

SCIENCE

Green way to tackle global warming Down Under

Scientists say feeding cattle seaweed will cut methane emissions, lowering pollution

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For The Straits Times
In Sydney

Australia has committed to reducing carbon emissions but admits to one major source of pollution that is expected to keep rising: methane released by animals during grazing.

The country's 26 million-plus cattle are expected to fuel a 5 per cent rise in Australia's agriculture emissions by 2020 and a further 20 per cent increase by 2030.

Agriculture accounts for about 13 per cent of the nation's emissions, due largely to methane burped by livestock such as cattle and sheep. These methane emissions are up to 25 times more powerful than carbon dioxide.

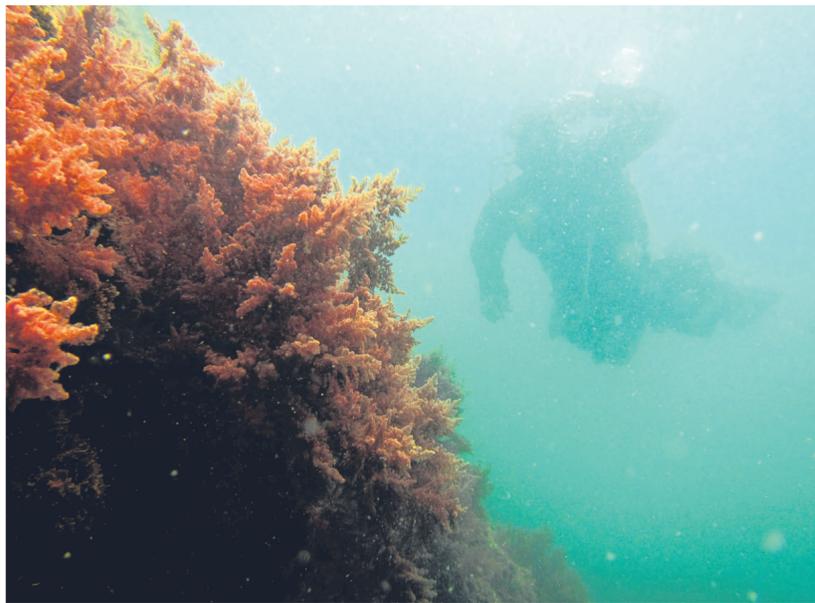
But scientists from the United States-based The Climate Foundation believe they have found a novel

way to curb the contribution of cattle to global warming: Feed them seaweed, which reduces the methane in their gaseous emissions.

The researchers say farming seaweed to feed livestock has another significant benefit. They have developed a method of underwater seaweed farming that can help to cool water temperatures, which are damaging marine life and threatening the Great Barrier Reef.

The founder of the foundation, Dr Brian von Herzen, said the seaweed-to-feed project has been successfully trialled and could lead to cattle farming effectively becoming "carbon negative" by 2025.

"There are more greenhouse gases emitted by livestock and agriculture around the world than by all of transportation, including cars and planes," he told The Straits Times. "Being able to eliminate most of that would have a profound



Researchers say farming seaweed to feed livestock has another significant benefit. Their method of underwater farming can help to cool water temperatures – a threat to marine life and the Great Barrier Reef. PHOTO: BRIAN VON HERZEN

impact on reducing the carbon intensity from livestock emissions."

The discovery that seaweed could prove the key to reducing greenhouse gases apparently resulted from the observations of a farmer in coastal Canada, who realised that his cattle liked to graze on a beach near his paddock.

Mr Joe Dorgan began feeding seaweed to the cattle and noticed they were healthier and produced more milk than his grass-grazing cows.

The discovery prompted Canadian agriculture scientist Rob Kinley to test the feed. He found that it led to substantial reductions in the methane released by the cows.

Dr Kinley has since moved to Australia's science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), where he has conducted research on harvesting seaweed for use as cattle feed. He and his colleagues made a startling discovery: A particular type of seaweed off the coast of Queensland, *Asparagopsis taxiformis*, was found to reduce methane production by more than 99 per cent.

The CSIRO said methane emissions also result in "wasted energy" because the animals could instead be converting feed into muscle.

"If farmers could supplement

their feed with seaweed, this might just help with two of the biggest challenges of our time: fighting climate change and growing more food with fewer resources," the agency says on its website.

So the challenge is to produce large amounts of seaweed in ways that do not further damage the oceans, which are already under severe stress from global warming.

