

vegetables

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| Autumn - 2022



COVER STORY | MICHAEL HEYES: PUTTING SOIL FIRST

SPECIAL FEATURE | AUSVEG'S 2022 FEDERAL ELECTION PRIORITIES

R&D | SMARTER FARMING ON THE HORIZON FOR AUSTRALIAN VEG GROWERS



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Vegetables Australia is the most widely distributed magazine in Australian horticulture.



Editorial

Research and development (R&D) in the vegetable industry has come a long way in recent years. Today, it is not only focused on keeping pests and diseases at bay – and exotic ones out of Australia – but there is a wider scope of R&D being undertaken, from ag-tech to export development, Integrated Pest Management (IPM), and cover cropping to new product development.

In this edition, *Vegetables Australia* features over 50 pages of R&D that will help improve growers' productivity and competitiveness, as well as increase demand for Australian vegetables. This includes the next generation of research technologies that will be on-show at the recently announced Gatton Smart Farm facility. The Smart Farm is set to be future-focused – bringing together research in the field, pre-harvest, protected cropping and post-harvest areas, and the export environment.

A joint venture between the Queensland Department of Agriculture and Fisheries and Hort Innovation, the Smart Farm will play an integral role in ensuring the long-term viability and sustainability of vegetable industry

research. Turn to page 77 to read more.

We are also revisiting past R&D and outlining how it has influenced and led to current investments. We have featured previous Bayer Researcher of the Year award winners – Dr Lucy Tran-Nguyen, Denis Persley, Professor Salah Sukkariéh and Len Tesoriero, who have decades of experience in horticultural research. These four celebrated researchers give great insight into how projects can build and transform over time to meet the needs of industry.

Denis Persley provides an example of how collaboration and projects can develop and evolve. Denis worked on a project entitled *Integrated viral disease management in vegetable crops* that was completed in 2012.

The project team remained in contact, and today several members are involved in the current national project *Area wide management of vegetable diseases: viruses and bacteria*, which is due to end mid this year. As Denis says, this collaboration provides a broad perspective on what are the important issues across the country, and it helps with access to new techniques, trial

results and national and international contacts.

On-farm R&D adoption is also a key focus. The five-year *VegNET 3.0* project is building on improving Australian vegetable growers' knowledge and skills to implement best practice management on-farm, as well as acting as a knowledge broker to link growers with the best science and tools to meet their individual business development goals. You can read more about VegNET activities in this magazine.

One event that you can learn about industry R&D activities – and find out more about these projects – is Hort Connections 2022. Australian horticulture's biggest conference and trade show will be taking place from 6-8 June at the Brisbane Convention and Exhibition Centre, and we encourage you to come along and learn about the latest innovations that are taking place within the sector.

You can read more about this year's event on page 14 or visit hortconnections.com.au to register your attendance.

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Michael Coote
CEO
AUSVEG

Message from the CEO

Despite the ongoing economic, health and workforce challenges of the COVID-19 pandemic, Australia's hard-working vegetable growers have shown strong resilience to continue supplying healthy, fresh produce for Australian and international consumers.

The latest Hort Stats publication, produced by FreshLogic and funded by Hort Innovation, demonstrates that the Australian vegetable industry has increased production by approximately three per cent in 2020/21 compared to the previous year, which generated a farmgate value of \$4.9 billion.

Australian vegetable growers should be proud of their tremendous efforts during the difficult years of the pandemic. The Australian vegetable industry is one of Australia's strongest performers in the agriculture industry, with a farmgate value larger than many other agriculture sectors, including most domestic meat markets (except cattle and calves), all fisheries and forestry industries, all pulses and oilseed crops – and is comparable to our milk and fruit industries.

The outlook for 2022 is shaping to be possibly the most difficult of the pandemic. AUSVEG continues to receive reports from growers that the ongoing cost increases on necessities such as fertiliser, fuel, chemicals, freight containers, packaging and wood pallets and other vital farm inputs are significantly impacting growers' bottom lines.

This is why AUSVEG – as the national industry body that represents the interests of growers to government and the broader supply chain – has stepped up its advocacy to ensure that growers' concerns are raised to all levels of government, including parliamentarians, ministerial and departmental staff throughout the pandemic. This includes AUSVEG playing an integral role in the development and design of the Australian Agriculture Visa, as well as ongoing representation in areas including workforce, trade and biosecurity.

In the lead-up to the 2022 Federal Election, we have increased our investment in advocacy, public affairs and representations on behalf of growers, culminating in the development of our 2022 Federal Election Priorities.

These priorities have been developed in consultation with our state and territory grower associations and reflect a unified vision for the future success of our industry. They include:

- Driving increased demand of Australian vegetables through a dedicated, well-resourced behavioural change campaign.
- Securing a productive workforce.
- Protecting the future of vegetable production through biosecurity and sustainable growing practices.
- Futureproofing the industry through upgraded infrastructure and attracting the next generation of skilled workers to the industry.

You can read more about our election priorities on page 8. We will continue to advocate tirelessly during the election campaign and beyond to represent growers on matters that are important to them, and that are critical for the future success and growth of our industry.

As we emerge from the pandemic, AUSVEG will be prioritising face-to-face meetings with growers and industry members as there is no substitute to meeting in-person.

The upcoming Hort Connections conference – taking place in Brisbane from 6-8 June – will be the best opportunity to meet with growers and other supply chain members from across the country at the many networking opportunities held during the event.

AUSVEG will have a much larger presence at the Hort Connections Trade Show this year, and we are looking forward to seeing you all to speak about the issues that are important to you, your business and your industry.



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AUSVEG's 2022 Federal Election priorities



AUSVEG is pleased to release its Federal Election priorities for the upcoming 2022 Federal Election.

Throughout the latter half of 2021 and in early 2022, AUSVEG has consulted and engaged with its growers and State Members to produce a comprehensive set of policies to support our growers and industry. We have made a conscious effort to construct both short- and long-term policy goals that will assist growers into the future.

It is essential to lay out a clear set of priorities that strongly reflects the needs of our industry. These will help to form the basis of AUSVEG's advocacy agenda for the next government term – and beyond.

Throughout the development of AUSVEG's Federal Election priorities, we made sure to 'truth test' many of the policy asks to ensure it would meet the needs of growers nationally.

It was also important to think longer term in how we want the industry to look – not just beyond the COVID pandemic, which has dominated our lives for the last two years – but to think how we want the industry to look and operate in five- and 10-years' time.

The development of a unified position provides the vegetable and potato sector with the best chance of a policy result.

Our priorities circulate around three core themes including:

- Driving increased consumption.**
- Developing more efficient businesses.**
- Becoming a more resilient industry.**

Driving increased consumption leads to both domestic and overseas opportunities. Increasing domestic consumption requires bold new thinking to tackle a persistent and worsening problem. Data from the Fruit & Vegetable Consortium (FVC) indicates that vegetable

consumption is too low and declining over time. However, the FVC outlines the benefits of increasing vegetable consumption, with an increase of just one serve of vegetables per day conservatively generating an incremental increase in industry returns of \$1.3 billion per year. On the export front, the vegetable industry is just getting started. Increasing trade and market access to countries such as Singapore, UAE, Malaysia, South Korea, Hong Kong and Thailand will further enhance our selling opportunities for growers.

Developing more efficient businesses starts with access to a more efficient, reliable and competent workforce. While the Australian Agriculture Visa and Pacific Island programs are significant pieces of that complex puzzle, other pieces include affordable and reasonable accommodation options for workers and greater skilled career opportunities for the domestic workforce. Improved business management and negotiation skills are critical for farm businesses to become more prepared to effectively negotiate with their buyers and their banks. While greater market transparency will increase grower knowledge of pricing fluctuations and give them access to the free, timely and accurate market information, they need to make more informed decisions for the benefit of their business.

Becoming a more resilient industry is about planning for the future. This includes better understanding our customers' expectations and preparing for the constant challenges that the climate brings. From fires, floods, droughts and COVID, our growers have dealt with a wide range of issues outside of their control, but they can prepare to mitigate the impacts on their businesses and on our future food security. It also includes improved management for food safety and how the uptake in new technology can assist in ensuring Australia's fresh produce is safe for all consumers. These central themes are the core of the development of the vegetable and potato sector as it strives to become an \$8 billion sector by 2030.

From here, we divided our priorities into nine pillars including: increasing domestic consumption, workforce, regenerative systems, biosecurity, emergency preparation and prevention, competition and business, international trade, infrastructure, and the next generation.

Our top policy requests include:

\$100 million to develop and execute a national strategy and behavioural change program.

Australians consume an alarmingly low number of vegetables a day. The declining servings is now a multi-billion-dollar problem that is impacting the economic, health, social, and environmental wellbeing of all Australians. Although this is critical for the health of Australians, it is also dire for our industry. A national strategy has the ability to improve the health of Australians, as well as stimulate the vegetable and potato industry with jobs and improve regional communities.

Delivering a fully operational Australian Agriculture Visa.

An Agriculture Visa will help growers access an efficient, reliable and competent workforce. It will also give businesses the confidence to grow and improve, knowing they have a competent workforce to back them up.

Deliver a National Labour Hire Licencing Scheme.

The implementation of a National Labour Hire Licencing Scheme would give greater confidence for growers and workers that the labour hire providers are operating legally and ethically. They can simply present a licence to a grower upon arrival.

The COVID-19 pandemic has shone a light on many issues within our industry and created consistent challenges. We will continue to work through these challenges to support our industry; however, these policies are not solely focused on COVID recovery.

These policies look to create long-term change well after the pandemic has subsided, helping our industry become stronger and more resilient to future challenges.

These priorities will help our industry strive towards the goal of being a \$8 billion sector by 2030, and simultaneously have immense flow-on effects to the broader Australian and international community.

The process

AUSVEG has been hard at work developing these priorities to strongly reflect the needs of our industry.

The development process began in early August 2021, where we held comprehensive discussions with our State Members to identify core issues. Following these discussions, we released an Australia-wide survey to our growers to help truth test the policy asks and provide further input.

AUSVEG has already begun its advocacy in the lead-up to the Federal Election briefing key ministers, MPs and departments in December 2021. AUSVEG briefed key ministers and members including Agriculture Minister David Littleproud, Member for Wright Scott Buccholz, Member for Forrest Nola Marino, Member for Mallee Anne Webster, and many others.

AUSVEG has also briefed the Department of Agriculture, Water and Environment (DAWE) and Federal Treasury. We will continue to advocate these policies throughout 2022 and beyond.

Overall, we received very positive feedback and look forward to meeting with more politicians this year.

The next stages of our Federal Election process will be developing a Pre-Budget Submission with more detailed points on each of our priorities to submit to Treasury. Following this, AUSVEG will be doing more face-to-face meetings (pending COVID restrictions) with politicians around the country.

AUSVEG welcomes growers and members to provide feedback on our Election Priorities. Please don't hesitate to email or call our advocacy team on the details below.

You can also view the full 2022 Federal Election Priorities document online at ausveg.com.au.

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Five-year plan aiming to drive positive change across the Australian vegetable industry

During 2021, Hort Innovation worked closely with growers and other industry stakeholders to refresh the documents that guide investment of grower levies. The 2022-2026 Strategic Investment Plans reflect the current needs and aspirations of industry, as well as provide an overarching roadmap for each industry to follow.

To complete the picture of how levies will be invested over the five years, the 2021/22 Annual Investment Plan (AIP) for each industry – including vegetable – was released in early December 2021.

The vegetable Strategic Investment Plan (SIP) 2022-2026 provides a roadmap to guide Hort Innovation's investment of vegetable industry levies and Australian Government contributions, ensuring investment decisions are aligned with industry priorities.

Its intent is to drive opportunities in both domestic and international markets for vegetable products while accelerating sustainable production practices, managing risks and building a more resilient and informed industry through people development, communication and extension of research.

Currently, the vegetable research and development (R&D) fund has capacity to invest in new projects from FY2022. Careful prioritisation of future investment needs is required over the next five years.

The four outcome areas of this SIP cover significant themes under which programs and investments will be focused.

Industry outcomes

Outcome statements as identified and prioritised by the vegetable industry have been prepared under four key outcome areas:

- Industry supply, productivity and sustainability.
- Demand creation.
- Extension and capability.
- Business insights.

Outcome 1

Industry supply, production and sustainability

To accelerate the application of production practices that are proven to optimise returns and reduce risk to growers.

Achieving the outcome will involve:

- New knowledge and understanding of sustainable production systems for Australian vegetable growers including enhanced soil health, improved water and nutrient use efficiency, precision inputs and labour use efficiency.
- Responding to environmental change and climate variability.
- Advances in biosecurity and the management of pests and diseases through a proactive and prepared industry.
- Optimising the supply chain to improve quality and traceability, as well as reduce wastage and improve sustainability of vegetable production systems.
- Improvements in protected cropping and intensive production technologies.
- Proactively monitoring potential crop protection regulatory threats and having access to a broader suite of effective, socially acceptable and environmentally sound crop protection solutions.

Outcome 2

Demand creation

To maintain and strengthen consumer demand as the foundation for sustainable expansion of production and consumption in both domestic and international markets. It means the industry is investing to:

- Grow the value of Australian vegetable exports by supporting industry to market premium products, targeting higher value market segments.
- Articulate the value proposition for Australian vegetables and pursue more targeted market and channel growth opportunities.
- Develop strong relationships across the supply chain with a shared goal to grow the category.
- Enhance opportunities for value-adding and packaging.
- Improve stakeholder engagement with the foodservice sector and the education of health benefits to consumers.

Outcome 3

Extension and capability

To manage knowledge, relationships, systems and processes required to communicate effectively with internal and external stakeholders.

Achieving the outcome will involve:

- A change in knowledge, attitude, skill, aspiration and practice for grower/ industry profitability and sustainability through use of best practice and innovation.
- Maintaining and improving industry cohesiveness, with the majority of businesses and the majority of the industry supply chain actively engaged in implementation of this strategy.
- Growers, supply chain, media and governments being well-informed on industry initiatives and achievements as a vital part of regional communities and networks.
- Increased on-farm use of R&D outcomes that will build a stronger, more resilient industry – in addition to improved networks and cross-industry collaboration.
- Proactive strategic and evidence-based decision-making in businesses and for industry on investment, priorities and risk management.

Figure 1

Four key pillars of the Australian-grown Horticulture Sustainability Framework.



Outcome 4

Business insights

To deliver data and insights that is foundational to achieving success in the other three outcome areas of demand creation – supply, productivity and sustainability as well as extension and capability.

