March 2019

LANDCARE IN FOCUS

TECHNOLOGY IN AGRICULTURE

Landcare Australia

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Landcare In Focus
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In this issue

Submit a story to Landcare in Focus

LANDCARE in Focus is published quarterly and the editorial team always welcomes story submissions.

Next issue

The next issue of *Landcare in Focus* will be published in June 2019.

The theme for this issue is '30 years of Landcare'.

We are seeking stories that celebrate the achievements of the Landcare movement over the last 30 years and exemplify the Landcare ethos.

All article submissions must adhere to the following guidelines:

- One article between 150-600 words.
- Contact information or weblink for readers seeking more information.
- 1-3 high resolution images (must be at least 1.5MB in size and 300dpi) as separate jpg attachments, with included captions (captions do not count towards the word count).
- A video, if you have one! This will be shared with the online version.

Contributions should be sent to *lif@landcareaustralia.com.au* **by Monday 29 April 2019**.

** Please note: due to space restrictions article content may be edited. We also cannot guarantee that all submissions will be published.*

Australian Government | National Landcare Program

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Cover photo courtesy of Agrifutures.

Electric fencing helping vulnerable species to fly

IT was once a common sight to walk down the streets of Brisbane and see thousands of Richmond birdwing butterflies dart across the sky.

The subtropical rainforests in the area were the perfect breeding environment for their larvae, who fed on the lowland Richmond birdwing vine.

In fact, the abundance and distribution of these pretty pollinators once extended throughout South East Queensland to Grafton in New South Wales.

Sadly, today it is a rare sight to see a Richmond birdwing butterfly in the wild.

Urban development, land clearing for agricultural production and the introduction of the invasive South American dutchman's pipe vine has destroyed the native butterfly's habitat, rendering them a vulnerable species.

It's a problem Brisbane Valley Kilcoy (BVK) Landcare Group are trying to rectify.

Recognising the importance of the Richmond birdwing vine in providing much-needed habitat for the Richmond birdwing butterfly, the group are planting vines throughout the Stanley River Catchment, with the assistance of a Landcare Australia Habitat Restoration Grant.

The Richmond birdwing vine is integral to the viability of the Richmond birdwing butterfly as they are the only food source for their larvae.

The hope is that once established, the larvae will be able to feed off the vines, increasing its population and distribution across the area.

The spectacular Richmond birdwing butterfly. Photo: Dr Don Sands, CSIRO.

The vines also establish wildlife corridors for other native animals, rehabilitating the local landscape.

More recently, the group has worked together with Landcare Australia sponsor Gallagher to install electric fencing on the property of group member Dave McCowan.

Situated at Mount Kilcoy on the edge of the Conondale National Park, Dave's farm 'Yandilla' is one of five locations where BVK have planted Richmond birdwing vines.

Browsing livestock, deers and wallabies on the property were posing a threat to the fledgling vines, who would trample or eat them.

The electric fencing has provided protection for the vines, allowing them to grow without threat.

According to Dave, the fencing has been a great success.

"There's a lot of work required in setting up and establishing the vines," he said.

"You need to make sure the soil is right, there's enough water and protection from strong winds, and the roots are kept cool.

"The last thing you want to happen after all this effort is for the plant to be destroyed by being eaten or trampled."

Continued page 24.

Rewarding farmers for biodiversity

By David Littleproud MP, Minister for Agriculture and Water Resources

TODAY more than ever, farmers deserve to be rewarded for the services they provide for the national good – like biodiversity stewardship and carbon sequestration.

That's why I've announced a $30 million pilot to incentivise farmers for these services.

The pilot will run across different regions and different commodities as we test whether farmers can successfully make biodiversity and carbon gains for our nation and get a serious income stream from it.

If this works, I'd love to see it become part of the Climate Solutions Fund, so this could become broad policy and farmers everywhere could receive financial incentive for biodiversity work and carbon storage.

I've also announced $4 million so farmers who are managing biodiversity well can get a nationally and internationally recognised biodiversity accreditation and stamp on their product.

This could provide a premium to farmers who are in many cases, already doing these things without financial reward.

I attended the EU Agriculture Minister's conference in Berlin recently, and this is the way the world is headed.

Consumers both in our key overseas markets and here in Australia are increasingly wanting produce which is farmed both sustainably and in a way which helps our native wildlife.

Our farming land must be managed sustainably in order to maintain a competitive agriculture sector and embracing innovation is key to achieving this.

Minister for Agriculture and Water Resources David Littleproud MP.

In September 2018, I commissioned Ernst & Young (EY) to examine our agricultural innovation system to determine if it was fit for the future.

If we keep doing the same thing while our competitors improve, we may as well be going backwards.

The report has provided us with a clear vision for the future of innovation in our agricultural industries, highlighting key areas for improvement if the industry is to reach its target of a $100 billion sector by 2030.

If we want Australia's agricultural sector to continue to grow, we need to turn these visions into actions.

That's why the Coalition Government has just awarded over $39 million in grant funding for projects to help us get there.

This funding takes the government's total commitment to the Rural R&D for profit program to over $153 million over four rounds.

This round four funding will go to projects across the livestock, horticulture and cropping industries, including a program to transform the performance of honey bees and phase two of a project to convert agricultural waste into animal feed and chemicals.

We are also supporting innovation through Smart Farms, the key agricultural component of our National Landcare Program.

Under Smart Farms, Smart Farming Partnerships will improve sustainable production and natural resource management on Australian farms, enable capacity building within communities and demonstrate the sustainability of Australian agriculture.

The first round of grants were an overwhelming success, funding 15 projects worth $27 million.

The second round of grants for the Smart Farming Partnerships is now open, for projects to develop, trial and implement new practices or tools.

I encourage anyone with fresh ideas on how to improve the protection, resilience and productive capacity of our soils, water and vegetation while maintaining or improving the productive capacity of our agricultural industries to apply for these grants.

Sustainable farms means sustainable regional economies, and thriving local communities.

Together with our scientists, researchers, farmers and communities we can develop the technologies and practices that will prepare Australia's agricultural sector for the years and decades ahead.

Technology helping us to be better stewards of our land

Landcare Australia chief executive officer Dr Shane Norrish.

By Dr Shane Norrish, CEO Landcare Australia

TECHNOLOGICAL innovation offers enormous potential in land management.

Emerging technologies are helping farmers and Landcarers to adapt to the continuous challenges they face in managing our country's natural resources, with positive results.

Investing in technology, and how we use it, offers an opportunity to better understand changes in the landscape and ultimately become better stewards of our land.

When used effectively, technological innovations can help us to work smarter and more sustainably.

In this issue of *Landcare in Focus*, you'll hear from Landcare groups, researchers and natural resource management organisations about how they are using or adapting technology to sustainably manage our natural resources.

Remote sensing and advances in automated drones are helping farmers to improve irrigation practices, reduce water use and maximise crop harvest.

Machinery automation is helping manage weeds far more efficiently in sugarcane, horticulture and cotton crops, reducing herbicide volumes and lifting farm productivity.

Wearable sensors are providing practical ways for the livestock sector to reduce their environmental footprint.

And electric fencing is protecting the survival of an endangered Australian species.

It's encouraging to read about the work being undertaken across the nation to tackle important agricultural and environmental issues.