Currently, *Asparagopsis taxiformis* must be carefully removed from the ocean by divers and can be harvested only in small quantities.

But Dr von Herzen believes his method of harvesting the seaweed – which involves a platform on which

the seaweed grows, with cold water piped up from the depths below – has large-scale potential.

The seaweed, he said, could be planted in waters north-east of the Great Barrier Reef. This would help to lower temperatures and prevent coral bleaching.

In addition, the farming process leads to the release of plankton, which forms a layer in the water that can protect coral from peak sunlight. "We take cool water from the deep to the layer where the kelp is," he said.

"We could grow a field of *Asparagopsis* at sea that would grow quickly and would be adapted to the local latitudes. This would transform the reef managers' ability to respond to coral bleaching warnings rather than sit and watch the reef die slowly."

Cattle farmers have joined the push to try to reduce methane emissions. Australia is the world's third-largest beef exporter behind Brazil and India.

Dr von Herzen said he has been in discussion with Meat and Livestock Australia, which conducts research and marketing for the sector, about collaborating on seaweed production in Queensland. He said this would involve feeding cattle with a feed containing about 1 per cent seaweed, which would be harvested offshore and transported to regional farmers.

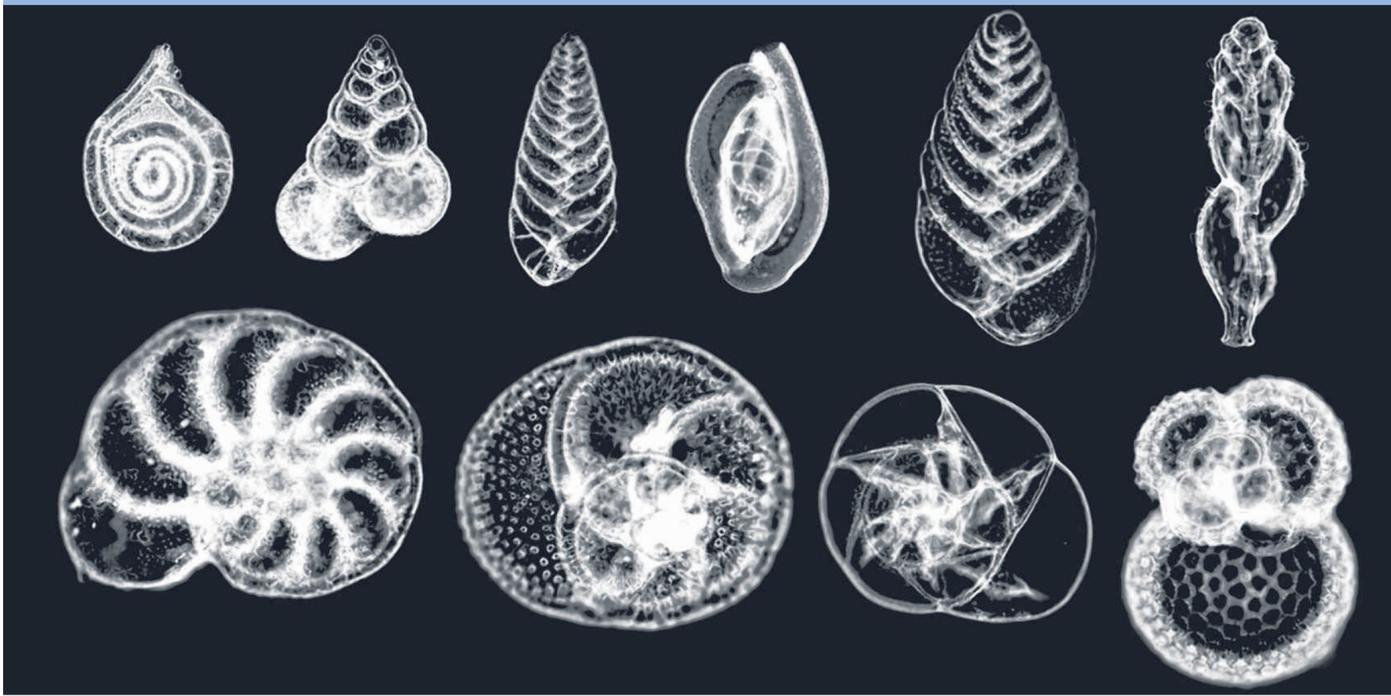
"We would have a sustainable harvest of seaweed every 45 to 90 days off the Great Barrier Reef," he said, adding that such a project could be running in "about four to five years".