Achieving the outcome will involve

reliable baseline data and analysis to provide insights and understand current and emerging trends. Key investments will support the provision of consumer knowledge and tracking, access to trade data, production statistics, forecasting and independent reviews to enable better

decision-making process at industry level and individual businesses.

These investments underpin and are complementary to delivery of the other outcome areas.



Investment opportunities through Hort Frontiers

Innovation is key to the future success of Australian horticulture. The next evolution of the long-range, higher risk and transformational R&D that has the potential to make a significant impact will be possible through Hort Innovation's Hort Frontiers program strategic partnership initiative.

Hort Frontiers is a strategic partnership initiative that facilitates collaborative, cross-industry investments focused on the longer term and more complex themes identified as critical for Australian horticulture by 2030.

The partnership framework is currently being established and will include a number of key investment themes for potential investment to guide the initiative and drive transformational R&D across horticulture.

Key investment themes will include:

- Environmental sustainability (water, soil and climate).
- Pollination.
- Green cities.
- Biosecurity.

- Health, nutrition and food safety.
- Advanced production systems.
- International markets.
- Leadership.
- Novel food and alternate uses (waste reduction).

The development of these areas for investment will benefit all of horticulture, with support from partners with aligned priorities to co-invest in deliverables identified that require alternative funds available outside the levy.

Hort Frontiers is being developed to align with the Australian-grown Horticulture Sustainability Framework to invest in specific impact areas to drive innovation and sustainability initiatives.

The vegetable industry views all the above investment areas as opportunities for success into the future. Partnering with Hort Frontiers on these areas would provide the vegetable industry with opportunities for access to world-class research, specialised project management teams and large-scale R&D.

Australian-grown Horticulture Sustainability Framework

Hort Innovation has developed the Australian-grown Horticulture Sustainability Framework report, aiming to strengthen the horticulture industry's sustainability to meet the changing expectations and needs of growers, consumers, the community, investors and governments.

Find out more R&D

Please visit horticulture.com.au to read the full Hort Innovation Vegetable 2022-2026 Strategic Investment Plan.

For further details or if you have any questions, please contact Hort Innovation Industry Strategic Partner Mark Spees on 0439 574 173 or email mark.spees@horticulture.com.au. Alternatively, you can phone the AUSVEG office on 03 9882 0277.

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Growing together in 2022: Save the date for Hort Connections!

Hort Connections returns to Brisbane this year with several key changes, including a fresh website and more streamlined processes for delegates. Australia's biggest horticultural conference and trade show will be held at the Brisbane Convention and Exhibition Centre from 6-8 June, and we're excited to welcome delegates back to an action-packed, rejuvenated program.

This year's conference and trade show returns to the Brisbane Convention and Exhibition Centre and follows a successful COVID-safe delivery of the event in 2021.

The theme for Hort Connections 2022 is *Growing Together*, which highlights the importance of unity within the horticulture industry, as well as supporting each other and building a stronger, more resilient food system to feed local and international consumers.

Hort Connections is also excited to announce several process improvements ahead of the 2022 event that have been implemented to enhance the attendee experience.

What's new for delegates?

Hort Connections website

This is your one-stop-shop for all things Hort Connections! The website has undergone a makeover, complete with interactive web pages and easier to access forms such as registration, exhibitor and award nomination. Scan the QR code below to check it out.

On-site improvements

The on-site registration process will become easier for delegates in 2022. The Hort Connections team has been collating feedback and working to improve check-in systems.

The on-site registration process is set to become easier for Hort Connections delegates.

There will also be a re-designed Trade Show floor plan to create more networking spaces and greater ease of access for all exhibitors. You will be able to search for exhibitors and speaker sessions more easily, with information desks situated within the Trade Show.

This year's Trade Show is sponsored by Australia's Fresh Produce Markets.

Key networking events return

Hort Connections 2022 will see the reintroduction of the much-anticipated Welcome Reception, which will take place on Monday 6 June at 4:30pm.

Also making a return this year is the Women in Horticulture event, and this will be joined by Diversity and Inclusion Sessions. These will take place on Tuesday 7 June. Keep an eye out for further announcements about these events once details are confirmed.

Delivering value for growers

The horticulture industry has endured many challenges over the past couple of years, and Hort Connections recognises the tough times faced by growers.

In light of this, growers have the opportunity to purchase an all-access pass for the special early bird rate of \$500, which includes entry to the National Awards for Excellence on Wednesday 8 June.

There will also be an exclusive grower networking event, to be held after the Trade Show Happy Hour on Tuesday 7 June. Further details will be made available to growers in the coming months.

Early bird – don't miss out!

Early bird registrations close Monday 21 March. If you're looking to showcase your business to the largest number of horticultural growers under one roof, exhibition booth early bird sales also close on 21 March.

The National Awards for Excellence will take place at the Hort Connections 2022 Gala Dinner on Wednesday 8 June.

The Trade Show is a popular place to connect and network during the three-day event.

Acknowledging horticulture's leaders

The National Awards for Excellence will be presented at the Hort Connections 2022 Gala Dinner on Wednesday 8 June. The Gala Dinner is the capstone event of the three-day convention, and it recognises the outstanding contributions and leadership of individuals and companies to Australian horticulture.

This year's Gala Dinner is sponsored by the Costa Group.

Award nominations are now open, and you can visit hortconnections.com.au/hort-awards for further details. Nominations close Friday 15 April.

Find out more

Please visit hortconnections.com.au. For further enquiries, email info@hortconnections.com.au or phone 03 9882 0277.



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We're pleased to
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confirmed speakers for
Hort Connections 2022



Jane Bunn
Meteorologist



Justin Dry
Chief Executive
Vinomofa



Tony Maher
CEO
National Farmers
Federation

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Professor Salah Sukkarieh.



Dr Len Tesoriero.



Denis Persley.



Dr Lucy Tran-Nguyen.

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“Bayer is proud of our long association with this prestigious award. Our partnership with AUSVEG is part of our ongoing commitment to collaborating with industry to strive together for efficiency and sustainability in farming.”

Bayer continues to work alongside growers, industry bodies and researchers to develop new solutions tailored to Australian farming.

“We look forward with anticipation to celebrating the announcement of the 2022 Bayer Researcher of the Year at this year’s Hort Connections event,” Mr De Monte said.

In this edition of *Vegetables Australia*, past winners Dr Lucy Tran-Nguyen, Denis Persley, Professor Salah Sukkarieh and Dr Len Tesoriero reflect on their research, and how it is making a difference to Australian horticulture.

Hort Connections 2022 will take place at the Brisbane Convention and Exhibition Centre from 6-8 June. The National Awards for Excellence is on 8 June. Please visit hortconnections.com.au for further details.



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Denis Persley

Queensland, 2011

Denis Persley is a plant pathologist with the Queensland Department of Agriculture and Fisheries (DAF). Based at the Ecosciences Precinct at Dutton Park in Brisbane, Denis' work is largely on the management of virus diseases in vegetables.

Denis has worked in plant pathology for the entirety of his career at DAF, which has spanned forty-plus years.

"My main work and interest has been in applied plant virology, and my first major work area was on virus diseases in grain crops and sweet corn," Denis says.

"Virus diseases of vegetable crops became a major focus around 2006, which led to project VG07128 – *Integrated Viral Disease Management in Vegetable Crops*. The project involved virologists from all states."

A strategic levy investment under the Hort Innovation Vegetable Fund, VG07128 ended in May 2011. However, since then the project team has maintained contact and collaborated across a broad range of plant pathology issues.

"This collaboration provides a broad perspective on what are the important issues across the country. It really helps with access to new techniques, trial results and national and international contact," Denis says.

Several of those team members – including Denis – are part of the current national project led by Dr Cherie Gambley, *Area wide management of vegetable diseases: viruses and bacteria* (VG16086). VG16086 is due to finish mid this year.

Additionally, Denis was an extension plant pathologist for several years. During this period, he produced two handbooks about diseases in fruit and vegetable crops in Australia.

"These were published by CSIRO in 2009 and 2011. It is great to see these books still in use by growers, students and agronomists," Denis says.

Reward for effort

Denis was recognised for his outstanding

contribution to the Australian vegetable industry when he received the Researcher of the Year award at the 2011 AUSVEG National Awards for Excellence.

Upon reflection, Denis says it was an honour for him and his project teams to be recognised for their work.

"I also appreciated the efforts of those who made the time to nominate me for the award," he adds.

Denis says his 40-plus years in the industry hasn't seemed that long.

"I've always enjoyed the work, particularly collaborating with colleagues in plant pathology and more broadly with the many great people in the vegetable and horticulture industries," he says.

"As a virologist, vegetable crops are really interesting because unfortunately, many vegetable crops can be severely affected by virus – so there is plenty of scope to study the viruses and the insects that often spread them."

Denis says researchers need to understand the virus, the means of spread and host interactions if they are to hopefully develop useful control methods.

"Many viruses and vectors affect more than vegetable crops, so there are good opportunities to work across industries to better understand the big picture," he says.

Recent research

Since receiving the Researcher of the Year award, Denis' focus has largely been on developing practical, sound management systems for virus diseases.

"I have always had an interest in using resistant varieties for disease control and have been part of projects doing this in capsicum, tomato, sweet corn and cucurbits," he says.

Over the past decade, Denis has worked with an international company on developing virus capsicum and tomato hybrids as well as an Australian seed company on assessing germplasm used to produce hybrids for national and





international markets.

He has also collaborated with several companies in assessing new zucchini varieties for resistance to the potyviruses Papaya ringspot and zucchini yellow mosaic viruses – and has been impressed with the levels of resistance that have been recorded.

Denis says all the projects that he has worked on have been interesting. “We have probably built on all the projects through recommendations for future work and doing at least some of this as opportunities and funding becomes available,” he explains.

“A project on carlavirus in beans

(*Characterisation of a carlavirus of French bean; VG15073*) in Queensland was completed recently, but there are aspects which need further work to unravel. The more you look, the more you find!

“Nature is seldom simple.”

Looking ahead to further research that may be needed for the vegetable industry, Denis says the nature of pathogens and insects mean that there will always be issues with effective control. For example, new strains and hosts and changes in production practices, will present challenges for growers.

“Unfortunately, we will still most likely see new problems arrive in Australia

like the fall armyworm,” he says.

Denis adds the COVID-19 pandemic and labour shortages have emphasised the urgency in developing mechanised harvesting, and the current cost and availability of fertilisers means that industry needs to be more efficient in their use.

Meanwhile, Denis’ current area of interest is disease resistance breeding and genetics. There is research underway that is looking more closely at the genetics and mechanisms of virus resistance in cucurbits, sweet corn and beans.



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Dr Len Tesoriero

New South Wales, 2010

Len Tesoriero's career as a researcher identifying and managing vegetable crop diseases spans over four decades.

Len retired from the New South Wales Department of Primary Industries (NSW DPI) in 2017, but is continuing to work as a consultant through his company, Crop Doc Consulting Ltd. He is actively working on various horticulture projects with key R&D providers – government and private sector – and is a Visiting Fellow with the NSW DPI. Len is also passing on his extensive knowledge and expertise to others through his mentorship of several early- and mid-career plant pathologists.

Len was recognised for his tireless dedication and significant contribution to the Australian horticulture industry at the 2010 National Horticulture Convention when he received the Researcher of the Year award, sponsored by Bayer CropScience.

Gaining knowledge

Len started his career in the early 1980s at a large research institute run by NSW Department of Agriculture in Western Sydney, the Biological and Chemical Research Institute. He was working as a technician for a vegetable crop pathologist.

"It held a wealth of human capital in plant pathology, entomology, and chemistry. It was a fantastic place to learn from a range of experts and I've always acknowledged the importance of mentoring," Len says.

During that time, Len was encouraged to undertake further studies to attain a Master of Science (MSc) and PhD. Although most of Len's research has been vegetable-related, his MSc was in on *Pythium* root rot of cereal crops. This same group of pathogens cause important losses in vegetables.

Industry collaboration

Since 2010, Len has been keeping busy working on several projects – with the NSW DPI before formally retiring, and

since as a contractor. His final project working with the NSW DPI was leading the project *Effective management of parsley summer root rot* (VG13101), a strategic levy investment under the Hort Innovation Vegetable Fund.

Since retiring, Len has worked on a number of vegetable levy investments with project partners.

He has assisted Applied Horticulture Research (AHR) and RM Consulting Group with *A multi-faceted approach to soilborne disease management* (VG15010) and *Soil wealth and integrated crop protection – phase 2* (VG16078); *Area wide management of vegetable diseases: viruses and bacteria*, with the Queensland Department of Agriculture and Fisheries and NSW DPI; *Improved management of pumpkin brown etch* (VG15064) and *Internal fruit rot of capsicum* (VG17012) with AHR; and a review of the causes of potato bacterial soft rots and blackleg that included relevance to other horticultural commodities.

The capsicum and area wide management projects are in the final stages of completion.

"Unfortunately, progress and extension activities in both have been affected by the current pandemic," Len says.

"But I'm also assisting on a disease project for the almond industry project with Agriculture Victoria and The South Australian Research and Development Institute, and and have been doing some work for pistachio growers."

Dedication to research

While he is coming to the end of his career, Len's still passionate about plant pathology.

"From the moment I first looked at plant pathogens down a microscope, I was fascinated by their diversity and intrinsic beauty – despite their destructive nature," Len says.

"I also really enjoy meeting growers and seeing how and where vegetables are grown across Australia."

When asked about those projects that

he's worked on and what can be built upon, Len points to soilborne disease management.

"The soilborne disease project is one where I think more work will add significant value, as we only had limited opportunities to demonstrate benefits of integrated disease management strategies," he says.

"I think there needs to be a focus on further studies for optimising soil health interventions, such as cover crops, rotations with the use of microbial biocontrols and conventional agrichemicals."

There will always be a need for more pest and disease management research as things are always changing, Len says.

"New pests and diseases are arriving to our shores, and they develop resistance to our agrichemicals; and our weather patterns are likely to change, which will affect how plants grow and their relationships with their microbial communities."

Len would like to see further emphasis on an integrated or holistic view of disease management – using those aforementioned interventions, but also including other factors that influence plant health such as plant nutrition.

"I like the farm demonstration approach used in the Soil Wealth project. I also have a strong interest in protected cropping – both from a strategic food security viewpoint and as a viable peri-urban land use which could integrate several aspects of a circular economy," he says.

The final word

Upon reflection, Len says it was a great honour to receive the 2010 Researcher of the Year award.

"I'm extremely grateful for the recognition, especially since there were several deserving nominees. I was humbled to have been given the award," Len says.

"I'm grateful to have had a career working with such a fabulous industry and people."