Taking the time to consider how new techniques or technology can be adapted to improve our own natural resource management and agricultural practices may well assist to ensure our landscapes and communities improve their resilience and secure a strong future.

An EMU approach to the recovery of landscapes

Katalpa Station following the first significant rain since the works were carried out.

By Western Local Land Services

THE Western Local Land Services region encompasses one of the most diverse rangeland areas in Australia.

Comprised of arid and semi-arid land, it is mostly unsuitable for intensive agricultural practices because of constraints such as unreliable rainfall and soil type.

Due to these and other factors, the predecessor agency of Western Local Land Services initiated a rangeland rehabilitation program in 2008.

The program's aim is to rehydrate degraded landscapes affected by soil erosion with a variety of earthwork techniques.

This program, which has been continued by Western Local Land Services, involves employing a specialised officer and funding for on-ground projects to assess the degraded landscape, design an appropriate solution and lay out proposed earthworks.

In recent years, Western Local Land Services have used the Ecosystem Management Understanding (EMU) approach.

The primary purpose of the EMU approach is to introduce managers and planners to recognising natural patterns and processes and learning to work with them toward the health and recovery of landscapes and habitats.

Positive outcomes have been achieved through the EMU program.

Luke and Sarah Mashford of 'Katalpa Station', 85 kilometres west of White Cliffs, were one of six properties that participated in the program in 2017.

Following the first significant rainfall after the program was completed, the Mashfords were pleased to see virtually all the water spread and captured by waterholes which eventually resulted in the growth of green grass.

"Knowing the impact that amount of rain would have previously had on erosion makes it very satisfying to see it all caught up in the gilgais," Luke said.

"This water will now rehydrate the landscape which will greatly assist with agricultural productivity and landscape health."

Richard Wilson of 'Yalda Downs', a property 85 kilometres north of White Cliffs, also participated in the program in 2017 and found it to be extremely valuable.

"The work that was carried out did wonders toward the restoration of areas that had suffered from erosion," Richard said.

"Through diversion banks and contour furrowing we were able to rejuvenate a perched floodplain which will have real long term benefits.

"The program has been really valuable for our enterprise and it is something we would highly recommend other landholders look into."

In addition to the positive outcomes for the Mashfords and Wilsons, the critically endangered thick-billed grass wren has been identified on the rehabilitated areas in White Cliffs.

Over the last 10 years, 81 rangeland rehabilitation projects, including projects that have followed the EMU approach, have been completed in the Western region, covering a total of 23,650 hectares.

This has brought significant improvement to the area, rehydrating degraded landscapes, improving its agricultural productivity and producing environmental benefits.

The EMU property planning program has been supported by Western Local Land Services through funding from the Australian Government's National Landcare Program.

USQ and John Deere partnership developing next generation of agricultural technology

SPRAY weed technology developed by University of Southern Queensland (USQ) researchers will soon be in use on John Deere machinery.

The technology, which is able to distinguish between weeds and crops in sugarcane, horticulture and cotton crops, will be installed on high clearance sprayer booms after USQ successfully negotiated a licensing and development agreement with Deere & Company.

This global partnership is enabling USQ research to help lift farm productivity and develop the next generation of agricultural technologies including machine automation and control such as automated weed management systems and driverless tractors.

Weeds are one of the most significant environmental threats to Australia, costing up to $4 billion each year and apart from savings associated with reducing the volume of herbicide applied, selective spraying systems will reduce the risk of herbicide resistance.

Research out of USQ'S Centre for Agricultural Engineering has culminated in an agtech solution that can distinguish between the composition characteristics of crops and weeds at speeds of up to 20 kilometres per hour in different lighting conditions.

USQ deputy vice-chancellor research and innovation Professor Mark Harvey said the research partnership was not only benefitting Australian communities but also international industries, illustrating the global reach and relevance of USQ's research efforts in agricultural engineering.

"Our researchers are continually looking to improve the profitability, environmental sustainability and socio-economic wellbeing of our rural industries as high tech farming becomes an everyday tool for primary producers.

"This partnership also highlights the importance that international organisations are giving to the development of future technologies that will transform agricultural industries over the years to come."

The partnership between USQ and John Deere is enabling research to help lift farm productivity and develop the next generation of agricultural technologies. Photo: USQ Photography.

The technology, originally funded through a combination of industry research projects between Sugar Research Australia, Cotton Research Development Corporation, Horticulture Innovation Australia and USQ, has been included as part of a global commercialisation strategy by John Deere.

John Deere Australia managing director Peter Wanckel said the research partnership between USQ and John Deere's Intelligent Solutions Advanced Engineering Group will benefit growers by reducing agricultural production costs.

"We are delighted to work alongside USQ's researchers," he said.

"Together we can provide additional tools for agriculture to feed, fuel and clothe the increasing global population."

The technology demonstrates that discrimination of weed species in real-world on-farm conditions is achievable using combined colour and depth image analysis.

It will save growers costs on herbicides while minimising run off of chemicals and also give them the potential to recover weed-infested crops that would have previously been ploughed out.

It will be used on high clearance sprayer booms in the United States, with retro fit options for Australian growers to use on smaller machines.

Monash plants seeds to improve farming practices

Monash University engineers are working with Australian farmers to help them improve irrigation practices by using autonomous drone technology.

MONASH University engineers are working with Australian farmers to help them improve irrigation practices, reduce water use and maximise crop harvest by using autonomous drone technology.

As severe drought continues to devastate farmland and impact food supply across Australia, a Monash University research team, led by Professor Jeff Walker, has spent the past two years developing a drone-based autonomous soil moisture mapping system for irrigated paddocks.

The team has recently completed field experiments using optical mapping which can determine soil moisture levels in the near-surface.

The data taken from the drone can be downloaded and used to produce a map of ground soil moisture levels to inform the farmer on how best to irrigate the paddock.

Drones have the capacity to analyse soil moisture at metre-level scales within a paddock, allowing farmers to focus on specific crop irrigation and overcome the challenges of aircraft or satellite mapping.

"We need to produce 60% more food with the same amount of land and water, and we can only achieve this by being more efficient with the water we use through irrigation," Professor Walker said.

"We need to know how much the crop needs, how much moisture is already there and apply just the right amounts of water in the correct places to avoid wastage while keeping the crop at its peak growth."

Good soil moisture allows for the optimal growth and yield of crops, while at broader spatial scales also regulates weather, climate and flooding.

The water levels in the soil controls evaporation over land and thus the energy fluxes into the atmosphere.

This drives the atmospheric circulation, which drives climate.

"If the soil is too dry, crops can fail due to a lack of water. But if the soil is too wet, crops can not only fail but pests and diseases can flourish," Professor Walker said.

Professor Walker said the farming industry has welcomed smarter and more automated practices, but there are few tools available to make the already difficult workloads of farmers more manageable.

"At best, farmers might have a single soil moisture sensor in a paddock, but this doesn't allow for the optimal application of water, especially as this resource becomes scarcer.

"Plus, it won't take into account moisture variation levels across the individual paddocks," he said.

As crop failures due to a lack of water have enormous human and financial consequences, Professor Walker said Australian farmers need to become more efficient in soil moisture mapping by using 'precision agriculture' methods such as autonomous soil moisture mapping using drones.

"Farmers also need to cooperate; water conservation and efficiency is a collective responsibility.

"Everyone needs to do their part to use water more effectively or we're at risk of running out completely.

