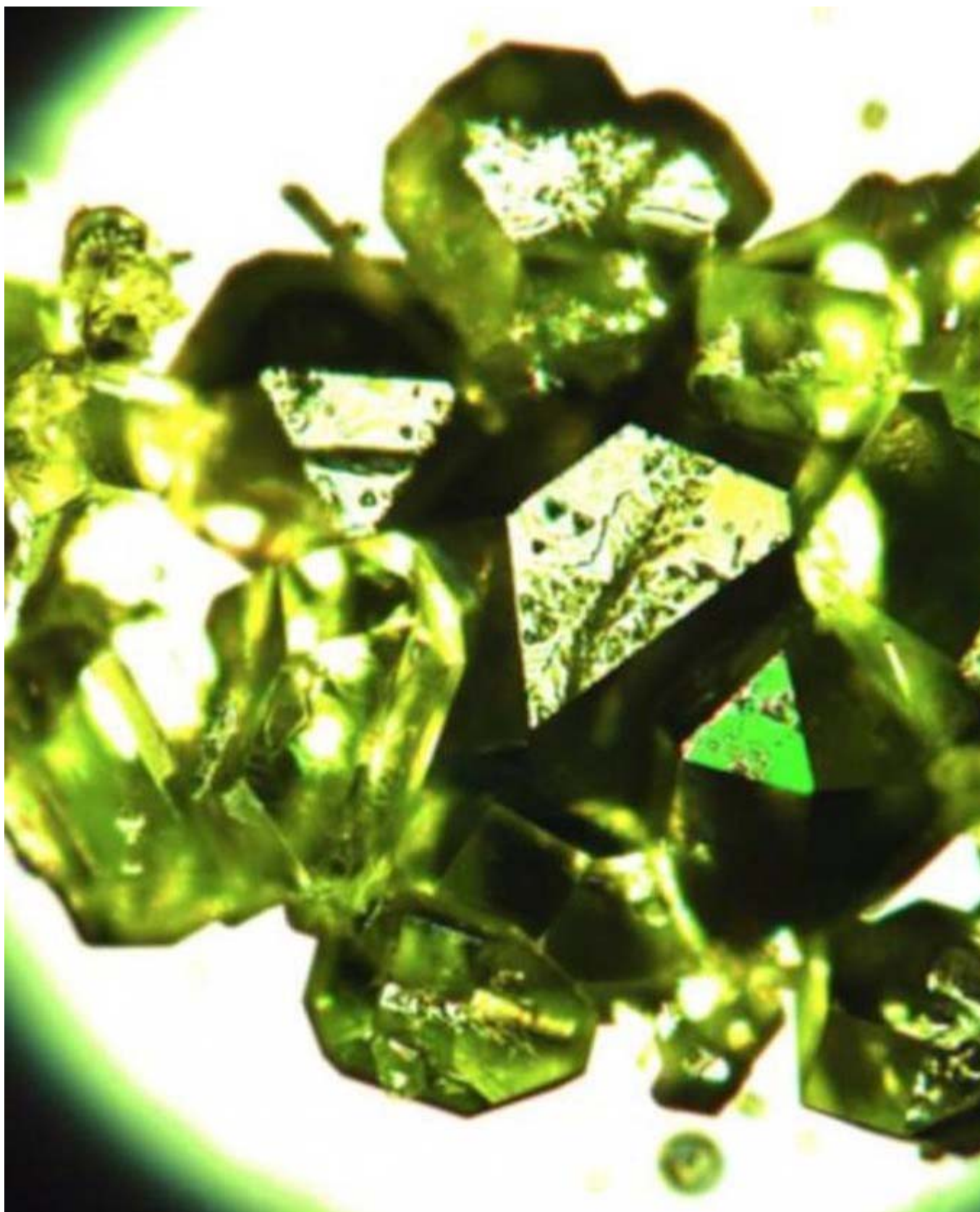
The West Australian mining town of Norseman has become Australia's shakiest town after a series of earthquakes.