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JOHN DEERE

Meet Dr Lucy Tran-Nguyen: The Top End 'ologist'



Lucy Tran-Nguyen sharing molecular pathology knowledge with trainees and graduates from the Cambodian Agricultural Research and Development Institute and General Directorate of Agriculture in Cambodia as a part of the ACIAR mango project.

Dr Lucy Tran-Nguyen has been a horticultural researcher for almost 24 years, with resounding success. In 2016, Lucy was awarded the Bayer-sponsored 2016 Researcher of the Year award for her efforts in managing the 2014/15 *Cucumber green mottle mosaic virus* (CGMMV) outbreak. In this column, Lucy reflects on the award and her research, plus provides an update on her current activities and thoughts on research in the vegetable industry.

Lucy, you won the Researcher of the Year award at the Awards for Excellence in 2016. What are you up to now? What is your current role?

In January this year, I moved from the Top End to Canberra and joined Plant Health Australia (PHA) as the National Manager: Diagnostics. This follows just over three years in the Principal Plant Biosecurity role at the Northern Territory (NT) Government's Department of Industry, Tourism and Trade (the department).

In between winning the award and now, I have been involved with the national citrus canker eradication program following the detection of the exotic bacteria in April 2018. While at the department, my portfolio included biosecurity preparedness for our agency, but also our industries and identifying funding opportunities for early detection surveillance and diagnostics.

Can you please provide a short overview of your career as a researcher (to date)?

Since completing my PhD in phytoplasma genomics in 2007, I have focused my research career on diagnostics, continually to learn and broaden my knowledge into plant health, particularly

in pathology.

In the NT, we didn't get the opportunity to specialise in any particular area or industry as the team had so much to cover. So, I would call myself an 'ologist' pending on what was needed. I joined the department in 2007 to establish molecular diagnostics in the plant labs. From there, it was a steep learning curve in mycology and a suite of different plant pests that impacted our NT industries (mangoes, vegetables, melons etc).

I was involved in many exotic plant pest incursions while in the NT; most notably, mango malformation, banana freckle, *Cucumber green mottle mosaic virus* (CGMMV), fusarium wilt of watermelon, mango fruit borer, citrus canker – to name a few. Research areas include varietal testing, management options for Panama wilt, CGMMV, fusarium wilt of watermelon, fusarium wilt of snakebean to citrus canker research. All the time, my passion for molecular diagnostics – and finding different ways to do things – remains.

Not only did I love spending time in research, but I was also interested in building capacity and capability in plant health. In my previous role as the Principal Molecular Scientist, I had the opportunity to work overseas to develop diagnostic protocols and work on exotic plant pests to get ready for when they arrived in Australia.

Being involved in Australian Centre International Agriculture Research allowed me the opportunity to work and train colleagues in Cambodia and get out in the field more (a strange thing for a molecular scientist).

Back in the NT, capacity building meant building my team around early career scientists who had a chance to gain a footing in research, work in remote areas, and learn to adapt quickly under a small team with so many opportunities. I was provided a similar opportunity fresh out of university, so I wanted to give something back.

I have been involved in several

research programs that have been funded by Hort Innovation to support the vegetable, melon and banana industries (VG07125, VM12001, VG15013, VG16086, BA10020, BA14013, BA14014 and BA16001) and Rural Research for Profit project to boost diagnostics.

I find it rewarding when my PhD students complete their candidature and graduate. I gave up the researcher hat to go into the space of policy, preparedness and research grant writing to allow me the space to grow in the strategy head space. I wanted to take my on-the-ground learnings and try to help industries in other ways.

But I still retain my science interest by co-supervising two PhD students who are working on phytoplasmas and CGMMV in the VG16086 project.

As mentioned, you received the Researcher of the Year award at the National Horticulture Convention in 2016. What did winning the award mean to you at the time?

2016 was tough. Leading up to winning this prestigious award, I was working on both banana freckle and then *Cucumber green mottle mosaic virus*. This also included securing funding for the VG15013 CGMMV management project.

Personally, it was a tough year to manage work/life balance as my late father got his initial diagnosis, so I was also his carer. I was surprised and deeply humbled to be recognised and nominated for this award; as to me, I was doing what I love and gave it my all.

How long have you worked in the vegetable/horticulture field?

I have been working in the horticulture industry since 1998 (wow!) and specifically vegetables since 2007.

What type/s of vegetable industry research have you conducted since 2016?



Images courtesy of the Northern Territory Government's Department of Industry, Tourism and Trade.

While at the Northern Territory Government's Department of Industry, Tourism and Trade as Principal Plant Biosecurity Officer, Lucy Tran-Nguyen shared plant biosecurity information with the local community.



From 2016-2019, I was the project lead for VG15013 that looked at management options for *Cucumber green mottle mosaic virus*.

This was on the back the initial detection of CGMMV in the NT and Australia in 2014. In this national project, I led a team of awesome researchers in the NT, Queensland, Victoria, New South Wales and Western Australia to identify the true host range of CGMMV including weed species along with the role of honeybees in epidemiology and studies on CGMMV longevity in soil.

In addition, as CGMMV became widespread in the NT and WA, we needed to ramp up our extension activities (with AUSVEG and NT Farmers Association) and work with our cucurbit growers (melons, vegetables, Asian vegetables) to help them to increase their on-farm biosecurity, improve understanding of the virus and helping them continue their business while living with CGMMV.

After the successful completion of project VG15013, the NT team also secured another project (VM18008) to look at CGMMV and honey bees, which was a strategic levy investment under the Melon Fund.

What research are you conducting at the moment (if any)?

Nowadays I don't get to actually do any research. As I mentioned, my research involvement is through my two PhD students in the VG16086 and VM18008 projects.

However, while in the NT, I did write many research grants and project proposals to get funding for the plant biosecurity team in diagnostics, early detection and surveillance, industry preparedness and biosecurity training.

We recently finished a project on development of artificial scent lure for citrus canker and have a great collaboration with Charles Darwin University and the local Darwin-based company, Top End Conservation Dogs,

which has a couple of dogs trained to detect the citrus canker scent. We are looking to continue the momentum in the volatile technology space.

What did you find most challenging about working in vegetable industry research in the Top End?

I felt it was the diversity of the vegetable industry in the Top End – the crop varieties, the number of pests and the demographics of the small vegetable grower groups.

We spent a large time working and making connections with our vegetable growers, where English is their second language and – due to their backgrounds – have a natural distrust towards government. So, our work with NT Farmers included extension and building relationships. Transferring and extending research outcomes to growers could at times be challenging.

What do you enjoy most about being involved in vegetable research?

I love how resilient the vegetable industry is. It gets exposed to so many different pests and diseases, which expresses a unique suite of symptoms. Aside from the diagnostics, I enjoy and understanding the epidemiology of the disease: how it got there, how it spreads, what options and help does the grower need to prevent spread and reduce the economic impact.

Is there any particular vegetable or horticulture research project that stands out to you as one that was successful/interesting, or that can be built upon?

I have been involved in so many different vegetable and/or horticulture research projects that it is hard to identify one in particular. But I find projects that support the research to investigate new varieties and test against pest resistance, as well as capacity building to maintain Australia's level of expertise in the fields and

management options, all provide critical outcomes for industry.

Where do you think more vegetable research needs to be undertaken (e.g. pest and disease)?

I am keen to see more applied research such as the use beneficial microbes to reduce pathogen inoculum in the soil, what can be done to break the life cycle of resting spores, stable virus particles etc. How can it be maintained long term? What are the applications such as hyperspectral imagery technology for example – that can be used to screen large vegetable cropping areas to increase surveillance sensitivity?

There is some really cool research being conducted overseas on vertical vegetable growing structures, innovative ways to irrigate, monitor and screen for disease symptomology. I'd like to see some of that here in Australia.

Do you have any future plans in research – is there a particular subject or area you'd like to pursue?

Grower-led surveillance and crop monitoring, diversification of products, artificial intelligence and/or machine learning. Regarding the latter, would it be useful for the vegetable or horticulture or is it just a fad.

I am keen to understand and hear more from the growers what do they want or need from researchers? This should help guide the research and channel the funds accordingly as if industry is interested from the start, there is buy-in at the end to adopt the research findings.

Find out more

To get in touch with Dr Lucy Tran-Nguyen, please email LTran-Nguyen@phau.com.au.

Readers who have any questions or would like further details about the below levy funded projects, please email Northern Territory Government's Department of Industry, Tourism and Trade's media department at media.ditt@nt.gov.au.



A distinguished career in research

Below is a list of Hort Innovation strategic levy investments that Dr Lucy Tran-Nguyen has been involved in.

These encompass the vegetable, melon and banana industries.

VG07125 – Best Practice IPM strategies for control of major soilborne diseases of vegetable crops

This research was directed towards the development of IPM based strategies for the management of key soilborne diseases (caused by the pathogens *Sclerotinia*, *Pythium*, *Fusarium* and *Rhizoctonia* spp.) in vegetable crops.

VM12001 – Characterisation and management of Fusarium wilt of watermelon

Fusarium wilt is one of the most severe diseases of watermelon and is caused by the soil-borne fungus *Fusarium oxysporum* f. sp. *niveum* (Fon).

This project identified the Fon race(s) found in the NT compared with other Australian and international (USA) Fon isolates; screened rootstocks and grafted watermelon seedlings for resistance to Fon; and raised awareness of Fusarium wilt and propose management options to industry through extension strategies.

VG15013 – Improved management options for Cucumber green mottle mosaic virus

This project investigated how the *Cucumber green mottle mosaic virus* (CGMMV) is spread in cucurbit production as well as alternative hosts for the virus and farm biosecurity protections that growers can implement.

VG16086 – Area wide management of vegetable diseases: viruses and bacteria

Beginning in 2018, this investment is responsible for developing an 'area wide management' (AWM) strategy to address high-priority viral and bacterial diseases affecting vegetable crops.

VM18008 – Understanding and managing the role of honey bees in CGMMV epidemiology

Beginning in July 2019, this project is exploring how honey bees are able to introduce *Cucumber green mottle mosaic virus* (CGMMV) into melon crops, and is developing management practices to combat this for both the melon and apiary industries.

BA10020 – Banana plant protection program

This project was focused on understanding the fungus that causes Fusarium wilt Tropical Race 4 (TR4) and whether it was possible for the fungus to be transmitted through the tissue culture process. In addition, a large component in the NT was to conduct variety field trials to identify resistant varieties. This project was paused due to the outbreak of Banana Freckle in the NT and banana plants including those in the trials had to be eradicated.

BA14013 – Fusarium wilt Tropical Race 4 – biosecurity and sustainable solutions

This project had a focus on biosecurity strategies around the Fusarium wilt Tropical Race 4 (TR4) fungus – one of the most destructive diseases of banana. The work delivered new science, information and practices to help in avoiding, containing, and managing TR4.

BA14014 – Fusarium wilt Tropical Race 4 research program

This investment built a strong foundation for the Australian banana industry to manage Fusarium wilt with minimal impact on production, by addressing three key areas: prevention, resilience and resistance.

BA16001 – Improved plant protection for the banana industry

BA16001 focuses on access to and evaluation of banana varieties with improved pest and disease traits; access to clean planting material that has been pathogen tested; enhancing the diagnostic capacity for endemic and exotic threats; and improving integrated pest and disease management.



Lucy Tran-Nguyen is the National Manager: Diagnostics at Plant Health Australia.

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Salah demonstrates how low-cost robotics and smartphones with AI can benefit farmers in developing countries.

Professor Salah Sukkarieh

2014

Salah Sukkarieh is a Professor of Robotics and Intelligent Systems at the University of Sydney. In 2014, Salah was awarded the Researcher of the Year award for his work on intelligent farm robots, in particular the ‘Ladybird’ – a lightweight solar-electric robot that uses intelligent perception to guide its activities.

Fast-forward to 2022, and Salah is still very much active in the field of ag robotics. He has added elements of extension into novel robotic tools for crop production processes, and artificial intelligence (AI) techniques for crop intelligence.

Since winning the award nearly eight years ago, Salah has led several industry-funded R&D projects looking at the applications of these technologies in mining (Rio Tinto), Flight Planning (Qantas), drones for environment monitoring (various government grants) and robotics for Agriculture (Hort Innovation, Meat & Livestock Australia and Grains Research and Development Corporation).

“Currently we have a number of high technology readiness level robotic demonstrators in agriculture looking at intelligent sampling, spraying and animal tracking. The latest R&D is focusing on how real time crop intel can benefit real time decision making of the robot in the field,” Salah explains.

Award reflection

When Salah was recognised for his achievements, the ag robotics discussion was just beginning for the Australian vegetable industry.

“There was uncertainty over whether the technology could work and – if it could – to what level,” Salah says.

“There were some commercial and research elements locally and overseas, but they were still focusing on the automation of a tractor-like platform.”

Salah’s award followed the conclusion of the first Hort Innovation-funded investment on a dedicated robotics platform for the vegetable industry, entitled *An intelligent farm robot for the vegetable industry* (VG12104). This is when the Ladybird robot was born.

“This was the first dedicated robotics and AI platform that focused on making a system that could in real time detect and act on individual plants,” Salah says.

“The award was recognition of the how the industry and research came together to deal with a very difficult technical challenge, as well as recognition that the tide was turning in our understanding and desire of automation on-farm.”

Further research

Since 2014, Salah’s research has focused on five areas that need to be seen collectively to bring together a coherent and optimised solution. These include:

- The platform including the energy and drive system – this has focused



One of the ag robots built in Salah's lab pictured being used in Fiji to conduct automatic detection of individual weeds and spot spraying. Images courtesy of Professor Salah Sukkarieh, the University of Sydney.

on the research and development of the structure of the platform for low energy motion on vegetable rows, as well as the battery and motor system combination.

- Autonomy and safety – optimal motion planning for the robot to reduce energy consumption, and safety sensors for collision detection and avoidance.
- The sensors, data analytics, and machine learning – types of sensors to use for detection of different plant features, and the AI algorithms that use this information to determine plant properties such as size, height, yield, pest and diseases.
- The intelligent tools – development and testing of new tools for precision mechanical weeding, spraying and harvesting.
- Automated Decision Support – a relatively new area that is coupling ag science with machine learning to give the robot the capability of undertaking real time agronomy actions.

While the first four areas of still an active part of the research, Salah says the decision support element is now taking on more interest.

“This is where we start to add greater intelligence into the robot to act on the information it is seeing,” he says.

“As an example – if we knew that by the fifth week of production in a particular location on farm, the average crop yield should be a certain number.