"As the world's driest continent facing climate change, a growing population and a greater demand for food, water conservation should be one of Australia's top priorities," he said.

To see the Autonomous Drones for Soil Moisture Mapping project in action visit vimeo.com/307394713/95a9c25d5c.

Healthy soil benefits farms

FOR the West Gippsland Catchment Management Authority (WGCMA), helping improve farm productivity while reducing the impact on the environment is a key part of natural resource management.

WGCMA's Healthy Soils Sustainable Farms project aims to educate and assist farmers to improve their soil management, particularly in terms of nutrients, plants and grazing practices.

The project incorporated regular field days and events, mentoring programs, demonstration sites and discussion groups to support best practice and encourage innovation.

One of WGCMA's most innovative demonstration sites involved the SoilKee, a unique machine developed in Gippsland, which aerates soil with minimal pasture disturbance.

It simultaneously buries residual organic matter, top-dresses the pasture with soil and drills seed into the rows.

Between 2015 and 2018, a demonstration ran on Madeline Buckley and Ross Batten's property in Buffalo.

With an annual rainfall of 600 millimetres their pastures included rye grass, white clover and some strawberry clover.

Some paddocks had a problem with bent grass and root mat.

For WGCMA project manager Tony Gardner, the demonstration was a chance to look at the effects of the SoilKee machine on soil health and production, and compare that with a regular approach to aerating pasture and a control.

"We know that increasing soil carbon is beneficial for managing pastures and that increased microbial activity and nutrient cycling can reduce fertiliser use and increase profitability," Tony said.

"A demonstration such as this one provides an opportunity to track progress and raise awareness of these issues over a three-year period."

The SoilKee strips showed dramatic improvements in species, response to rainfall, pasture quality and dry yield matter.

The clover was bigger, there was evidence of worm castings and the land felt spongier underfoot.

According to Tony the results are exciting.

"Soil tests showed an increase across all available nutrients," he said.

"There was an increase in cation exchange, pH levels, the calcium/magnesium ratio and a decrease in exchangeable aluminium."

Deep soil core samples showed a massive increase in soil carbon and a reduction in bulk density.

Core samples taken in 2018 comparing (from L to R) the aerated, control and SoilKee strips.

"The initial response from the seed sowing was poor, but it worked well on the third and fourth runs," Tony said.

"It was another indication that soil conditions had improved.

"What is exciting to us, as natural resource managers, is being able to trial a new technology that could have such a significant impact for farmers and the environment.

"This is an innovative machine that has a unique approach to increasing the carbon in the soil and incorporating organic matter.

"It helps farmers maintain their groundcover while improving pasture.

"It's another method of pasture cropping, but rather than traditional methods of knocking pasture back with a herbicide to sow a crop, it actually stimulates pasture growth as well."

Tony believes good soil management doesn't just benefit the farm.

"Improving pasture, animal health and the farm's bottom line can reduce erosion, salinity, nutrient and chemical run-off, which impacts on the health of our waterways.

"Building soil carbon is a major initiative in mitigating greenhouse gases and is critical in improving water use efficiency," he said.

The Healthy Soils Sustainable Farms project was delivered and supported by West Gippsland Catchment Management Authority through funding from the Australian Government's National Landcare Program.

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How do you measure the environmental footprint of grazing cattle?

By Aaron Ingham, CSIRO; Greg Bishop-Hurley, CSIRO and Paul Greenwood, NSW Department of Primary Industries

DEMAND for meat and dairy products worldwide has been booming.

According to the World Health Organisation, annual meat production in particular was projected to increase from 218 million tonnes in 1997-99 to 376 million tonnes by 2030.

The demand has been driven by increases in population, personal wealth and urbanisation.

But with it has come increased demand to feed those animals.

How many animals?

An estimated three billion animals now produce the world's global meat and milk resources.

Three billion animals which consume eight billion tonnes of feed annually.

Production of feed for these animals comes from 2.5 billion hectares of land.

Want to estimate what it takes to feed the world's animals to feed us?

Start with one animal.

Concerns with large-scale cattle production

Large-scale cattle production systems come with some big environmental questions.

Could the grain consumed by livestock be used to feed people instead?

Could that grazing land be used for alternative agricultural production such as cropping?

And what about the potential environmental impact of waste methane emitted by the animals?

Livestock farming produces approximately 90 million tonnes of methane per year.

That's 27 per cent of human attributed methane emissions (not because we are producing the methane directly but because we are growing the animals as a food source).

To continue as an important component of global food supply, but with a reduced potential for environmental impact, the livestock sector is under increasing pressure to produce more from a smaller environmental footprint.

Transforming the livestock sector

Production efficiency in the grass-fed beef sector is essential for the industry's transformation.

It is the most cost-effective way to grow production and profitability whilst achieving reduced greenhouse gas emissions intensity.

In the livestock sector, efficiency can be measured as a ratio of inputs to outputs or as feed consumed to kilograms of meat produced or calves weaned.

This is where knowing how much feed an individual animal eats becomes the critical question.

If we knew this value we could identify the most efficient animals and preference these to breed the next generation, assisting in the goal to produce more from less inputs.

Given the sheer number of animals across the planet it is easy to understand how small improvements in efficiency can have large cumulative benefits.

Until now it has been a difficult and time-consuming process to measure individual intake of pasture by cattle (or any animal) in a grazing environment.

This prevents measurement of efficiency at a scale that can be used easily for breed improvement.

Enter wearable sensors

CSIRO, in collaboration with NSW Department of Primary Industries, set out to solve this problem by developing a practical way to measure pasture intake of individual cattle.

Our idea was to use wearable sensor technologies to work out what the cattle were doing much the same way your phone or Fitbit records your activity.

We wanted to determine if the sensor signals could be used to identify and measure basic cattle behaviours such as grazing, walking, resting and ruminating and whether these behaviours could then be used to estimate the amount of feed eaten by cattle.

Our first challenge was to build a

suitable device.

We designed and built sensors that could collect real-time data from grazing livestock that are solar powered, contain radio for two-way communications and real-time data recovery, micro SD cards for data storage and a processor chip to control sensor functions.

And they're tough!

Tough enough to withstand a 500-kilogram steer banging them into a fence post while having a good old scratch.

Once the sensor devices were built, we were then able to confirm we could accurately classify cattle behaviour and determined relationships between these behaviours and how much the animal was eating.

The process has taken well over five years and lots of watching grass grow, cattle eating, tinkering with sensor devices, data collecting and analysis but we have now developed a system, that we call eGrazor, that can quantify the amount of food consumed by an individual grazing animal.

These intake values can be wirelessly transmitted to a producer's phone or home computer and when used in combination with walk-over weighing or calving records will deliver efficiency records for each individual animal.

Importantly, these results will be specific to the producer's property and environmental conditions.

The prototype eGrazor is the full 'bells and whistles' version that has been designed as a research tool, and has much greater functionality than is required to gain the intake measure.

We are currently investigating ways to produce a cheaper product that focuses on only measuring intake and is commercially available to producers.

Digital phenotyping is the future

Being able to meet future demands and constraints on grazing livestock production will require the industry to transform the way phenotypic data such as this is collected and analysed.

Digital phenotyping using devices such as eGrazor offers a range of new opportunities to efficiently obtain data on traits that have been previously difficult to measure.