He would also like to increase the portion of seaweed in the human diet.

"We think seaweed will be the next superfood," he said. "If it is right for animals, it must be right for humans."

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Beautiful Science



Planktonic foraminifera, such as these collected in the Gulf of Mexico, form the base of many marine and aquatic food chains. Upon death, their skeletons settle on the seafloor to form sedimentary rock such as limestone and chalk. Pressed together in sufficient quantities, such sedimentary rock could have a lubricating effect on the movement of continental plates.

A new study by The University of Texas at Austin shows that sediment could play a key role in determining the speed of continental drift.

In addition to challenging existing ideas about how plates interact, the findings describe potential feedback mechanisms between tectonic movement, climate and life on earth, said the university in a statement.

PHOTO: RANDOLPH FEMMER, USGS

ScienceTalk

My Christmas climate wish list for 2019

Tok Xinying

What do I want for Christmas? Hope for our climate.

In November last year, Minister for the Environment and Water Resources Masagos Zulkifli declared 2018 Singapore's Year of Climate Action – elevating the topic into a national conversation. Since then, we have seen climate action across different industries in Singapore:

- The Carbon Pricing Bill was passed at \$5 per tonne of greenhouse gas emissions from next year to 2023. While lower than the price of carbon (about \$55-\$110) required for a climate-safe world, it sends clear signals to our businesses.
- The Building and Construction Authority introduced a new

Super Low Energy/Zero Energy building code that can drive a further 40 per cent reduction in energy use.

- Energy company SP Group committed to a roll-out of 1,000 electric chargers by 2020, encouraging taxi companies such as HDT Taxi to increase its all-electric fleet.
- The Monetary Authority of Singapore's Green Bond Grant Scheme has attracted a variety of issuers. This year, renewable energy firms like Star Energy Geothermal and International Finance Corporation raised \$1 billion worth of green bonds through Singapore.

The Year of Climate Action created momentum for action. And we cannot stop now.

As I read The Sunday Times' six-

part special on climate change, two things stood out. Many of the people who lost their homes and became refugees due to global warming are in their 30s, just like me.

Climate change is not merely a problem of science and technology, but of humanity and our responsibility towards one another.

Things are going to get worse, but only if we do not act. The impact of rising temperatures will be the most strongly felt in the tropics, including South-east Asia. Our long and densely populated coastlines mean homes and people are at the mercy of rising sea levels and intense storms. Our fisheries – a key source of protein – could collapse.

Media headlines focused on this dire reality in the Intergovernmental Panel on Climate Change special report, which was released in October. But the same report also

pointed a pathway that can lead to a safer and more equitable future for all of us – through deep system changes driven by a large redirection of investments, policies and technology innovation, on top of behaviour change.

Mr Masagos has pointed out that taking climate action cannot just be a year-long affair. So here's my wish list for the country in 2019.

- For Singapore to continue to deepen our climate awareness. We may read about melting icebergs and wildfires, but most people here do not yet associate these with events around us. The truth is, our temperatures are rising; droughts are recurring at Johor's Linggiu Reservoir, which supplies water to Singapore; the runway of Changi Airport's Terminal 5 is being built higher to

prepare for higher sea levels.

Media coverage this year has helped us join some of these dots. For example, linking rising sea levels in the Mekong delta region to our nutrition.

This year, plays, games and festivals were dedicated to climate change with the support of government agencies, the private sector, including the City Developments Limited Singapore Sustainability Academy, and individuals.

Continued support and media focus are necessary to ensure we continue to hear and talk about climate change, and connect it to our lives.

- For businesses in Singapore to turn their focus towards target setting and staff engagement to drive climate-aligned strategy. While over 600 companies and

organisations signed Singapore's Climate Action Pledge, only a handful had longer-term climate strategies in their pledges.

Notably, Sembcorp has released its climate change strategy, Singtel has developed science-based targets, and Marina Bay Sands hotel has set clear carbon footprint reduction goals.

Globally, we see strong action from firms. Ikea has committed that by 2020, customer deliveries in Amsterdam, Los Angeles, New York, Paris and Shanghai will be mostly completed by electric vehicles. Standard Chartered Bank committed to not funding any new coal power plants as air and water pollution from these plants costs lives and impacts livelihoods. Several global insurers, including AXA and Nippon Life, have also pulled support from the coal industry.

A business coalition dedicated to moving companies beyond reporting and towards carbon reduction target setting can help businesses move faster.

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