“The robot is detecting the yield of



The Ladybird robot was the first fully autonomous robotic solution developed for the Australian vegetable industry.

each plant in real time, and we're investigating if the robot can make a decision (e.g. spray, remove, alert) on each plant to ensure uniformity in yield or maximising yield."

Working in the robotics space has its challenges.

"Ag robotics is the nexus of AI, robotics, biophysical systems, field operations, and business requirements. The complexity requires social, economic and environmental solutions to come together in a unified manner," Salah says.

However, Salah enjoys working with the vegetable sector – particularly alongside the growers.

"They are great, down-to-earth people who are highly experienced systems thinkers. And they want this technology to work."

Looking ahead

Over the past eight years, Salah and his research team have been fortunate to receive a series of projects built upon each other to allow an idea to go to complete field prototype.

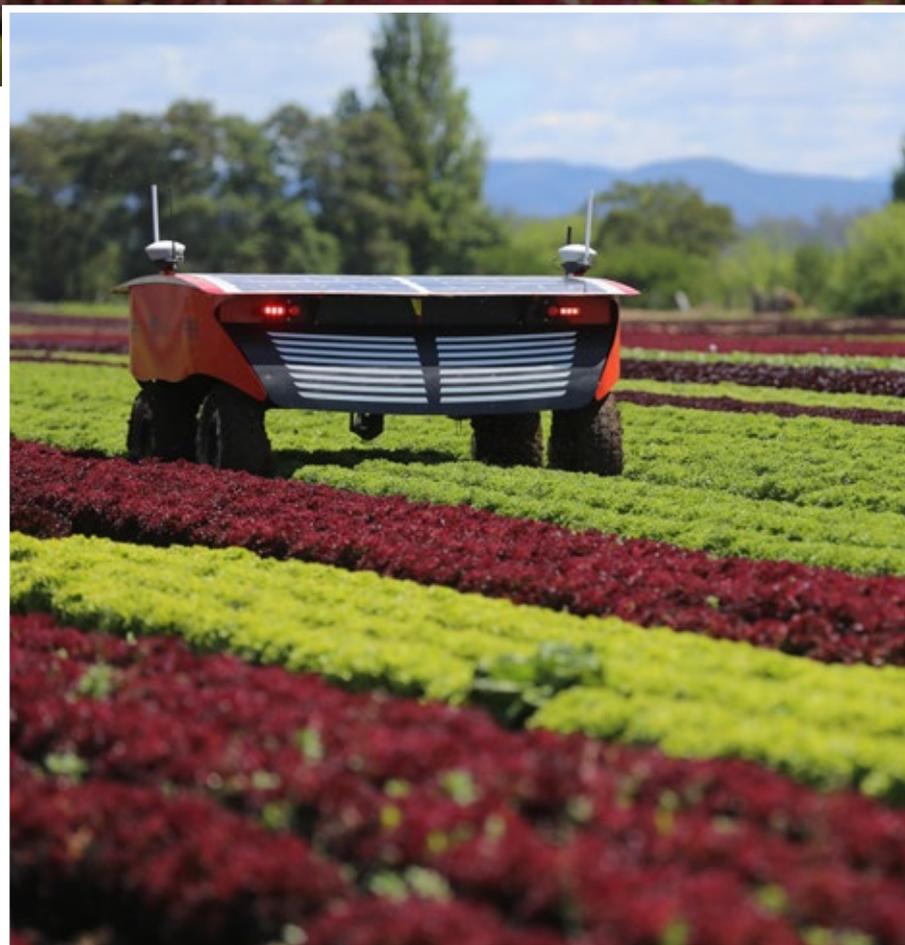
Along the way, there were a couple of projects – undertaken by Salah and his team and other researchers – that looked at novel sensing techniques to measure diseases in the field in real time.

"I believe this type of research, as well as the extension to measure quality in real time, would be an important area to keep focusing on," Salah says.

"As the Automated Decision Support tools get better, we will be able to close the loop on the whole research area and get to a point where the research will focus on robots making timely decisions about when and how to operate."



The RIPPA robot was a field operational platform that used the learnings from the Ladybird robot, and was demonstrated on vegetable farms across Australia.



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The ASA-LIFT T-300DFH in action.



The Landpower Vegetable Centre head office team.

Investing in innovation to meet Australian growers' harvest needs

Australian vegetable growers are set to reap the rewards of the acquisition of ASA-LIFT by GRIMME, which has resulted in the brand expanding its harvesting machinery options to across more than 30 vegetable crops.

Vegetable harvesting technology in Australia has been given a boost, with the Landpower Vegetable Centre adopting the latest innovations to meet current demand.

The centre has fully integrated ASA-LIFT into its range of vegetable harvesters available to Australian customers. This follows the completion of GRIMME's acquisition of the company.

The acquisition consolidates GRIMME's position as the world's leading manufacturer of cultivation, planting, harvesting and handling equipment used in the potato, beet and vegetable industries.

ASA-LIFT was established outside Copenhagen in 1936 to serve the needs of Danish vegetable growers. Expanding into international markets in the 1960s, it quickly became recognised as a market leader.

Takeover success

GRIMME originally acquired a 70 per cent share of the company in 2013 and purchased the balance in 2020. It has invested heavily in new product development and production facilities over the past seven years.

This has allowed ASA-LIFT to significantly expand its operations, which now offers more than 150 machines across 30 different crops, including beans, beet, cabbage, carrots, celery, chives, fennel, onions, parsnip, potatoes, leeks and lettuce.

"ASA-LIFT has always enjoyed a

reputation for innovation, quality, performance and after-sales service," Landpower Vegetable Centre Product Manager, Haydon Martin, says.

"The integration with GRIMME over the past eight years has opened up significant improvements in terms of electronic and manufacturing technologies. Each design draws on the considerable experience gathered from throughout the world."

Landpower Vegetable Centre first displayed its ASA-LIFT equipment at Hort Connections 2021 in Brisbane, and has since received significant interest in the range.

"The addition of this range furthers our expertise in vegetable production and means we can now offer a complete range of cultivation, planting, harvesting and handling technology across all of the major vegetable crops grown in Australia," Haydon says.

"We already offer ASA-LIFT in New Zealand so we will be able to access knowledge, experience and technical expertise from our business there to ensure our Australian customers get the best possible start with their machinery.

"We are also planning to widen our portfolio of products available in Australia to ensure we can provide complete solutions for as many vegetable growers as possible across the country."

An international brand

GRIMME also owns SPUDNIK, a US potato harvesting machinery manufacturer, and two OEM manufacturers – INTERNORM,

which produces polyurethane products, and RICON, which produces webs and conveying technology.

Founded in Damme, Germany in 1861, the family-owned company employs more than 2,700 people worldwide, has a physical presence in 12 countries and operates in more than 120 countries.

Haydon paid tribute to Vin Rowe Farm Machinery in Warragul, which has represented the ASA-LIFT brand in Australia for the past 40 years.

"Landpower has represented GRIMME in Australia and New Zealand for the same length of time, and we respect the level of commitment that Vin Rowe has made to grow the brand over the years," he says.

Landpower Vegetable Centre will have ASA-LIFT on show again at Hort Connections 2022, which is being held at the Brisbane Convention Centre from 6-8 June.

Find out more

Please contact Landpower Vegetable Centre Product Manager Haydon Martin on 0447 184 250.

About Landpower

Landpower is the largest privately-owned farm machinery distributor in Australasia. It represents some of the world's leading farm machinery brands, including CLAAS, AMAZONE, GRIMME, JCB (New Zealand) and Vaderstad (Australia).



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Robin Tait is a Soil First Tasmania committee member. Robin is coordinating the technical, on-the-ground activities that are taking place during the soil amendment trials.

Putting soil first in Tassie potato crops

Soil First Tasmania is a farmer-led organisation that focuses on the sustainability and regeneration of soil and water resources. It supports a community of farmers across Tasmania who want to conduct on-farm trials to find out how they can keep their soils in good conditions and reduce inputs such as fertilisers and pesticides. Importantly, the group provides a platform to share what they have learned on their own farm discuss new ideas and develop networks. Michelle De'Lisle reports on the group's latest activities that involve soil amendment trials in potato crops. Potatoes, which can damage soil structure, are grown in rotation with other crops, especially vegetables – so it is vital to look after soils during the potato crops.

The grower group

Former Soil First Tasmania President and current committee member, Dave Roberts-Thompson is a flower bulb and bulb crop grower. Dave established Soil First Tasmania in 2016 with potato grower Darren Long, flower grower Jeremy Robinson and Serve-Ag Technical Agronomist/Project Lead Julie Finnigan.

Soil First Tasmania has been running on-farm trials in potato crops during the 2021/22 season. Trials are focused on organic soil amendments and biological products and how yield and quality as well as soil health are affected.

"At the moment, potatoes are one of the major crops in northern Tasmania for farmers. They're one of the few crops where people can earn a significant amount of money and are partly keeping a lot of farmers in the area going – they're a critical income stream for a lot of cropping farmers, even beef and dairy farmers in the area," Dave says.

"Because potatoes are such an important crop to farmers, we saw that they were reluctant to pull back on inputs for growing, especially on fertiliser. At the same time, there is an increase of soil-borne disease affecting yields of potatoes in the north of the state, and we suspect that poor soil health is being partly driven by overapplication of some fertilisers."

Dave said many farmers are putting on too much high acidic and high salt index fertilisers, which could be leading to root burning and lowered potential yield.

"It would have been ideal to do a full-blown study on this, but we had to keep within the scope of this organisation. So, we chose to look at some alternative fertilisers or organic-based fertilisers to add to the regular fertiliser program to help reduce that acidity and salt load, as well as improve soil health," Dave explains.

"There are some good studies in our area that show improved soil health leads directly to improved yield. Anything that's reducing your soil health is theoretically reducing your yield in the paddock."

Another Soil First committee member, Robin Tait is coordinating the technical, on-the-ground activities with growers.

Robin has an agronomy background, having worked for 10 years as a production agronomist (growing pyrethrum) at Botanical Resources Australia. She completed a Nuffield Scholarship in 2018, and produced a report entitled *High value cropping: Maximising soil health to minimise synthetic inputs*.

Robin hopes that these potato trials can culminate in recommendations for further research and sees them as a positive step for potato growers in the regenerative ag space.

"What growers get from the trials is that involvement from Soil First and further discussion with all of us who are involved in it," Robin says.

"We'll be running 'Farmer Fridays' at some of the paddocks, which gives them the opportunity to have broader



Photography by Prime Perspectives.

discussions as there will be different people on their farm, and they can share their experiences. The growers are quite proud of their trials.”

The trials are being partly funded by Landcare Tasmania and the Tasmanian Landcare Fund.

The trials

There are six potato growers in Tasmania’s north participating in the organic origin fertiliser trials. They are using composted chicken manure variations including Neutrog pellets, as well as humate-based products.

“We’re using granular humate products to try and complex some of the fertiliser nutrients so that they would release over a longer period. The theory is, that we can reduce the input of mineral fertilisers by up to a third by adding humates. People have been suggesting this for a long time, but we have to test it,” Dave says.

The team has been flexible with growers and allowing them to trial differing types and levels of amendments.

“If their risk appetite was high, we were happy to support them doing some more extreme cutbacks on fertilisers and higher rates of organic amendments,” Dave says.

“Whereas we have growers whose risk appetite is lower, and they were keen to just substitute out a small percentage of their fertiliser for something else.”

At the time of writing, the Soil First team – assisted by three agronomists – have

taken some stem counts.

“Next we’re taking sap tests on all sites – two sap tests across all the treatments on each site, which should give us the initial data,” Dave says.

The sap from petiole samples will be analysed by a local commercial lab with high precision instrumentation, and that has data in desirable ranges for each nutrient.

“So, we might be able to look back at a treatment where we put down composted chicken manure pellets or something like that, and say, ‘That one didn’t yield quite as well as the conventional treatment but if you look back on sap analysis, you can see it was short or had an excess of a mineral in the plant that might have been detrimental to the yield.’”

The next stage will be yield assessment, with measurements being undertaken in April. Results should follow in June.

The grower

Michael Heyes is a potato grower in Ringarooma, located in Tasmania’s north-east. He farms alongside his brother Richard and father Peter. He is a member of the Soil First group.

The Heyes family’s operation contract harvests around 15,000 tonnes of potatoes as well as growing cereals – including wheat and barley – and lupins. The farm also manages 200 Angus breeders.

Michael is passionate about soil health

and the regenerative farming concept. He also believes that the heavy use of fertilisers and crop protection products creates quality issues, and these can be linked to disease incidence in potatoes.

Michael’s currently hosting three trial plots using straw pallets and fertiliser, chicken manure pellets and a vermicast biological in-furrow liquid. He became involved with Soil First Tasmania because the group’s research aligns with his on-farm activities.

“We’ve been into cover crops for almost 10 years. We’ve put on compost and pig manure. I’ve tried combination crops and I’ve been using fish kelp and humates for five or six years now,” Michael explains.

“We don’t use any fungicides or insecticides on the farm, and we try to limit our herbicide usage. We do multi-species cover cropping. So, that’s what we’ve been involved in – regenerative farming before it was called regenerative farming.”

Soil and animal health has improved for Michael through his on-farm trials, but an increase in potato yield remains to be seen.

“I grew a trial plot with no fertiliser last year and noticed that the quality improved. The size was better, but my paddock yield dropped off (but there was less waste) – which is to be expected,” he says.

“But if I can work on different aspects and introduce biology and trace elements, and do a bit of sap analysis, then maybe





Michael Heyes is a potato grower in Tasmania's north-east. Michael is passionate about soil health, and is part of the Soil First Tasmania grower group.



the yield can pick up.

"That's the great thing about these trials – we're using chicken manure, straw pellets, natural fertilisers and carbon sources that might show to improve yield."

Michael identified another potential long-term benefit for growers.

"This Soil First trial looking at reducing fertiliser usage and that just happens to tie-in with a huge increase in input costs. There's some handy information that could come out of it."

There's a lot of enthusiasm within the Soil First Tasmania group, and it connects like-minded growers who are learning from one another in a field where, Michael says, knowledge is limited.

"Soil First is a group of people that is great to bounce ideas off. You can learn from those who have a tried a lot of different things."

VegNET collaboration

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable Fund. The VegNET – Tasmania project team has provided technical information as requested by Soil First Tasmania, as well as supported some of the administration, grant application and other events over the last few years. It also assisted with a strategic planning session.

"The relationship came about during Theresa Chapman's time as VegNET – Tasmania Regional Development Officer (RDO). Theresa shares a passion for soil science with the group, which has been the driver for her involvement," current VegNET – Tasmania RDO Ossie Lang explains.