They also offer the potential to measure many traits simultaneously or at a level of detail previously unachievable, and to define new traits.

Successful adoption of this technology will improve the precision of nutritional and other management strategies, and accelerate the rate of genetic gain for feed efficiency in grazing cattle.

Wearable sensor technologies such as the eGrazor offers opportunity to better manage cattle and their environment.

Embracing agtech: nine practical ways to develop agtech solutions worth adopting

INNOVATION in agriculture is not a new phenomenon, in fact Australian farmers are considered among the most innovative in the world.

Research by AgriFutures Australia has uncovered barriers to agtech adoption and ways farmers and other sector stakeholders can create valuable agtech solutions.

The AgriFutures Australia funded report *Accelerating the development of agtech solutions worth adopting*, by advisory firm AgThentic, addresses the knowledge gaps in relation to Australia's agtech ecosystem, specifically in relation to how farmers interact with, and adopt, agtech solutions.

The report acknowledges the barriers farmers face interacting with agtech and seeks to highlight opportunities for entrepreneurs, farmers, researchers and the service sector to understand the needs of each group and build relationships to drive the development of better technologies in the agricultural sector.

AgriFutures Australia program manager, research and innovation, Jennifer Medway said the report is key to unpacking how all parts of the agtech ecosystem can better work together to achieve mutual benefits.

"Australia is on the cusp of realising the opportunities agtech brings," Jennifer said.

"To date we have focused on the end product, the deal flow or technologies themselves; this report offers new insights into the engagement model between end users and startups and highlights opportunities to improve technology development for the sector."

AgThentic's Sarah Nolet offers a global perspective on the agtech ecosystem and is quick to point out that agtech is well and truly on the map in Australia.

The AgTech Solutions report offers agtech solutions worth adopting.

"The new wave of innovators, products and services rolling out across the globe are ripe for the picking and have big potential to help Australian agriculture increase profitability, meet changing consumer demands, reduce negative environmental impacts and create new career opportunities in regional communities," Sarah said.

"What we need to work on, though, is harnessing the momentum and pointing it toward the development of solutions that solve real problems for farmers.

"Entrepreneurs and new technologies can bring value to Australian agriculture, but they cannot do it alone."

Push and pull factors associated with agtech adoption are explored in the report, and insights are offered into why technologies fail to solve real problems in a practical way, leaving producers frustrated and unconvinced of the value of agtech.

The report also questions agtech value propositions, suggesting they are missing the mark, but digs deeper to understand the challenges associated with the complex agricultural environment.

The end result is nine practical and actionable opportunities that have the potential to accelerate the development of agtech solutions worth adopting.

"We know digital technologies alone hold the potential to increase the gross value of production by over $20 billion, an increase of 25 per cent," Jennifer said.

"We've only just begun to scratch the surface when it comes to the benefits agtech can offer our rural industries.

Read the Accelerating the Development of AgTech Solutions Worth Adopting report.

eDNA testing helping to create healthy farm dams

Demonstrating the testing of turbidity levels at Neerim South wetlands.

DID you know every creature leaves traces of DNA in their surrounding environment, through skin cells, hair, scales and other bodily secretions?

Known as environmental DNA, or eDNA for short, it is a new way of detecting wildlife that Victorian-based company, EnviroDNA is at the forefront of.

Using innovative technology, scientists are able to extract DNA from a sample of water and use it to identify the animal, plant or organism that left it behind.

The unique sequence of each DNA molecule is then analysed for matches against a database of species.

By providing evidence of what is – or is not – present in an environment, eDNA is a genetic fingerprint that offers the opportunity to monitor endangered and invasive species, biodiversity and biosecurity.

In November 2018, the team at EnivroDNA began working with Jindivick Landcare Group and Neerim District Landcare Group to collect water samples from 16 farm dams across the West Gippsland region.

These water samples will be tested to detect eDNA, giving farmers information on the health of their water and what wildlife might be present on their property.

Dams are a critical resource on farms for irrigation and stock watering, but they also play an important role in creating biodiversity in agricultural landscapes.

According to Land & Water Australia there are over two million farm dams in Australia.

The aim of the project is to map the biodiversity across farm dams in order to determine their suitability to support local wildlife and improve the agricultural landscape.

For Phil Darton, from Neerim District Landcare Group, it is an exciting opportunity.

"I think dams are a resource we haven't looked at in providing a corridor system for wildlife," he said.

"We've looked at streams, we've looked at creeks, but we haven't looked into dams before."

Local farmer and fellow group member Lindsay Lockett agrees, highlighting the benefits of a healthy dam for productivity.

"This project enables me to explore the water health of my dams which is important for protecting my livestock," Lindsay said.

"They're my livelihood; I don't want them getting sick."

Increasing biodiversity in and around farm dams is an opportunity to make farming more ecological sustainable.

"For farmers, there is an enormous benefit to productivity from a healthier and more biodiverse dam," Helen Barclay, EnviroDNA managing director said.

"Through our testing we are interested in finding out how dams can be a sustainable support system for local wildlife in order to increase overall farm health.

"It offers a win-win situation."

To stay informed about EnviroDNA's research contact Helen Barclay at hbarclay@envirodna.com.

All treatment systems go!

FARMERS in Far North Queensland are trialling proof-of-concept treatment systems in what could be new lines of defence for the Great Barrier Reef.

Man-made wetlands, an in-drain wetland, a denitrification bioreactor and high efficiency sediment basin are all treatment technologies being trialled to reduce the amount of nutrients, sediments and pesticides flowing to the reef.

The technologies are being implemented as part of the Wet Tropics Major Integrated Project (MIP), a community-designed reef water quality project that focuses on water quality hotspots, the Tully and the Johnstone.

Monitoring data will help build a more comprehensive story about the effectiveness of different treatment systems in far North Queensland.

Sandra Henrich from the Wet Tropics MIP said the project responds to demand for relevant, local information about water quality, and solutions that are informed by landscape conditions and local knowledge.

"This project has been designed for local by locals.

"Growers want to make informed decisions that help reduce risk of nitrogen, sediment and pesticide run-off, without compromising productivity or profitability," she said.

Bioreactors are an engineered landscape feature used to remove nitrogen from groundwater before it enters local waterways.

Sub-surface water flows through the bioreactor and, under the anaerobic conditions, naturally-occurring bacteria convert the dissolved inorganic nitrogen into a gas which is then dispersed into the atmosphere.

Bioreactors for the control of nitrate in agricultural catchments are not a new technology internationally, but as of 2017 there were only two bioreactors in Australia, both installed in South East Queensland.

There are now bioreactors installed in the Innisfail area, Babinda and Townsville.

A high efficiency sediment (HES) basin has also been installed on a banana farm in the Innisfail area.

A HES basin is engineered to capture sediment, and associated nutrients and pesticides from agricultural water before it enters local waterways.

Coagulant is added to the basin through a rainfall-activated dosing system, which makes sediment particles settle on the bottom.

"HES basins as a treatment option can be of particular interest to growers concerned with fine sediments erosion," Sandra said.

"HES basins are often used in the mining and building industries, but they are in the trial stage in agricultural environments in Queensland.

"In this instance the coagulant dosing system was retrofitted to an existing irrigation dam."

Banana farmer Rob Zahra said it will be interesting to see the results.

"All of my farm run-off goes into this irrigation dam which then gets recycled," he said.