There have been more than 30 earthquakes reported near Norseman, 720 kilometres from Perth, in the past month.

The events were triggered by a [magnitude-4.9 earthquake on May 29](http://www.abc.net.au/news/2016-07-23/norseman-earthquakes-see-town-declared-australias-shakiest-town/7655068), which was followed by a magnitude-5.2 quake. <http://www.abc.net.au/news/2016-07-23/norseman-earthquakes-see-town-declared-australias-shakiest-town/7655068>

'Designer' materials found deep in Siberian permafrost

We've just discovered natural metal-organic frameworks – but scientists have been making them in the lab for decades. Belinda Smith reports.



Synthetic zhemchuzhnikovite. The mineral's structure is similar to that of MOFs.

Igor Huskić, Friščić Research Group, McGill University

Chemists often copy molecules from nature – think drugs derived from bacteria and plants which are refined and synthesised in the lab.

Now, the tables have turned – in a way.

A team of chemists from Canada and Russia probed the structure of rare minerals dug from the depths of Siberian coal mines and found they had the porous structure of metal-organic frameworks, or MOFs – a family of recently manmade, designer materials never before seen in nature.

https://cosmosmagazine.com/chemistry/designer-materials-found-deep-in-siberian-permafrost?utm_source=Today+in+Cosmos+Magazine&utm_campaign=d7150324d9-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-d7150324d9-179982353



Australian Government
Geoscience Australia

Australian Energy Resource Assessment



Foreword

Welcome to the Australian Energy Resources Assessment (AERA) Interim Report. This report is a partial update of the national assessment series of Australia's energy resources, which was first released in 2010 and updated in 2014. This interim release provides an overview of Australia's identified

<http://www.ga.gov.au/aera>

How to scientifically name a species

ABC Science

By Amber Beavis

Updated 5 Aug 2016, 2:58pm Fri 5 Aug 2016, 2:58pm



Photo: Scientific names prevent confusion among taxonomists ([Ann Jones](#))

New species is one of the most exciting parts of taxonomic research, but also one of the most important because — unlike common names — a scientific name is unique to one species. But how are they decided? <http://www.abc.net.au/news/2016-08-05/how-to-scientifically-name-species/7681634>

Scientists map a new island volcano



A satellite view of the new island. Credit: NASA

One of the earth's newest islands exploded into view from the bottom of the southwest Pacific Ocean in January 2015, and scientists sailing around the volcano this spring have created a detailed map of its topography.

The Schmidt Ocean Institute's research vessel Falkor conducted the mapping in collaboration with NASA during a research cruise whose focus was actually elsewhere: exploring marine life around the hydrothermal vent fields of the nearby eastern Lau Basin, near the island Kingdom of Tonga. Lamont-Doherty Earth Observatory scientist Vicki Ferrini, who uses geophysical mapping techniques to study the seafloor, was aboard the R/V Falkor and helped process the mapping data. Read more at <http://www.geologyin.com/2016/05/scientists-map-new-island-volcano.html#t0cWeRdrc6Wjfel.99>

Help choose a fossil emblem for South Australia



[Survey State Fossil Emblem Voting](#)

[Discussion State Fossil Emblem Discussion](#)

South Australia is choosing a fossil emblem to join our existing emblems of the Sturt's desert pea, the hairy-nosed wombat, the opal gemstone and the leafy sea dragon. You can help to decide which ancient sea creature will be the fossil emblem for our State - [cast your vote here](#).

What is being decided?

One of four fossils will be chosen to be South Australia's fossil emblem. A State fossil emblem will help generate pride in our State's natural wonders and a sense of ownership for our unique fossil heritage. <http://yoursay.sa.gov.au/decisions/yoursay-engagements-fossil-emblem/about>

“Riparian buffer zones are nature's hydraulic shock absorbers,” Deanna Osmond