"The group is focused on preserving and rebuilding the fantastic soils we have in Tasmania. With most of the growers in the group including vegetables in their rotation – and their guiding principle of applying research at a paddock scale – it was a natural fit for VegNET to support Soil First where it was welcome."

Other grower groups similar to Soil First can get involved in VegNET, which is a nationally-coordinated, regionally-delivered project.

"Growers can benefit from active involvement in VegNET through the national network that is at the core of the project," Ossie says.

"While each region has its own priority areas, the strength of VegNET is in the shared network of RDOs and the contacts they have with regional and national research projects. This ensures that growers can tap into best practice from around the country and find out how to best use it in their production systems. They can also contact their RDO with specific questions and ideas.

"Based right around the country, the RDOs are really keen to work with grower groups and support them as they work towards their goals."

Find out more

For further information about Soil First Tasmania activities, please contact Dave Roberts-Thompson on 0467 771 977 or email dave@vdbulbs.com.au.

You can follow Soil First Tasmania on Facebook: [@soilfirsttasmania](https://www.facebook.com/soilfirsttasmania) and Twitter: [@soilfirsttas](https://twitter.com/soilfirsttas).

Robin Tait's Nuffield report can be found at nuffield.com.au/robin-tait-2018.

To get involved in VegNET – Tasmania activities or find out more about the project, please contact Ossie Lang on 0430 380 414 or email ossiel@rmcg.com.au.



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Minor use permits

Permit Number	Crop	Pesticide Group	Active	Pest/Plant disease/ Target weed	Date Issued	Expiry Date	Permit Holder	States
PER83797 Version 2	Parsley	Fungicide	Metalaxyl-M	Pythium root rot (<i>Pythium</i> spp.), Phytophthora root rot (<i>Phytophthora</i> spp.)	20-Mar-17	31-Mar-25	Hort Innovation	All states and territories, except VIC
PER13444 Version 3	Radishes	Fungicide	Propiconazole	Cercospora leaf spot (<i>Cercospora</i> spp.)	01-Apr-12	31-Dec-26	Hort Innovation	All states and territories, except VIC
PER13114 Version 4	Celeriac	Herbicide	Prometryn	Weeds as per the approved label for carrots and celery	29-Mar-12	31-Mar-27	Hort Innovation	All states and territories, except VIC
PER83203 Version 3	Celery; head and leafy lettuce (field only)	Insecticide	Fipronil	Western flower thrips, onion thrips	16-Mar-17	31-Dec-24	Hort Innovation	All states and territories, except VIC
*PER13446 Version 3	Taro	Insecticide	Chlorpyrifos	African black beetle	11-Apr-12	31-Mar-24	Hort Innovation	All states and territories, except VIC
PER14353 Version 4	Peppers including capsicum, chillies and paprika and celeriac (field cropping only)	Fungicide	Iprodione	Sclerotinia rot	01-Jul-14	31-Mar-27	Hort Innovation	All states and territories, except VIC
PER91492	Green beans	Herbicide	Clethodim	Annual grasses as per registered product label	13-Jan-22	31-Jan-25	Hort Innovation	All states and territories, except VIC
PER14470 Version 3	Snow peas	Fungicide	Dimethomorph and Mancozeb	Downy mildew	01-May-14	28-Feb-27	Hort Innovation	All states and territories, except VIC

* Continued issuance of this permit is subject to the outcomes of the current APVMA review of chlorpyrifos. This permit may be impacted by the outcomes of this review.

Please be advised that the below permits will be surrendered as the uses are now covered by registered labels.

Permit Number	Active	Crop/s	Comment
PER87852	Afidopyropen (Versys Insecticide)	Capsicum, cucumber and eggplant (protected cropping)	Uses in protected cropping now covered by the BASF label registration in April 2021. <i>Generation of residue, efficacy and crop safety data for pesticide applications in horticulture crops 2017 (ST16006)</i> project outcome
PER14142 Version 5	loxynil	Spring onions, shallot, Welsh onions	Permit to Label Project - Registered - Reylon loxynil 250 Herbicide Label 89847/130341 - Genfarm loxynil 250 Herbicide Label 88335/130342 - Barmac Totril 31729/130269
PER89645	Linuron	Shallots and spring onions	APVMA permit to label Registered - Imtrade Linuron 800WG
PER13367 Version 4	Linuron	Leeks and celeriac	APVMA permit to label Registered - Imtrade Linuron 800WG
PER13496 Version 2	Linuron	Celery	APVMA permit to label Registered - Imtrade Linuron 800WG
PER12357 Version 4	Linuron	Parsnips	APVMA permit to label Registered - Imtrade Linuron 800WG
PER11991 Version 4	Quinoxifen (Legend)	Silverbeet	APVMA permit to label Registered on Legend Fungicide label
PER13088 Version 2	Spinetoram (Success Neo)	Specific root vegetables, alliums (not onions) and celeriac	Permit uses covered by registration
PER86443	Pirimicarb	Sweetpotato, spring onions	Permit to label – Use registered Pirimore WG label

Addressing wide-ranging pest issues in vegetable crops

Growers have many choices when it comes to protecting their crops from destructive pests. In this article, *Vegetables Australia* explores a couple of insecticide options on the market that not only help to control pests but extend crop protection, and work in combination with Integrated Pest Management techniques.



High-quality vegetables are produced with the use of Coragen® and Benevia® insecticides.

Two insecticides from agricultural sciences company FMC provide growers with ideal choices to address pest issues at different stages of the season.

Coragen® and Benevia® are part of the Group 28 insecticide family, and are particularly effective against target pests while being soft on key beneficial insects used in Integrated Pest Management (IPM) programs.

FMC Strategic Product Manager, Leandro Posteraro, said the former was targeted at a range of chewing pests including caterpillars, leaf miners and loopers.

“Benevia® also has activity on a range of chewing pests and the added benefit of sucking pests such as aphids, silverleaf whitefly, and rasping pests like thrips,” he said.

“The key to both products are to scout the fields and to determine what pests are becoming a problem at that particular time of the season.

“As an example, if populations of aphids, whitefly and thrips are of concern then an application of Benevia® would control those insects, and also reduce the background numbers of chewing pests.

“If, at the time aphids and thrips are not of concern, then Coragen® – with

its targeted control of a wide range of chewing pests – is the better option.”

Key benefits

Mr Posteraro said both insecticides have attributes to help growers achieve their goal of producing good quantities of high-quality fruit or vegetables.

“The mode of action means pests will stop feeding rapidly once exposed to the chemistry, which provides almost immediate crop protection,” he said.

“Both have translaminar and local translocation activity, which helps the insecticides reach hidden feeding sites to control the pests in these places.”

The pair also have an impact on a wide range of pest life stages to target various pests at different stages of their development.

“Coragen® will control chewing pests from the egg through to the larvae stage,” Mr Posteraro said.

“Benevia® has similar activity against the chewing pests and in the case of silverleaf whitefly control starts from the eggs, through the nymph phase and adult insects. Nymphs and adults of aphids and thrips are also controlled.”

Mr Posteraro added that the robust

performance of Benevia® on a wide range of pests meant it was ideal to use early in the season.

“It has the ability to control a cross spectrum of pests early to stop damage and extend crop protection across a range of crop types,” he said.

“Growers also find back-to-back applications work particularly well for robust control of the pest spectrum.”

Advice for growers

Mr Posteraro said as both products are part of the Group 28 family, care should be taken to not overuse the insecticides during the season.

“Benevia® should only be used twice across the entire crop, so it is important to place it where it will provide the most value to the growers. Coragen® can be used three times across a crop, with no more than two consecutive applications,” he explained.

Importantly, the total exposure period to Group 28 insecticides from seedling through to harvest should not exceed 50 per cent of the crop cycle.

“Use a window approach, rotate with alternative modes of action and incorporate IPM techniques to help with insecticide resistance management,” Mr Posteraro advised.

“These products are too important to the Australian horticultural industry to lose to resistance.”

Products including Avatar® eVo from FMC – among others – are available on a wide range of crop types as an effective rotation tool with the Group 28 options.

“Use Coragen® and Benevia® as cornerstone products in any insecticide management program because of their robust performance, IPM-friendly position and agronomic attributes to assist growers in achieving better crops,” Mr Posteraro said.

Find out more

Please contact your local FMC representative or visit fmc.crop.com.au.



Figure 1. *Ascophyllum nodosum*.

Seaweed application: An essential piece in the Integrated Pest and Disease Management puzzle

In this article, Victorian agronomist Reyhaneh Pordel explains the differences between seaweed species and how the right seaweed solution can play a major role in Integrated Pest and Disease Management programs for vegetable production.

Optimising plant health can greatly affect the success of vegetable production. Improving overall vegetable health, enhancing root growth, inducing vigorous top growth & up-regulating plant defence pathways maximise natural plant resistance to pest and disease pressure plus post-harvest stresses.

An important method to achieve high quality and resilient vegetables is the application of biostimulants; one is seaweed. The benefits of seaweed (marine macroalgae) as a source of organic matter, nutrients and amino

acids have been known to agriculture for centuries. For example, foliar and root drenching applications of seaweed extracts have been found to significantly reduce soil-borne diseases in carrot, cucumber and tomato. This effect is credited to the components of the algal extract – most notably laminarin, betaines, osmoprotectants, cytokinins, sterols, amino acids & phenols that work synergistically to stimulate plant defence responses.

Unlike chemical products, extracts derived from seaweeds are

biodegradable, non-toxic, non-polluting and non-hazardous to humans and animals. This is one reason why seaweed extracts have gained popularity in recent years in organic and sustainable agriculture.

Brown, red and green algae characteristics

Macroalgae broadly classified into three main groups based on their pigmentation: Phaeophyta, Rhodophyta, and Chlorophyta; or the brown, red, and green algae, respectively.

Brown algae (examples are *Ascophyllum nodosum* in Stimplex and *Durvillaea potatorum* in Seasol) are common in cold water along continental coasts. It is a major source of iodine, potash and an important source of mannitol. They are the type most commonly used in agriculture and among them, *Ascophyllum nodosum* (L.) is the most researched one (see Figure 1).

Red algae (example is *Kappaphycus alvarezii* in Aquasap) are mainly live in tropical marine locations; they are high in sorbitol, vitamins, calcium, magnesium, and antioxidants (see Figure 2).

Figure 2. Red algae (*Kappaphycus alvarezii*).





Mung bean rooting bioassays: Acadian extract induces a rooting response like auxin.



Figure 3. Green algae (*spirogyra*).

Green algae (genus *Spirogyra*) are mainly live in freshwater. Fructose, sucrose, and glucose are found at high concentrations in green algae (see Figure 3).

Seaweed Mode of Action

Among different algae species, the brown alga, *Ascophyllum nodosum* (L.) has attracted lots of attention and is sustainably harvested along the North Atlantic coastline. *A. nodosum* is exposed to extreme weather conditions from -25°C/-13F in winter to +40°C/+104F in summer. The *A. nodosum* has adapted to life in the intertidal zone by evolving its biochemical compounds include laminaran, fucan, alginate, betaines, sterols, amino acids, and phytohormones, such as abscisic acid, cytokinins, auxins and unidentified compounds with hormone-like activities to overcome stresses.

Currently, nearly 47 companies are engaged in producing commercial *A. nodosum* extracts (hereafter designated ANEs) for agricultural applications. The biostimulant activity on a wide variety of plants including vegetables has been attributed to the following roles of beneficial bioactive compounds in this alga.

Organic acids – Uronic acid and many other organic acids serve as a source of energy production as well as precursors for many organic compounds including hormones.

Alginate Acid – Mineral chelator that aids in nutrient availability and as a food source for microbes.

Amino acids – They contribute to plant metabolism and promote microbial activity in the rhizosphere. These compounds alleviate osmotic

stress induced by salinity and drought stresses.

Mannitol – Chelator which helps with cell water retention and nutrient mobility. Mannitol also acts as a powerful quencher of reactive oxygen species (ROS).

Oligosaccharides – Elicitors of plant defense mechanisms that promote plant health and strengthening.

Fucose-containing polysaccharides (FCPs) – These compounds form antioxidant and stress protection capability of plants. They are involved in the biosynthesis of several cell wall polymers (e.g. pectin, xyloglucan).

Macronutrients – Nutrients essential to the growth of healthy plants.

Micronutrients – Present as organically chelated forms, which makes them more available to plants.

An increase in auxin and cytokinin signalling in ANE-treated plants is reported in many vegetables. ANE-treated Mung bean rooting bioassay shows that ANE induces a rooting response similar to Auxin phytohormone application (see Figure 4). Biologically active auxin-like compounds such as amino acids and indole conjugates of Indole Acetic Acids were reported in the extracts of *A. nodosum*. These auxin-like compounds elicit plant growth by enhancing root tip and plant elongation through cell wall growth.

The ANE treatment suppress the expression of genes involved in cytokinin degradation which result in better nutrient use efficiency, callus formation, leaf & shoot growth and delayed senescence in plants. Increased levels of cytokinin and mobilisation of nutrients in vegetative and

reproductive sections of plants have been reported to be influenced by seaweed extracts. Such responses indicate that seaweed extracts are involved in enhancing the mobilisation of cytokinins from the roots to shoots and improving the amount of endogenous cytokinins.

However, there is a wide variation in auxin and cytokinin content in seaweed extracts from 6.6 to 50 mg/g of dry matter; this is likely to be a function of the method of extraction and processing, as well as the geographical location of the raw material harvested.

Playing a major role in Integrated Disease Management

Plants can shield themselves from a wide array of pathogenic attacks by regulating various inducible defence reactions. These reactions involve the action of signalling molecules, which arise from pathogenic stimuli or plant exposure to an external physical or chemical stress factor.

Treatment of plants with seaweed extracts containing elicitor molecules can potentiate various inducible defence reactions. ANE foliar spray was able to significantly reduce *Xanthomonas campestris* and *Alternaria solani* fungal diseases severity levels for both pathogens in tomato and capsicum. The combinatory treatment of seaweed extract and a minimum dose of contact fungicide in field trials recorded the overall lowest disease levels (60 per cent reduction) and highest yield (57 per cent increase) in these vegetables. ANE stimulates plant growth and plant defence responses, and the contact fungicide works as a direct antimicrobial agent, which tends to persist on the leaves of



Ascophyllum nodosum extract (ANE) improves the growth of several crops by different modes of action.

the plant, preventing severe infections and secondary spread of the diseases. The induction of plant defence enzyme activities and elevation of total phenols, as well as upregulation of defence marker genes, was sustainably high in tomato and capsicum plants treated with ANEs.