"If I can reduce the sediment in my water it's definitely going to improve the efficiency of my irrigation system.

"If I've got better water quality in my dam I've also got better water to put on my bananas.

"I also think if this project delivers the results that we think it may, it could be quite a good exercise for other growers to adapt into their farming procedures to help improve the quality of water headed for the Great Barrier Reef."

The Wet Tropics Major Integrated Project is funded by the Queensland Government through the Reef Water Quality Program.

Banana farmer Rob Zahra with Mike Back (L) and Butch Uechtritz (R) from Turbid Water Solutions retrofitting a HES basin to an existing irrigation dam.

Bass Coast Landcare Network tackle gorse using EcoBlade technology

IF you have never seen an EcoBlade in action then you are missing out according to Bass Coast Landcare Network.

The EcoBlade is an attachment for machinery that uses 'wet blade' technology to cut, mulch and apply herbicide to stumps and stems on woody weeds in the same event.

Utilising a community grant from the Victorian Gorse Taskforce (VGT), Bass Coast Landcare Network (BCLN) engaged a contractor with access to EcoBlade technology at private properties on Phillip Island.

The results of using an EcoBlade to manage gorse have blown BCLN away.

"Spraying herbicide in previous years was ineffective due to the sheer mass of plants," said Anna Brayley, a member of BCLN.

"Some plants were two metres high and so thick that it was hard to even make your way through to begin spraying."

Cutting and painting had also been unproductive due to the prickly nature of the job, with the plants being far too dense to reach through and access the stems.

"The EcoBlade is a brilliant piece of machinery," Anna said.

"It is essentially a cut and paint machine, which also mulches the bulk of the shrub, leaving behind a lovely clean looking paddock with all remaining parts of the plant poisoned."

Advantages of using the EcoBlade over traditional mulching methods include a reduction in the amount of chemical used, reduced spray drift which therefore reduces off-target chemical application.

Having the herbicide applied immediately to cut stems means the plant has no chance to heal before the herbicide is absorbed straight into the root system.

Additionally, the EcoBlade is suitable as a year-round treatment technique.

BCLN returned a few months later to check the progress and a majority of the mulched gorse had dried up with only a few specks of green standing out for easy follow up control.

"There was the odd new shoot, as to be expected with such a persistent weed, but overall we were very impressed with the results," Anna said.

The VGT offers community grants of up to $30,000 to groups of two or more landowners and local Landcare groups to help combat gorse in their local area.

The EcoBlade in action.

"The focus of our grants is to assist those who need to kick-start their gorse control," VGT chair Peter Everist said.

"The grants are available for on-ground gorse control projects that embrace community-led effort."

The VGT community grants 2019-20 program will open for applications the beginning of May 2019.

Visit vicgorsetaskforce.com.au for more information.

New community deer monitoring tool launched

DeerScan was developed in response to rising concerns about feral deer.

COMMUNITY website and smartphone app FeralScan has been helping thousands of landholders across Australia monitor and evaluate their feral animal management programs, through citizen surveillance.

More than 100,000 records are hosted on the platform, detailing feral animal sightings including rabbits, wild dogs, toads, camels and foxes.

Now groups and individuals managing pest animals and their impacts can use the popular website and app to report deer in their local area and the damage they cause with DeerScan.

The new feature was developed in response to rising concerns from farmers, landholder groups and the community about the negative impacts of deer.

Centre for Invasive Species Solutions chief executive officer Andreas Glanznig said, "We are hearing more stories of landholders being impacted by deer and members of the public are concerned about deer damage within national parks and protected areas, so it was important we provided an easily accessible and free product for people to report sightings.

"DeerScan links communities across Australia with government agencies, allowing us all to take action collectively and collaboratively.

"It is an imperative part of our Centre's large research collaboration into deer management."

Why use DeerScan?

Reports from the public will help develop detailed knowledge of where and how deer are using the landscape, point to problem areas and allow farmers and landholder groups to implement better management strategies.

This information will help to reduce the impact of feral deer on the environment and communities.

Southern New South Wales beef producer Ted Rowley has commended the new approach to reporting deer.

"We need to know more about the distribution, density and rate of spread of deer – they are a serious and persistent threat to our cattle business," Ted said.

"Deer are already causing agricultural production losses, damaging the environment and remnant vegetation and pose a hazard to motorists on our local roads.

"Wild deer have been listed as a priority pest in all 11 NSW Local Land Services regional pest animal management plans.

"I will be using DeerScan regularly and hope other land managers use it to help focus resources for appropriate and effective management.

"All land managers need to work together to reduce deer problems."

Where can you download DeerScan?

To report deer sightings, their impacts and management, visit *deerscan.org.au* or download the free FeralScan app from *Apple* and *Google Play*.

Anyone can use the DeerScan website and the free FeralScan app.

All information is managed discretely and the exact locations of deer sightings are not available to the public.

FeralScan is funded through the Centre for Invasive Species Solutions with financial and in-kind support from the Australian Government, NSW Department of Primary Industries and Australian Wool Innovation.

Farm technology: better for the back pocket and our backyard

FERTILISER, chemical, fuel and power.

These four costs are combining to seriously compromise Queensland cane farmers.

In light of this, a group of growers are moving towards what they hope will be a more efficient future; one that utilises technology to help their local area, as well as farmers' back pockets.

In Mackay and the Whitsunday region, 244 growers, farming 35,587 hectares of cane, are taking steps toward change, particularly nutrient and herbicide management.

"The days of putting on too much fertiliser are long gone. It's very expensive if you don't get the tonnes per hectare," said Graeme Blackburn, a cane farmer based in Mirani.

This year Graeme harvested 90,000 tonnes and is now looking ahead to see where cost and environmental savings can be made.

"For me it's the future. We want to grow the cane as efficiently as we can and remain viable," he said.

"This means making hectares work smarter and making the most of technological advances."

Graeme worked with Reef Catchments to purchase a three-row bed renovator.

The renovator transforms crop zones with narrow rows into modern, controlled traffic farms with wide rows.

"The bed renovator allows Graeme to convert old ratoons and widen 1.5 metre rows to 1.8 metre rows" Reef Catchments sustainable agriculture officer Ian Brooks said.

"Wider rows and GPS controlled traffic farming systems are incredibly important to improving the production and water quality to the Great Barrier Reef across the state."

Graeme has quickly seen major benefits from the renovator.

"With this equipment we can do up to 28 to 30 hectares a day, double to capacity of a tractor with the same horsepower," he said.

"It uses less fuel to the hectare and we're going twice as wide as what we'd normally do."

Cane farming has undergone big changes over the years, but it has taken time.

"Our next big project will be a soybean fallow crop, put in on beds made by the renovator," Graeme said.

"We're hoping this system will help improve soil nutrition, put more organic matter into the ground and in time, lead to better crops."

Graeme said you can start small to make the most of new technological ideas.

"Even before we purchased the renovator I started with a one-row system that was homemade.

Graeme is part of the wider Reef Trust program in Mackay and surrounds.

The program enables farm extension officers to work with local growers to improve nutrient and herbicide management and make the most of technological advances.

Through Reef Trust, more than $800,000 has been distributed to help hundreds farmers.

Cane farmer Graeme Blackburn.

Graeme's three-row Hodge bed renovator.