Further benefits

The effects of moderate stresses are mitigated by the seaweed extract, which lead to improve plant responses and performance in the field. Application of seaweed extracts during the vegetative stage in tomato plants showed an increase in fresh fruit weight and fruit quality. This is attributed to the likelihood

of the seaweed extracts promoting nutrient uptake, which leads to improved growth and vigour.

Generally, the direct benefits of seaweed applications on plants are increased germination rate, enhanced root growth, extra shoot biomass, improved nutrient use efficiency, delayed senescence, increased chlorophyll, improved tolerance to abiotic (drought, salinity and freezing) and biotic (nematodes, fungi, viruses, bacteria and insects) stresses, superior fruit yield and enhanced postharvest quality.

The bottom line

The use of seaweed extract in vegetable production presents a valuable and

significant cost-saving practice compared to the chemical inputs. The important point is choosing the right seaweed extract that has a blend of beneficial molecules to deliver the benefits that discussed here to vegetable crops. The organic nature of the extract makes it very appealing to vegetable consumers towards its inclusion in producing quality vegetables as part of healthy diet; and for vegetable growers, for inclusion in a sustainable farming system.

Find out more 

Please email Reyhaneh Pordel at reyhaneh.pordel@gmail.com.

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Vegetable industry statistics now available

The Australian Horticulture Statistics Handbook (Hort Stats Handbook) is the leading resource for Australian horticulture statistics and market information. It is an analysis that combines all available data on production, international trade, processing volumes and fresh market distribution to produce statistics on more than 70 horticultural categories. The latest edition of the Handbook was released in February 2022, unpacking the sector's performance during 2020/21.

The latest Hort Stats Handbook has officially been launched, offering the most comprehensive and contemporary data available on all sectors of the Australian horticulture industry in one easy-to-read guide.

The Handbook, developed by FreshLogic and funded by Hort Innovation, features more than 470 pages of information drawn from several supply chain sources, including international trade statistics and industry peak bodies. It includes data on more than 70 horticultural products including fruit, nuts, vegetables, nursery, turf and cut flowers.

Top 3 highlights (Horticulture)

- Despite the ongoing impacts of COVID-19, production volume and value remained relatively stable in 2020/2021.
- Fresh export value decreased by 14 per cent and fresh export volume decreased by eight per cent, which can be linked to the impacts of COVID-19 and global trade disruptions from key markets for some commodities.
- Fresh supply into the retail and food service sectors accounts for around 59 per cent of farm-gate volume.

Highlights for 2020/21

Horticulture

Year ending June	2021	2020	▲ %
Production (t)	6,629,506	6,532,853	+ 1%
Production (\$m)	\$15,236.6	\$15,156.1	+ <1%
Fresh Export (t)	761,538	825,475	- 8%
Fresh Export (\$m)	\$2,368.3	\$2,749.0	- 14%
Fresh Supply (t)	4,050,975	4,047,771	+ <1%
Fresh Supply Wholesale Value (\$m)	\$15,633.2	\$15,524.6	+ <1%
Supply per capita (kg)	157.32	156.89	+ <1%

Vegetables

Year ending June	2021	2020	▲ %
Production (t)	3,831,301	3,722,469	+ 3%
Production (\$m)	\$4,913.5	\$4,919.5	- <1%
Fresh Export (t)	215,374	210,824	+ 2%
Fresh Export (\$m)	\$264.0	\$275.9	- 4%
Fresh Supply (t)	2,255,724	2,252,840	+ <1%
Fresh Supply Wholesale Value (\$m)	\$5,207	\$5,292.6	- 2%
Supply per capita (kg)	87.6	87.32	+ <1%
Retail Supply (t)	1,835,415	1,855,000	- 1%
Retail Supply Wholesale Value (\$m)	\$4,140.4	\$4,285.4	- 3%
Food Service Supply (t)	420,309	397,840	+ 6%
Food Service Supply Wholesale Value (\$m)	\$1,066.8	\$1,007.3	+ 6%

Carrots

Year ending June	2021	2020	▲ %
Production (t)	335,527	330,145	+ 2%
Production (\$m)	\$256.0	\$222.1	+ 15%
Fresh Export (t)	108,356	103,868	+ 4%
Fresh Export (\$m)	\$97.0	\$91.1	+ 6%
Fresh Supply (t)	206,545	205,982	+ <1%
Fresh Supply Wholesale Value (\$m)	\$202.3	\$168.7	+ 20%
Supply per capita (kg)	8.02	7.98	+ <1%

Broccoli/baby broccoli

Year ending June	2021	2020	▲ %
Production (t)	80,264	76,631	+ 5%
Production (\$m)	\$258.9	\$288.0	- 10%
Fresh Export (t)	3,619	5,169	- 30%
Fresh Export (\$m)	\$15.3	\$19.7	- 22%
Fresh Supply (t)	72,673	67,748	+ 7%
Fresh Supply Wholesale Value (\$m)	\$288.2	\$317.9	- 9%
Supply per capita (kg)	2.82	2.63	+ 7%

Onions

Year ending June	2021	2020	▲ %
Production (t)	271,930	265,162	+ 3%
Production (\$m)	\$203.2	\$243.9	- 17%
Fresh Export (t)	44,885	36,480	+ 23%
Fresh Export (\$m)	\$30.4	\$30.2	+ <1%
Fresh Supply (t)	206,538	211,975	- 3%
Fresh Supply Wholesale Value (\$m)	\$209.6	\$261.9	- 20%
Supply per capita (kg)	8.02	8.22	- 2%

Top 3 highlights (Vegetables)

- Vegetable production increased in volume (three per cent) but reduced slightly in value (less than one per cent).
- Vegetable value and volume into the food service sector increased by six per cent with a slight reduction in value and volume supplied into the retail sector. This can be linked to a correction from the first year of the pandemic, where there was a reduction in value and volume into the food service sector and an increase in value and volume of vegetables in the retail sector.
- Fresh vegetable exports were a strong performer in horticulture exports – increasing in volume and only slightly reducing in value – while horticulture exports were significantly impacted by COVID-19 and global trade conditions.

Case studies

Top 3 highlights (Carrots)

- Carrots were a strong performer in

2020/21, with production volume increasing by two per cent and value increasing by 15 per cent. This is a different story compared to other vegetable crops where the volume produced increased, but the overall farm-gate value decreased.

- Carrot exports continued to grow, with over 100k tonnes exported in 2020/21 at a value close to \$100 million.
- The supply of carrots into the retail and food service sectors remained relatively stable, but the value of this produce increased significantly (approximately 20 per cent).

Top 3 highlights (Broccoli/baby broccoli)

- Broccoli and baby broccoli production increased by five per cent in volume, but decreased by 10 per cent in value.
- Broccoli and baby broccoli exports experienced a significant decrease in 2020/21, though was starting at a lower base than more mature vegetable exporting crops.
- Supply of broccoli and baby broccoli

per capita increased, which reflects the increase in supply to the retail and food service sector.

Top 3 highlights (Onions)

- Onion production increased slightly in 2020/21 by three per cent, but farm-gate value decreased by 17 per cent.
- Onion exports increased in volume by 23 per cent, but the value of total onion exports remained relatively steady.
- Onion supply into the retail and food service sectors reduced in volume and value in 2020/21.

Find out more

To access Hort Innovation's Australian Horticulture Statistics Handbook, please visit horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/HA18002/

The Handbook's interactive dashboard is suitable for viewing on desktop computers and mobile phones.

Australian Horticulture Statistics Handbook 2018-19 to 2020-21 is a whole-of-horticulture project that has been funded by Hort Innovation using industry levies and contributions from the Australian Government.

Project Number: HA18002

**Hort
Innovation**



Lisa Brassington graduated from the Masterclass in Horticultural Business in 2017.

Gaining a formal skillset in the horticulture industry

The Masterclass in Horticultural Business is offered through the Tasmanian Institute of Agriculture and was developed in partnership with some of the world's leading names in horticulture. It is a flexible course, with online delivery and three face-to-face workshops scheduled throughout the course duration. In this column we meet 2017 graduate Lisa Brassington, who outlines how the course has benefited her career and how it continues to shape her thinking today.

It has been five years since Lisa Brassington graduated as part of the first intake of students to complete the inaugural Masterclass in Horticultural Business in 2017.

Lisa is a specialist in sustainable food systems. She is a passionate advocate for the agri-food sector, horticulture, agriculture, and agribusiness – particularly at a localised level – and was drawn to the Masterclass for the opportunity to build on and formalise her existing skills.

"Each week since graduating, I have used some element of learning and solution focused thinking from the course," Lisa says.

"As the curriculum was designed by Hort Innovation in partnership with the three universities, plus horticultural industry leaders, it was a great intersection and learning balance between vocation, education and application of horticultural agribusiness."

Lisa works part of her week in local government and her role focuses on growing a healthy, delicious, sustainable, and fair local food system as well as a vibrant and flourishing local food community.

"That is my day job's mantra – to collectively make community-wide change for all," Lisa says.

"In the local government food system's role, we have a single agenda that I work towards on behalf and alongside my

local community.

"My role has a focus on a paddock-to-plate community food system that is aligned to a food strategy action plan for better health and nutritional wellbeing of all residents."

Course reflection

Lisa said the Masterclass's wide range of subjects – including supply-chain management, life cycling, agriculture and farm business accounting and economics – were insightful and useful.

"The knowledge enables me to interpret relevant industry data in a localised manner to tailor my horticulture and agriculture conversations with the people and community I consult with, or the agri-food services I provide in my day job," Lisa says.

"Because my background knowledge was formalised, the course has given me the courage to set up a consultancy as well as undertake specialised professional development and provide client services."

Lisa recognises that the Masterclass' mix of remote and in-person learning – designed to provide flexibility to participants who may be juggling full-time work – was inadvertently ahead of its time.

"That was innovative, because this was pre-pandemic collaborative working and learning," Lisa says.

Masterclass in Horticultural Business

The Masterclass in Horticultural Business equips current and future farm managers, owners and food system leaders, with the agribusiness skills and capabilities required to run successful and sustainable food production businesses.

The course has helped professionals from across the country turn their business ideas into actionable business plans, so that they are ready to overcome challenges and reach their full potential. Readers can find out more by visiting the University of Tasmania website.

There were many highlights of the course, but Lisa points to forums where business leaders presented to the group as being a stand-out.

"They were excellent. We got to work in pairs or small groups, and each business leader would come in with a challenge or an opportunity to apply that thinking we had at that time," she says.

"Not only did we benefit from the guest speakers and the site visits, the people we visited or who spoke to us also received our insights into the challenges that they brought to us."

For her final assessment, Lisa presented a business case scenario that drew on an amalgamation and accumulation of all her learning in all the units through the course.

"It felt like you were giving back to the horticulture industry as a way of saying thank you for supporting my learning," Lisa says.

Find out more R&D

For further information and details on how to apply, please visit utas.edu.au/tia/study/masterclass-in-horticultural-business.

Masterclass in Horticultural Business is funded by the Hort Frontiers Leadership Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from the University of Tasmania and contributions from the Australian Government.

Project Number: LP15001





Freshcare CEO Jane Siebum

Certification program supporting billion-dollar plan

Australia's largest locally owned and operated certifier Freshcare has backed the Federal Government's national agricultural goal of \$100 billion output by 2030. It has released a plan that provides guidance and reassurance for those in the industries, and that will highlight opportunities for producers to build resilience and security.

Freshcare's 2030 Vision outlines the organisation's roadmap to deliver a sustainable future for Australian fresh food producers through continuing innovation and development of a robust and trusted certification system.

Freshcare CEO Jane Siebum says the 2030 Vision will provide a sustainable future for growers, industry and deliver pathways for growers who are not currently certified.

"Freshcare's strategic plan is about engaged communities, providing science and technologies that underpin our standards, expanding our growers access to local and global markets," Ms Siebum said.

"We have an abundance of great products in Australia and excellent produce that should be exported. Freshcare certification shows exporters that our growers meet the same level of rigour – if not better – than other markets."

A booming sector

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) currently forecasts that – for the first time in history – the Australian

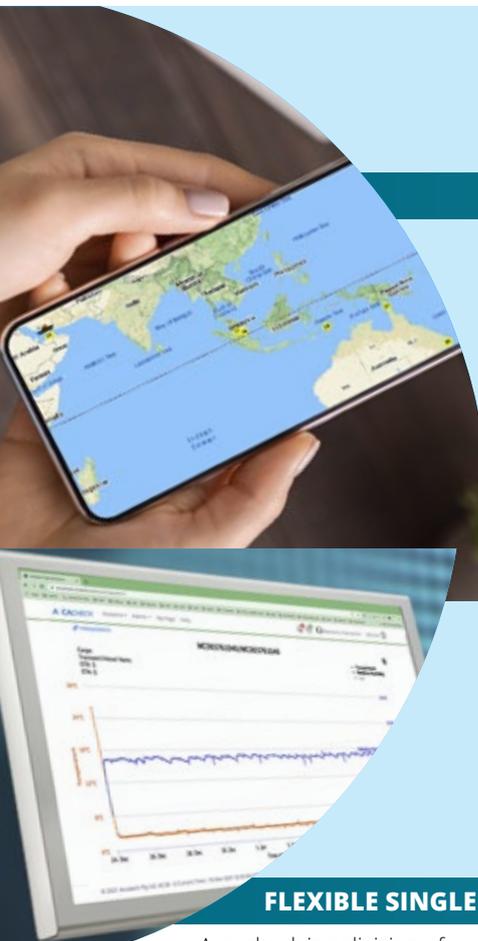
agricultural sector will be valued at more than \$70 billion, with the value of horticultural production forecast to reach a record \$12.4 billion in 2021-22. There are excellent prospects for growth.

As Australia's only industry-developed and designed for purpose organisation, Freshcare currently certifies approximately 80 per cent of Australian fresh produce supplied through domestic markets. It is investing to ensure its assurance standards for the Australian fresh produce and wine grape industries continue to underpin growth in these sectors.

Structured around three strategic pillars, the goal is to build security for the industry and producers by providing greater access to local and global markets. The pillars – 'engaged communities', 'leading science and technology' and 'sustainable future' – provide a framework for implementation and delivery.

Find out more

To view the Freshcare 2030 Vision, please visit freshcare.com.au/about/2030vision. Further details can be found at freshcare.com.au or phone 1300 853 508 to get in touch.



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ASEAN and the Middle East remain primary Australian fresh vegetable export destinations throughout 2021

With cumulating pressure from rising farm input costs, labour shortages, operational constraints, international shipping backlogs and expensive freight costs, Australian vegetable grower-exporters continue to ship fresh vegetables to international markets. AUSVEG International Trade Specialist Andrea Lin reports.

Australian vegetable export performance overview – 2021

Total vegetable exports have seen a modest decline compared to the same period in 2020. Based on data from the Global Trade Atlas, there was a 4.5 per cent decrease in export value, from \$263 million to \$251 million and total export volume grew by 2.6 per cent from 216,678 tonnes to 222,350 tonnes. The top four markets for fresh vegetable exports were Singapore, the United Arab Emirates (UAE), Malaysia and Hong Kong.

There was strong growth recorded for the ASEAN region, South Korea, New Zealand, and Taiwan in 2021 (refer to Table 1).

Singapore continued to be the top Australian fresh vegetable export market, although it recorded a slight decline in both export value and volume in 2021. The export value dropped by 5.3 per cent from January to December 2021, from \$51 million to \$48 million; export volume also decreased by 4.3 per cent from 28,786 tonnes to 27,550 tonnes. The UAE fresh vegetable export market fell by five per cent in value and three per cent

in volume. Malaysia recorded a 5.7 per cent rise in export value and 1.9 per cent increase in tonnage.

Vegetable export by crop – 2021

Root vegetables such as carrots, potatoes and onions remained the top three export crops for the Australian vegetable industry (refer to Table 2). Perishable vegetable export crops that are heavily reliant on air freight – notably asparagus – saw a substantial drop in trade for the 2021 season.

Table 1

Vegetable exports by destination January to December 2020-2021 (Source: Global Trade Atlas 2022).

Trade Partner	2020		2021		% ▲ 20-21	
	AUD\$	Tonnes	AUD\$	Tonnes	AUD\$	Tonnes
Singapore	\$ 51,370,318	28,786	\$ 48,644,740	27,550	-5.3%	-4.3%
United Arab Emirates	\$ 33,982,716	35,933	\$ 32,277,727	34,864	-5.0%	-3.0%
Malaysia	\$ 27,687,335	24,588	\$ 29,236,991	29,248	5.6%	19.0%
Hong Kong	\$ 19,712,174	9,898	\$ 19,010,765	8,468	-3.6%	-14.4%
Saudi Arabia	\$ 19,281,547	20,986	\$ 16,598,089	18,799	-13.9%	-10.4%
Thailand	\$ 10,638,373	10,954	\$ 14,948,269	19,118	40.5%	74.5%
South Korea	\$ 9,999,191	13,484	\$ 12,294,061	16,973	23.0%	25.9%
New Zealand	\$ 7,869,299	1,750	\$ 11,739,549	2,731	49.2%	56.1%
Taiwan	\$ 8,715,979	8,998	\$ 9,198,513	10,758	5.5%	19.6%
Qatar	\$ 12,254,458	12,179	\$ 8,794,875	9,065	-28.2%	-25.6%

Table 2

Change in vegetable exports by crop January to August 2019-2021 (Source: Global Trade Atlas 2021).

Crops	2020		2021		% ▲ 20-21	
	AUD\$	Tonnes	AUD\$	Tonnes	AUD\$	Tonnes
Carrots	\$99,338,050	109,874	\$91,743,823	103,570	-7.6%	-5.7%
Potatoes	\$38,706,365	43,831	\$40,407,804	47,794	4.4%	9.0%
Onions	\$31,561,141	40,064	\$33,493,584	49,583	6.1%	23.8%
Cauliflower & broccoli	\$18,079,331	4,514	\$15,211,198	3,177	-15.9%	-29.6%
Asparagus	\$19,595,858	1,876	\$10,000,193	1,186	-49.0%	-36.8%
Lettuce	\$9,834,964	1,510	\$8,742,872	1,262	-11.1%	-16.4%
Celery	\$8,606,522	5,017	\$8,575,447	4,733	-0.4%	-5.7%
Beans	\$6,315,319	1,325	\$7,562,510	1,511	19.7%	14.0%
Tomatoes	\$2,852,168	517	\$5,135,555	1,024	80.1%	98.1%
Pumpkins	\$5,792,764	3,298	\$4,473,775	3,079	-22.8%	-6.6%
Spinach	\$2,583,688	246	\$3,073,583	339	19.0%	37.8%
Brussels sprouts	\$1,463,259	217	\$2,226,321	366	52.1%	68.7%

Table 3

Carrot exports by destination from January to December 2020-2021 (Source: Global Trade Atlas 2022).

Trade Partner	2020		2021		% ▲ 20-21	
	AUD\$	Tonnes	AUD\$	Tonnes	AUD\$	Tonnes
United Arab Emirates	\$ 26,798,174	30,671	\$ 26,356,499	30,452	-1.6%	-0.7%
Saudi Arabia	\$ 18,871,171	20,534	\$ 16,331,031	18,530	-13.5%	-9.8%
Malaysia	\$ 13,357,854	14,749	\$ 14,644,383	17,062	9.6%	15.7%
Singapore	\$ 12,606,668	13,504	\$ 11,810,559	12,900	-6.3%	-4.5%
Qatar	\$ 7,847,036	9,032	\$ 7,001,282	8,139	-10.8%	-9.9%
Hong Kong	\$ 4,233,749	4,324	\$ 3,418,233	3,627	-19.3%	-16.1%
Kuwait	\$ 4,182,939	4,853	\$ 2,986,878	3,409	-28.6%	-29.8%
Thailand	\$ 2,495,314	2,731	\$ 2,057,700	2,222	-17.5%	-18.6%
Bahrain	\$ 1,847,251	2,278	\$ 1,653,435	1,963	-10.5%	-13.8%
Japan	\$ 1,954,605	1,637	\$ 1,340,366	1,166	-31.4%	-28.8%

Table 4

Potato exports by destination from January to December 2020-2021 (Source: Global Trade Atlas 2022).

Trade Partner	2020		2021		% ▲ 20-21	
	AUD\$	Tonnes	AUD\$	Tonnes	AUD\$	Tonnes
South Korea	\$ 7,748,869	13,061	\$ 9,642,314	16,512	24.4%	26.4%
Philippines	\$ 4,376,350	7,369	\$ 5,075,084	8,605	16.0%	16.8%
Singapore	\$ 4,217,821	2,588	\$ 4,036,974	2,699	-4.3%	4.3%
Malaysia	\$ 4,043,648	3,566	\$ 3,848,645	3,460	-4.8%	-3.0%
Hong Kong	\$ 3,668,814	2,903	\$ 3,436,432	2,087	-6.3%	-28.1%
Indonesia	\$ 4,155,054	5,760	\$ 3,184,134	4,173	-23.4%	-27.6%
Thailand	\$ 1,298,424	1,092	\$ 3,183,885	3,470	145.2%	217.8%
Taiwan	\$ 2,189,478	1,956	\$ 2,441,496	2,219	11.5%	13.4%
United Arab Emirates	\$ 2,205,568	1,639	\$ 2,120,886	1,717	-3.8%	4.8%
Mauritius	\$ 576,156	466	\$ 903,518	677	56.8%	45.3%

Carrots

Carrot export value saw a 7.6 per cent decline from \$93 million to \$92 million and a 5.7 per cent reduction in export volume, with 6,304 tonnes less shipped in 2021. There was an overall decline in exports to international carrot markets apart from Malaysia, which recorded a 9.6 per cent increase in imports of Australian carrots in value from \$13 million to \$14.6 million, and 15.7 per cent growth in export volume, contributing an additional 3,000 tonnes to its carrot imports (refer to Table 3).

Potatoes

Potato export value increased by 4.4 per cent, adding \$1.7 million to Australia's overall potato exports, along with a nine per cent increase in volume by 3,900 tonnes. These were largely driven

by potato exports to Thailand which recorded an increase of 145 per cent in export value from \$1.3 million to \$3 million and more than double in export volume from 1,092 tonnes to 3,470 tonnes.

The Philippines was another strong export destination for Australian potato exports, recording a continued increase in export value and volume over the last three years, with an increase of 16 per cent in export value from \$4.3 million to \$5 million in 2021 (refer to Table 4).

Onions

Onions export value has improved by 6 per cent from \$31.5 million to \$33.5 million and recorded a 23 per cent increase in volume from 40,064 tonnes to 49,583 tonnes. Thailand, Taiwan and Malaysia were the top three trade partners for Australian onion exports. Thailand has

recorded a significant increase in export value by 94.8 per cent, from \$4 million to nearly \$8 million; export volume has grown by 98.9 per cent from 6,613 tonnes to 13,154 tonnes.

Malaysia has taken over Belgium as the third largest onion export destination in 2021, recording a 38 per cent increase in export value from \$2.2 million to \$3.1 million and an 82 per cent increase in volume from 3,188 tonnes to 5,802 tonnes (refer to Table 5).

Beans

Bean exports continue to be strong, recording a 20 per cent increase in value from \$6.3 million to \$7.5 million in 2021. New Zealand remained the top bean export destination with a 27.5 per cent increase in export value from \$5.9 million to \$7.5 million (refer to Table 6).



Table 5*Onion exports by destination from January to December 2020-2021 (Source: Global Trade Atlas 2022).*

Trade Partner	2020		2021		% ▲ 20-21	
	AUD\$	Tonnes	AUD\$	Tonnes	AUD\$	Tonnes
Thailand	\$ 4,098,347	6,613	\$ 7,981,653	13,154	94.8%	98.9%
Taiwan	\$ 4,086,324	5,853	\$ 4,715,962	7,884	15.4%	34.7%
Malaysia	\$ 2,262,336	3,188	\$ 3,118,953	5,802	37.9%	82.0%
Singapore	\$ 2,464,473	2,075	\$ 2,387,141	2,631	-3.1%	26.8%
Netherlands	\$ 2,689,339	3,224	\$ 1,948,755	2,955	-27.5%	-8.3%
United Arab Emirates	\$ 2,632,036	3,023	\$ 1,789,294	2,157	-32.0%	-28.6%
France	\$ 1,954,351	2,345	\$ 1,606,273	2,245	-17.8%	-4.3%
Belgium	\$ 2,352,855	3,274	\$ 1,468,777	2,267	-37.6%	-30.8%
Indonesia	\$ 488,838	690	\$ 1,433,400	2,019	193.2%	192.6%
Spain	\$ 906,342	994	\$ 1,109,189	1,477	22.4%	48.6%

Table 6*Bean exports by destination from January to December 2020-2021 (Source: Global Trade Atlas 2022).*

Trade Partner	2020		2021		% ▲ 20-21	
	AUD\$	Tonnes	AUD\$	Tonnes	AUD\$	Tonnes
New Zealand	\$ 5,864,788	1,261	\$ 7,476,247	1,497	27.5%	18.7%
Hong Kong	\$ 32,926	6	\$ 25,556	4	-22.4%	-33.3%
Thailand	\$ 20,543	2	\$ 12,180	1	-40.7%	-50.0%
Switzerland	\$ 9,000	1	\$ 10,250	3	13.9%	200.0%
United Kingdom	\$ 173,925	24	\$ 9,000	1	-94.8%	-95.8%
Canada	\$ 195,894	29	\$ 9,000	1	-95.4%	-96.6%
Singapore	\$ 3,970	0	\$ 8,736	1	120.1%	N/A
Papua New Guinea	\$ 10,353	2	\$ 6,565	1	-36.6%	-50.0%
New Caledonia			\$ 2,050	1	N/A	N/A
Malaysia	\$ 1,427	0	\$ 1,051	0	-26.3%	N/A

Export outlook for 2022

The impact and disruptions from COVID-19 on global supply chains and logistics are likely to remain as significant challenges for exporters in Australia and around the world well into 2022. While export demand is reasonably buoyant, and customer enquiries for fresh produce orders continue, indications from airlines and shipping lines is that freight capacity and disruptions are likely to be a feature of the business environment for most of this year. It is unlikely there will be much pricing relief to access air and sea freight out of Australia.

Despite the difficult trading conditions,

Australian vegetable grower-exporters have demonstrated strong resilience throughout the pandemic to continue to service export markets and customers, and the efforts of these businesses to supply high quality Australian vegetables to international consumers should be applauded.

AUSVEG is hopeful that 2022 will see opportunities for exporters to travel back into international markets to reconnect with customers and begin rebuilding relationships face-to-face, to begin the process of regaining market share and identifying new export opportunities.

Find out more

Growers interested in participating in export events or discussing export opportunities can contact the AUSVEG Export Development team on 03 9882 0277 or email export@ausveg.com.au.



Brock Sutton (right) with his father Rick from Sutton Farms in Gatton, Queensland.

Driving innovation and sustainability in Australian fruit and veg production

Launched almost seven years ago, the Coles Nurture Fund has assisted fruit and vegetable growers from right around Australia to bring their innovative ideas to life. The 10th round of funding recently closed, but there will be ongoing opportunities for vegetable growers to apply for grants that will ultimately help drive industry sustainability and growth.

Fruit and vegetable growers across Australia have shared more than \$8.4 million from the Coles Nurture Fund since 2015 to help their businesses to innovate and grow.

Coles launched the \$50 million Nurture Fund in April 2015 to provide grants to small- and medium-sized businesses, which are working to drive innovation, produce more Australian food and beverages, and improve sustainability and growth.

Since then, Coles has awarded over \$28 million in financial support to more than 80 small- and medium-sized businesses.

From Australia's first quinoa processing facility to fence posts made from recycled plastic, and a state-of-the-art factory to grow grass indoors, the Coles Nurture Fund is helping Australian producers bring their big ideas to life.

Coles Group CEO Steven Cain said the Coles Nurture Fund was set up to support new, innovative practices, processes and technologies.

"At Coles, we want to win together with Australian producers to be the most sustainable supermarket in Australia. By helping to fund initiatives that increase recycling, reduce water use, increase local production and enhance the environment, we aim to drive generational sustainability in Australia," Mr Cain said.

Among the projects funded by the

Coles Nurture Fund over the past seven years, more than 30 are Australian fruit and vegetable growers.

Grant recipients

West of Townsville in Queensland, Black River Produce used a \$300,000 grant to plant locally grown asparagus and help to reduce imports of the vegetable into Australia.

By growing 10 hectares of asparagus and installing equipment to process the produce on-farm, the family business will be able to produce asparagus when it is normally out of season in Australia.

"This grant will enable us to realise the potential of growing asparagus in the tropics out of season to the Australian current production period and in direct competition to imported product," Black River Produce Managing Director Jon Caleo said.

Based in Gatton, Queensland, Sutton Farms is another vegetable growing operation to benefit from financial support from the Coles Nurture Fund.

The business has used a \$400,000 grant to increase water and fertiliser efficiency by introducing grow bag technology and a new irrigation system for its cherry tomatoes.