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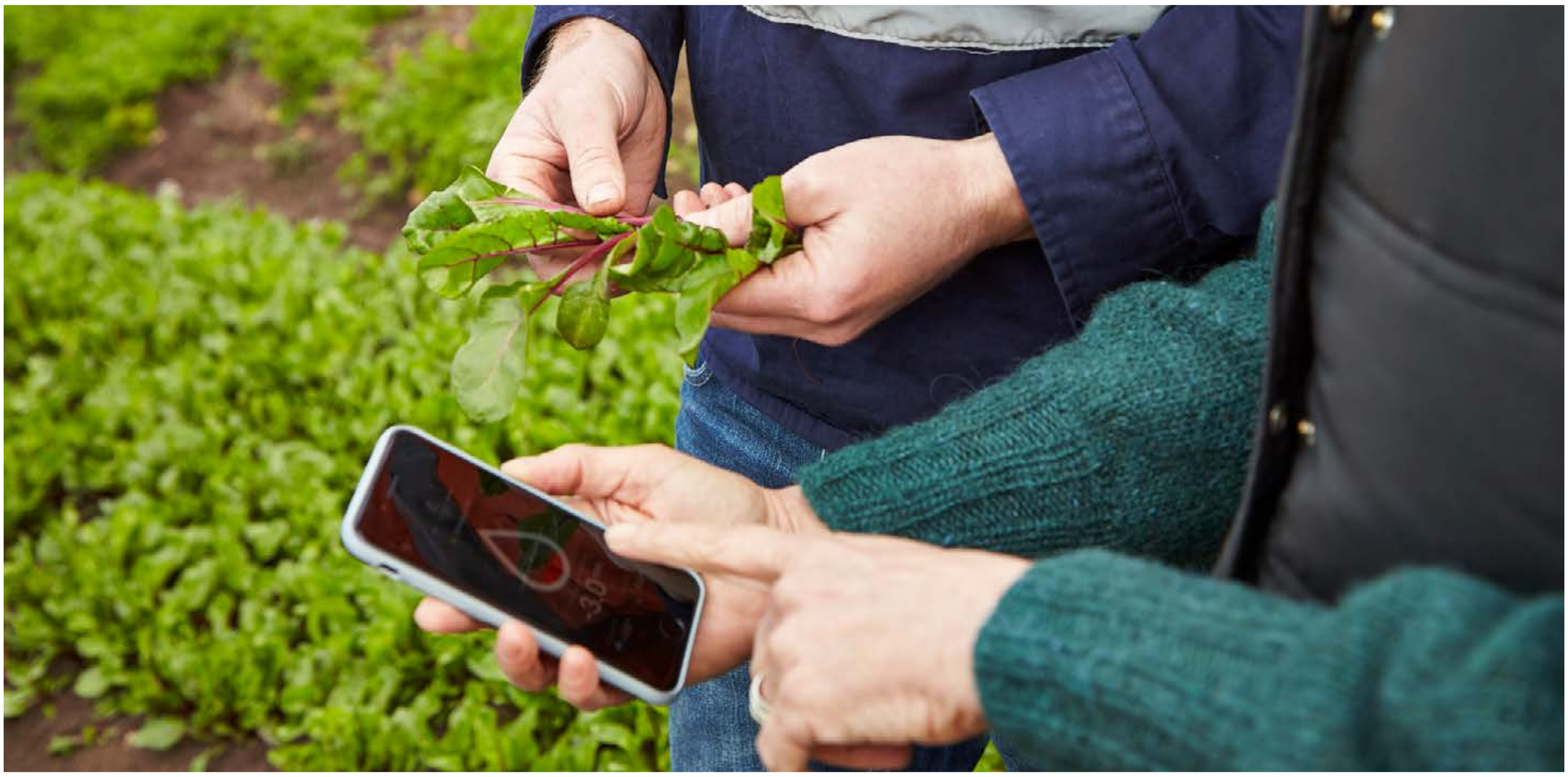
Digital mobile agriculture and the future of food security



Emerging agricultural technologies are accessible to a wider range of growers, from a wider range of backgrounds.

By Ros Harvey, The Yield

GLOBAL food production needs to increase 60% by the year 2050 to feed the earth's projected population of nine billion, according to the Food and Agriculture Organisation of the United Nations.

It is expected that 85% of this production increase will be driven by increased yields and cropping intensity.

Agtech, or agricultural technology, has grown out of the need to meet our future demands for food security and will increasingly become the key enabler of sustainable intensification of agriculture.

It is an exciting time as so many new technologies are being developed to meet the challenges we will face in the future, not just on farm but along the entire food supply chain.

Digital mobile technology

Growers have an ever-growing list of mobile apps they can download to make their lives easier.

There are apps for recording activities, monitoring weather, and tracking commodities prices.

There are converters and calculators, farm management apps, agricultural news apps, forums, pest guides and countless other tools for growers to download.

In a world in which growers are increasingly expected to do more with less, this influx of affordable, easily accessible tools can make a significant impact.

The democratisation of technology, particularly mobile technology, means emerging agricultural technologies are accessible to a wider range of growers, from a wider range of backgrounds.

Given the need to improve food production significantly in the coming decades, that access is crucial for agtech to make a tangible impact on food supply globally.

Unlike other agriculture technologies, digital mobile agriculture technology has few barriers to entry, with the savviest players in the market championing affordability, accessibility and simplicity.

With smartphone handsets getting cheaper and cheaper, and 4G (and soon 5G) connectivity rolling out across more areas, the potential

for digital mobile agriculture technology to revolutionise global food production is immense.

Over the past few years, hundreds of agtech solutions have entered the market with companies eager to help growers simplify and streamline their growing operations.

While the sheer number of available solutions means that, generally, there is a solution for every grower, it can make the task of seeking out the leaders in the field rather difficult.

Below are ten of the leading digital mobile agtech solutions currently on the market:

1. SmartShepherd

SmartShepherd enables livestock breeders to collect maternal pedigree information quickly and cost-effectively.

smartshepherd.com.au

2. BovControl

BovControl is a data collection and analysis tool to improve performance in meat, dairy and genetics production.

bovcontrol.com

3. The Yield

The Yield uses AI and data analytics to provide growers with localised seven-day predictions for a range of growing conditions.

theyield.com

4. AgriDigital

Agridigital is a cloud-based commodity management platform that helps growers change the way the buy, sell and store grain.

agridigital.io

5. Tule

Tule provides site-specific irrigation recommendations, using data from on-farm sensors.

tuletechnologies.com

6. Tend

Tend is a farm management solution for diversified farms.

tend.ag

7. Weathermelon

Weathermelon tracks price fluctuations caused by weather issues in 30 top produce markets in the US.

weathermelon.com

8. Fieldmargin

Fieldmargin is a simple farm map and notebook that enables easy communication within teams.

fieldmargin.com

9. HarvestYield

HarvestYield helps growers manage their workforce effectively.

harvestyield.com

10. Croptracker

Croptracker is a record-keeping and operations management app for produce growers.

croptracker.com

For more information, check out The Yield's comprehensive guide to understanding mobile agriculture as it fits into the global big picture, and some of the solutions available.

The guide takes a deep dive into ten of the leading agtech solutions currently on the market – from features to ratings, availability to target market: *go.theyield.com/Digital-and-Mobile-AgTech.html*.

The Yield is on a mission to transform food and farming practices with scalable digital technology.

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From 1788 to 2019: using fire to ensure plants and animal habitats flourish

By Valerie Woods, Landcare Australia

IN his plenary address at the 2018 National Landcare Conference, Australian National University emeritus professor Bill Gammage, spoke about how, at the time Europeans arrived in Australia in 1788, Aborigines used fire and no fire to ensure that every plant and animal had a habitat in which they could flourish.

He sketched what we might learn from their management, while noting how in important ways, the land has changed since 1788.

According to Professor Gammage, "In 1788, the Indigenous people used fire and no fire to distribute plants, and plant distribution to locate animals, birds, reptiles and insects.

"With fire and no fire people associated plant communities, grass with trees for example, to give plants and animals ideal habitats, making them abundant, then carefully distributed those habitats, making plants and animals convenient and predictable.

They could make paddocks without fences, because most Australian plants tolerate fire, the only large predators to disturb prey concentrated by fire were people, and people had a philosophy which protected every species."

Have we learned from these traditional indigenous practices and are they still relevant as a fuel management tool in 2019?

The answer is certainly yes.

Two VicTrack funded projects in partnership with Landcare Australia are excellent examples of recent ecological burns.

These burns, on former rail land in Victoria, successfully helped control weeds, promote new growth and increase native species diversity in high-conservation value grassland areas.

The Upper Goulburn Landcare Network, with the assistance of the Limestone Country Fire Authority carried out three ecological burns.

Using ecological burning to encourage new growth along the Great Victorian Trail

The VicTrack-funded Pedalling the Great Victorian Rail Trail with Landcare project undertaken by the Upper Goulburn Landcare Network (UGLN) in Victoria, focusses on controlling woody and noxious weeds in areas of biodiversity significance along the rail trail, as well as planting native plants.

Weed removal and revegetation to in-fill gaps and understorey diversity in the natural vegetation has ensured the improved condition and connectivity of the native vegetation.

Revegetating degraded sections of the disused railway land by planting 2,000 local indigenous trees and shrubs and installing 40 nest boxes built by local high school students were two of the tactics used in this project.

Employing ecological burns was a third significant tactic to help control weeds, promote new growth and increase native species diversity in high-conservation value grassland areas of the rail trail around Limestone and Cheviot.

The UGLN have been liaising with the Shane Monk from Taungurung Aboriginal Corporation and plan to involve him and the Taungurung community in future burns along the rail trail.

"There are huge benefits with having the local Aboriginal people involved.

Fire is such an important part the Taungurung heritage and it is the way Shane's ancestors managed our grasslands.

We're all learning together, CFA [Country Fire Authority], Landcare

and the Taungurung," Chris Cobern, Upper Goulburn Landcare Network Landcare coordinator and project officer said.

The ecological burning of these grasslands has encouraged new growth and improved the health of the native grasses.

Burning is especially important for kangaroo grass tussocks as they can die-off when the plants are smothered out by dead plant material.

These tussocks are important habitat of the endangered striped legless lizard found in the region.

As Bill Gammage shared in his address, the fire can also help regenerate native herbs, groundcovers and wildflowers present in these special areas.

As a result of undertaking three successful burns in 2018, the UGLN developed valuable partnerships with two local CFA Brigades.

Chris emphasises the crucial role local CFA brigades have in controlled burns.

Local council staff in charge of issuing fire permits feel more comfortable knowing the CFA are involved.

According to Chris, "The ecological burning component involved a lot more organisation than the other components of the project.

The team from Woolsthorpe Country Fire Authority assisted with the ecological burn on the Green Line project.

"However, now we've done it we know what to expect next time."

The Green Line project uses ecological burn as an environmental management tool

The Green Line is another Landcare Australia project in partnership with VicTrack which recently undertook an ecological burn as an environmental management tool.

The Basalt to Bay Landcare Network manages this planned biodiversity corridor project, which aims to protect and enhance the biodiversity and habitat connectivity of the former Koroit to Minhamite Railway Line in western Victoria.

This reserve stretches 37 kilometres, encompassing four listed endangered ecological vegetation classes (EVC), as well as numerous rare and endangered species.

At an average of 30 metres wide, it is always competing with edge effects of adjoining farming, like weed incursions.

It also suffers from a lack of native fauna processes, such as browsing kangaroos and digging bandicoots.

Having endangered EVCs meant that no graded bare earth breaks could be built, meaning an autumn burn with an experienced roadside burning brigade was chosen.

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Smart Farming Partnerships delivers innovation in Landcare

INNOVATION is key to the future efficacy of Landcare.

Acknowledging that farmers, fishers and foresters are vital to the protection and conservation of Australia's natural resources while productively using them, the Australian Government supports the Landcare movement and community land carers through the National Landcare Program.

Within this program, Smart Farms supports Landcare innovation in sustainable agriculture.

One Smart Farms component, Smart Farming Partnerships, supports medium to large scale projects that focus on innovation.

Projects are delivered in partnership with industry, communities and other governments.

These partnerships trial and develop innovative tools and farm practices that will reduce the pressure on Australia's natural resources while increasing industry productivity and profitability.

Projects also encourage the uptake of these innovative best practices, tools and technologies by farmers, fishers, foresters and regional communities which creates an on-going legacy for land carers after the project has ended.

In round one of the program there were 15 successful Smart Farming Partnerships announced.

They address a range of themes, including farming systems and aquaculture, soils, climate and markets.

Below are some examples of these projects:

- **E-beef Smart Farming in Northern Queensland** is establishing on-ground, regionally relevant smart farms to demonstrate the use of innovative practices and technology to improve landholders understanding of the links between soil, groundcover, production and economic returns.
- **Next Generation Forecasting** is developing, trailing and implementing a new and innovative, dynamic weather forecasting platform that combines data gathered from existing local monitoring networks with proven predictive modelling systems.
- **Soil Tech Projects** is translating peer reviewed soil science into digital soil management tools and a new soil management system for land managers, using a novel collaborative innovation model.
- **Sustainable Dairy Products** is building the capacity of Australian dairy farmers to demonstrate the sustainability of their operations and traceability of their products while also improving their management of natural capital and climate risk.
- **Warm and Cool Season Mixed Cover Cropping for Sustainable Farming Systems in South Eastern Australia** is demonstrating the use of mixed species cover crops across south eastern Australia to improve soil organic carbon, structure and health, while decreasing weed and disease in commercial crops.
- **The Sustainable Sugar Project** combines the use of the Smartcane Best Management Practice system and blockchain technology to demonstrate the provenance of Australian grown sugar.
- **Saline Bush Tucker** is developing a commercial bush food production system that engages with the indigenous, commercial and not-for-profit sectors, while directly improving management of degraded land, water and vegetation.
- **The Tasmanian Smart Seafood partnership** is increasing marine biodiversity in Tasmanian multi-use waterways by building upon established partnerships within the Tasmanian seafood industry.

These Smart Farming Partnerships projects allow new ideas to be developed, tested and shared across farms, industries and regions, to the benefit of the Australian landscape, community and economy.

Anyone involved in Landcare can expect to see the results of these exciting innovative projects flow through over the coming years creating the all-important project legacy.

Further, to find out more about the location of projects and what they set out to achieve refer to *agriculture.gov.au/ag-farm-food/natural-resources/landcare/national-landcare-program/australian-government-investment-in-landcare#round-1.*

In addition to these first round innovative projects, a second round of the program is expected during the first half of 2019.

Anyone with a good innovative Landcare idea can get involved, so now is the time to consider sharing ideas with suitably skilled organisations.

Huge gains for farm productivity and environment

By Michelle Young, Sustainable Farms Project

On-farm field days provide real examples of actions to improve productivity. Photo: Sustainable Farms project, ANU.

IN a win-win for everyone involved, a project run by the Australian National University (ANU) is helping farmers to improve the productivity, profitability and biodiversity on their farms while also improving farmers' wellbeing.

The Sustainable Farms project is founded on 20 years of research and monitoring on more than 270 farms across Australia's south east wheat and sheep belt.

Sharing this unique knowledge provides important and practical insights into how productivity, conservation and farmer wellbeing can be jointly achieved on farmland.

We know that science based information is critical for farmers to sustain production, maintain healthy landscapes and keep rural communities strong.

Sustainable Farms is not a remote university project – we have key ANU people working in the field with farmers on a daily basis.

With farmers and Landcare as key partners, the project team recently delivered a series of field days on farms to provide other farmers with demonstrations of improved farm dams, native shelterbelts, protected paddock trees and rocky outcrops, restored rivers and creeks and enhanced biodiversity.

NSW Local Land Services and Victorian catchment management authorities are also essential partners in the project.

There's nothing like seeing real-life examples of farmers' actions to improve productivity, to get people motivated.

One field day was hosted by farmers who have had great success in improving the productivity and natural assets on their farm by planting shelterbelts and growing saltbush to increase livestock performance and biodiversity, with substantial benefits for integrated pest management.

In all, 527 people attended 22 field days, sharing the knowledge and experiences of the land holder, research from the ANU and information from veterinarians, ecologists and agronomists.

The field days include plenty of opportunities for discussion and an enjoyable barbeque at the end.

This year we are calling for new partners to be part of the journey.

Please contact us if you are a farmer or group in the south east wheat and sheep belt with examples of sustainable farming practices and would like to be involved in the Sustainable Farms project: phone 0427 770 594 or email *sustainablefarms@anu.edu.au*.

There are many different ways to improve farm resilience in the face of climate variability – it doesn't have to be onerous or expensive – it can start with protecting one paddock tree.

The project is developing a set of helpful resources during 2019.

To find out more, visit sustainablefarms.org.au.

Electric fencing helping vulnerable species to fly

Continued from page 3.

Gallagher territory manager Chris Richards worked closely with BVK on the project, helping the group to select the most effective fencing solution whilst learning about the plight of the Richmond birdwing butterfly.

"The group helped me understand the importance of the birdwing vine and the issues around establishing and protecting it on Dave's property," Chris said.

"We decided that for the location, and to protect against the threat from a range of animals, a portable solar energizer would be best used in conjunction with our simple to construct insulated line post fence.

"We went with a solar energizer because they're powerful and reliable even in periods of low light and don't require connection to mains power.

"Electric fencing will provide a peace of mind that the vines are safe from pressure from any animals that are about."

Despite the initial investment of care that the vines require, once established they grow very well and will hopefully in years to come reintroduce the once-thriving Richmond birdwing butterfly to the area.

L to R: Gallagher territory manager Chris Richards with Reg Pease and Dave McCowan from Brisbane Valley Kilcare Landcare.

From 1788 to 2019: using fire to ensure plants and animal habitats flourish

Continued from page 21.

Woolsthorpe CFA took less than two hours to burn the site. Watch a video of the burn *here*.

Four trucks, one ute, 15 volunteer fire specialists and a donated tanker of water were employed for this grassland burn.

Basalt to Bay Landcare Network facilitator Lisette Mill said, "We and VicTrack need the CFA brigades for their expertise and because they are the farmers beside our project.

"Having them invested in working together means more positive outcomes follow."

One outcome is a stronger relationship with the CFA to support local traditional owners to connect with the sites through fire and bush foods.

The CFA has a full-time Indigenous engagement officer who is assisting in planning a 2020 indigenous burn in part of The Green Line where there is a newly registered scar tree.

"Our local Indigenous clans haven't had places to practice or train on Crown Land that isn't a National Park," Lisette said.

"The Green Line gives many a venue to blend burn styles and burn resources.

"Bringing people together to preserve the natural assets, encourage training and generate knowledge, awareness, and partnerships is the future for this project.

"It's the Landcare way."

According to Landcare Australia environmental projects manager Rowan Ewing there is a shift in the way Australians look at and manage our landscapes, particularly where fire is concerned.

"These projects undertaken by the Upper Goulburn and the Basalt to Bay Landcare Networks, where Landcare is able to reach out and bring a broad range of the community together to listen, plan and manage the areas important to them, are great examples of the positive role Landcare plays in towns and communities across Australia," he said.

The Atlas of Living Australia supporting the work of Landcarers

By Peter Brenton, Atlas of Living Australia

THE Atlas of Living Australia (ALA) is the national biodiversity data facility.

It brings together biodiversity data from thousands of sources and makes it accessible to researchers, policy makers, natural resource managers, industry, educators and the general public.

The ALA is funded by the Australian government through the National Collaborative Research Infrastructure Strategy (NCRIS) and hosted by the CSIRO.

Data in the ALA is provided by all the major flora and fauna collections in museums, herbaria and research organisations; state and territory flora and fauna databases; major interest group databases; and a myriad of other sources from researcher-driven and community-based citizen science projects to natural resource managers (including Landcarers), individual researchers, industry-based ecologists and local government organisations.

The ALA infrastructure also comprises software tools, databases and servers which make it possible to collect, process, store, discover, visualise, analyse and access the content.

Many different tools have been developed to provide these functions.

Some of the tools likely to be of particular interest to Landcarers and the NRM sector include the following:

The main ALA

A suite of integrated applications to search, filter, view and access a vast array of publicly available biodiversity information and occurrence data for over 140,000 species of plants, animals, fungi and micro-organisms.
ala.org.au

Spatial Portal

A sophisticated spatial analysis tool allowing you to look at your data in combination with other data and almost 500 spatial layers.

Use it to work out what is likely to happen to certain species under projected climate change scenarios; find where seedstock for certain species which are tolerant to certain environmental conditions might be found; and many other uses too.
spatial.ala.org.au

BioCollect

ALA's field data collection tool for all kinds of data collection including citizen science and non-citizen science assessment and monitoring surveys, as well as activity-based project management for your weed and pest management projects, and restoration and rehabilitation projects.

Easily create and manage your own data collection projects.
ala.org.au/biocollect

Sandbox

A simple tool for loading and visualising your own data using ALA tools and data.
ala.org.au/tag/sandbox

A sighting of the blue-banded bee uploaded to the ALA by Anthony Katon in NSW.

DigiVol

A crowd-sourced digitisation platform.

This is a great tool to turn your field notes, data sheets and camera trap images into digital information so it can be analysed and used.
digivol.ala.org.au

All ALA data and tools are accessible online.

The ALA team works hard to improve the platform and we encourage constructive feedback from users and contributors to help make it better.

We encourage everyone with an interest in biodiversity to contribute data – both big and small – to improve scientific research in biodiversity and outcomes from biodiversity policies and management.

Go to *ala.org.au* to register and start exploring Australia's biodiversity.

Landcare Australia

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