In an innovative approach for cherry tomato production, the project aims

to combine the technology benefits of protected cropping while maintaining the efficiency of field production.

As well as increasing water and fertiliser efficiency, Sutton Farms hopes to increase productivity, reduce risk and be able to expand into new products.

Small and medium-sized businesses can apply for a grant of up to \$500,000 to help them develop new market-leading products, technologies and processes. Please keep visiting the Coles website for information about the next round of funding and cut-off dates.

Find out more

Please visit coles.com.au/nurturefund or email nurturefund@coles.com.au.



Anthony Caleo from Black River Produce.

VegNET 3.0: Introducing your VegNET Regional Development Officers

VegNET 3.0 is a strategic levy investment under the Hort Innovation Fund. It strives to improve Australian vegetable growers' knowledge and skills to implement best practice management on-farm through a variety of delivery mechanisms.

This investment acts as a knowledge broker to link growers with the best science and tools to meet their individual business development goals, as well as

linking the rest of industry with growers to help focus R&D efforts.

At the forefront of the project are highly skilled and trained extension experts, known as Regional Development Officers (RDOs). Their focus is on delivering results for growers, while forming a key link in providing information and feedback into the levy investment system to ensure that R&D priorities are delivering on key

industry issues.

In this edition of *Vegetables Australia*, RDOs Michael Bartholomew (Western Australia), Bonnie Dawson (Gippsland), Sylvia Jelinek (New South Wales) and Ossie Lang (Tasmania) introduce themselves to readers and outline their priorities for the third iteration of the nationally-coordinated, regionally-delivered VegNET project.

Get in touch

VegNET RDOs are located in all Australian major vegetable growing regions. For further details or to become involved, please contact your local representative.

Region	RDO (name and organisation)	Contact
New South Wales	Sylvia Jelinek, Local Land Services New South Wales	sylvia.jelinek@lls.nsw.gov.au 0427 086 724
Northern Territory	Amélie Corriveau, NT Farmers	ido@ntfarmers.org.au 0410 067 422
Queensland – North and Far North	David Shorten, Bowen Gumlu Growers Association	rdo@bowengumlugrowers.com.au 0419 429 808
Queensland – Wide Bay-Burnett	Andrew Halpin, Bundaberg Fruit and Vegetable Growers	vegnet@bfbvg.com.au 0407 366 797
Queensland – Southern Queensland	TBC	ido@lockyervalleygrowers.com.au
South Australia	TBC	jordan.brooke-barnett@ausveg.com.au 0404 772 308
Tasmania	Ossie Lang, RM Consulting Group	ossiel@rmcg.com.au 0430 380 414
Victoria – Gippsland	Bonnie Dawson, Food and Fibre Gippsland	bonnie.dawson@foodandfibregippsland.com.au 0407 683 938
Victoria – Northern, Southern and Western	Danielle Park, AUSVEG	danielle.park@ausveg.com.au 0432 324 822
Western Australia	Michael Bartholomew, vegetablesWA	michael.bartholomew@vegetableswa.com.au 0427 373 037

Gippsland Regional Development Officer: Bonnie Dawson



Name: Bonnie Dawson
Region: Gippsland
Organisation: Food & Fibre Gippsland

Bonnie grew up on her family's property in Central Gippsland. After moving to Melbourne and studying health sciences and international development straight out of school, Bonnie moved back to Gippsland to work in health promotion locally, promoting physical activity and healthy eating to the local community.

As the focus of her role shifted to

strengthening our local food system, Bonnie realised that food production could bring together most of her interests, so she decided to undertake a post-grad diploma in agricultural sciences.

The opportunity to work with VegNET was Bonnie's first foray into horticulture, and she has been in the role for just over two years.

Being a VegNET Regional Development Officer has given Bonnie a great insight into so many aspects of the industry, including how significantly public policy affects the industry – which has been emphasised by the current workforce and supply chain challenges presented by COVID-19.

Bonnie is looking forward to building momentum behind the strategy that the RDOs have developed and is hoping to get back on-farm more than the past 18 months.

She is proud of the positive relationships and partnerships developed during VegNET 2.0 despite being stuck at home for a lot of that time and is hoping

that the VegNET – Gippsland strategy can support the industry to develop further, and bring the region's growers the value they want and deserve.

Bonnie is also looking forward to progressing plans on projects such as workforce development with Raising Aspirations in Careers and Education - Gippsland (RACE - Gippsland), along with bringing agronomists together for better regional pest and disease management.

Additionally, Bonnie is working towards the next iteration of the East Gippsland Vegetable Innovation Days.

She's also currently overseeing a demonstration site of soil moisture monitors, which has been a great practical learning opportunity.

With the support of some of Food & Fibre Gippsland's other projects, Bonnie hopes that over the next five years she will see an increase in the industry's social license and the community's awareness of Gippsland's highly productive vegetable industry, taking pride in its produce and recognising the many career pathways it offers.

VegNET Western Australia Regional Development Officer – Michael Bartholomew



Name: Michael Bartholomew
Region: Western Australia
Organisation: vegetablesWA

Farming and agriculture have always been constants in Michael's life. Growing up in the city, as a child he would visit family farms during the school holidays. Helping to feed chooks and pat cows eventually turned into picking fruit, wielding chainsaws and driving farm vehicles.

At school, Michael developed a passion

for biology, and he targeted a career pathway that incorporated this passion with agriculture. Graduating with a Bachelor of Agribusiness from Curtin University, Michael wanted to enter the horticulture sector as he was intrigued by the diversity of the industry and familiar with its nature.

Completing the degree instilled an understanding of the uncommon relationship between science and business management – a partnership unique to the agricultural industry, and Michael aims to deliver extension services that focus on leveraging that connection.

Michael joined vegetablesWA as the VegNET – Western Australia Regional Development Officer (RDO) at the end of 2021. Over the past three months, he has developed his knowledge on extension theory and become actively involved in industry activities.

Over the next 12 months, Michael will be undertaking projects covering aspects of biosecurity, sustainability and business management. He is aiming to work collaboratively with other RDOs and experts from across Australia to develop

biosecurity resources and language resources for non-English speaking vegetable growers.

Michael also plans on researching and developing case studies on implementing economically and environmentally sustainable technologies and practices on-farm, such as alternate heating and energy sources.

Presently, the key focus is on preparing vegetable businesses for the impacts of COVID-19 on their workforce, ensuring business continuity as well as promoting discussion around business risk management. Another current project is promoting the uptake of data-driven decision making in irrigation timings to ensure the most sustainable use of water and labour resources.

Over the next five years, Michael hopes to widen his network and meet new experts, as well as forge strong relationships with WA's vegetable growers. He looks forward to developing long-term research projects and utilising those to make positive lasting impacts that will strengthen the state's vegetable sector. →

VegNET Regional Development Officer: Sylvia Jelinek



Name: Sylvia Jelinek

Region: New South Wales

Organisation: Greater Sydney Local Land Services

Sylvia Jelinek has always had a keen eye for plant life, mostly flowers and vegetables. After high school, she worked in the flower industry before venturing to university to complete her Bachelor in Horticulture, majoring in Integrated Pest Management (IPM).

Sylvia was lucky enough to score university work placement with the New

South Wales Department of Primary Industries (NSW DPI) and remained there until she was offered the VegNET NSW role with Greater Sydney Local Land Services, which she has held since June 2018. Sylvia has 12 years' experience working for NSW DPI in vegetable IPM extension, citrus micrografting, lab-based molecular biology, right down to nursery and field work.

Emergency management has been a focus in the past couple of years following bushfires, floods and exotic plant pest incursions like the serpentine leafminer. Having relationships with vegetable growers was invaluable for Sylvia during this time and made it easier to assist them through the challenges faced.

Sylvia's really looking forward to getting my hands dirty and hitting the fields, nurseries and greenhouses around NSW, meeting new people and gaining some ground through extension activities.

The focuses for the NSW region over the coming year include:

- Water and nutrient management in protected cropping.
- Pest and disease management,

including biosecurity and farm hygiene.

- Community of practice in soil health for the Australian-Chinese growers and Australian-Cambodian growers in and around Greater Sydney as well as field growers across the region.
- Farm innovation and technology – Precision irrigation and nutrition management in sweet corn.

This year is mapped out with many activities, extension events and workshops planned for all four topics, with the capacity to reach out and assist those in need when required to do so – ensuring that nobody falls through the cracks.

Sylvia is hoping to increase vegetable levy payers' knowledge and give them tools to improve their businesses through R&D extension and feeding back to the researchers the needs of the vegetable industry, so that R&D can happen for the right reasons.

She is also looking to empower growers to make positive changes on-farm and run a more profitable enterprise, while delivering high-quality vegetables for Australia and the export market.

VegNET Regional Development Officer: Ossie Lang



Name: Ossie Lang

Region: Tasmania

Organisation: RM Consulting Group (RMCG)

Ossie grew up in Tasmania and became interested in agriculture through a University of Tasmania summer program. He went to the mainland to study and

after some overseas travel, ended up in shipping and logistics roles.

The pull of the Tasmanian agricultural industry was too strong, and Ossie has been back in Tasmania for seven years now. He has worked with a biotech company, rural retailer, and small consultancy firm before becoming the VegNET – Tasmania Regional Development Officer in mid-2020.

Ossie has been in the role for around 18 months and has learnt a lot – more than he thought possible. Every farmer and their operation is different, even when from the same industry. The diverse mix of agricultural enterprises in Tasmania means that there is always something more to learn and solutions for one grower may not apply for their neighbour.

Ossie's looking forward to strengthening the relationships developed in the previous iterations of VegNET and seeing some long-term results in Tasmania's identified focus areas. He is also looking forward to working more with the other RDOs in the areas of

shared interest and looking over the fence to see what can be brought to Tasmania to support the industry.

There are five focus topics in Tasmania: biosecurity, herbicide resistance, precision ag, soil management and training. Ossie will be working throughout the year to ensure that vegetable growers' training needs are met, as well as building on the cross-industry herbicide resistance workshop held in 2021 to tackle resistance issues across the crops grown in rotation with vegetables.

Ossie hopes to achieve some on-the-ground gains for growers through the focus areas. He would like to see vegetable production increase in value at a high level alongside agricultural industries. At farm level, Ossie hopes that growers can point to beneficial changes made on their property due to participating in VegNET.

Tasmanian growers are invited to give Ossie a call to talk about current activities and how VegNET can support their operation.

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Innovation and collaboration key to addressing sustainability in northern Queensland



Bowen Gumlu Growers President Carl Walker (far right) with representatives at the ZED industries factory.

At the end of the 2021 harvest season, the issue of how to manage agricultural waste continues to be a challenge for North Queensland growers. In this article, Bowen Gumlu Growers Association's Ry Collins provides an update on how growers, industry and government are collaborating to improve the sustainability of the horticulture sector in the region.

Improving the sustainability of the horticulture industry has never been more important. With the majority of vegetable growers in Northern Queensland located on land that adjoins – or is in proximity of – a catchment flowing to the Great Barrier Reef, the expectation of consumers, government and the community is that the industry must enhance the sustainability of its processes to preserve the surrounding environment for the generations to come.

As many readers would know, 2021 has been a year like no other for the industry. As is the case for growers around the country, vegetable growers in North Queensland have battled through the challenges of the year that have been highlighted by labour shortages and soaring costs to doing business.

Taking a drive around the farming regions in Bowen, Gumlu or the Burdekin over the past two months, it's of equal concern that there is a growing issue of agricultural waste that threatens the ability of growers to operate sustainably and adding significant additional cost to effectively manage the issue.

Larger than average volumes of produce have been left in the fields and significant stockpiles of used agplastics are visible on many farms.

Coming together to progress the issue

Looking to understand the current situation and what was being done to address these issues, Bowen Gumlu Growers Association coordinated a stakeholder forum in late November.

In attendance were a number of vegetable growers, local and state government representatives and other industry members.

What became apparent through this forum was that these waste issues were a symptom of the aforementioned causes with the lack of labour at the end of season in particular affecting what could be picked, as well as rising waste environmental levy charges effecting the disposal of the waste plastics.

A number of future regional recycling options were discussed, but these have not developed to the point where they

are able to support regional growers – with the alternative of transport to recycling centres in Brisbane also being cost prohibitive.

Although research into waste issues has been completed previously, the attending group determined ongoing collaborative action was required. This would follow further investigation into solutions and industry innovation that is occurring to address the agplastic and organic waste issues.

Following this, the group looks to meet again in early 2022 to discuss options and further strategies to pursue in resolving these issues.

Investigating options for innovation in agplastic recycling

Through Bowen Gumlu Growers Association President and mixed vegetable farmer Carl Walker, we were introduced to chemical engineering company, Zero Emissions Developments (ZED) industries, which are pioneering new agplastic recycling methods to reuse waste trickle tape and plastic mulch into a range of products.

A tour of ZED's facility displayed a wide range of applications being undertaken by researchers and engineers through a process known as pyrolysis.

ZED Industries Managing Director Ahmed El Safety said the company's process is able to take a number of different plastic types, including agplastics



A selection of freeze, air and liquid extracted capsicum samples.



A stockpile (approximately 60 tonnes) of waste plastics comprising of used plastic mulch and trickle tape in Bowen.

and turn them into outputs such as carbon, biodiesel and graphene that can be made into new products such as battery cells and even new trickle tape.

"We hope to assist in solving this long-term issue for the agricultural sector and provide a sustainable future pathway for reuse of these products in other farming applications," Ahmed said.

Encouraged by our visit, the ZED industries team visited Bowen in early December 2021 to meet with Bowen Gumlu Growers Association and the Whitsunday Regional Council. The team inspected sample agplastic feedstock and discussed development of a handling facility in 2022.

Researching new uses for waste capsicums

In 2021, Bowen Gumlu Growers Association participated in a collaborative project with the Fight Food Waste CRC and the Queensland Department of Agriculture and Fisheries (DAF) to investigate the potential for new products made from waste grade capsicum.

It is anticipated that in the north Queensland growing region this 'waste grade' product makes up as much as 40 per cent of total product, including approximately 15,000 tonnes of waste capsicum per annum.

These new products can be used in processed foods, nutraceuticals, and complementary health care. Utilising discarded streams from these crops not only improves industry profitability through saving on waste disposal costs, but also creating valuable side-streams and co-products for growers.

With the project in the final stages of research, we received the opportunity to tour the DAF food and beverage research facility in Brisbane. The facility was conducting the research and we saw some of the output product from the research trials.

The successful trials from this project have produced freeze and thermally dried powders with significant nutrient and bioactive content such as β -carotene, and a liquid extract able to be used in a range of consumer product applications.

As more work is done to explore the commercial potential of these products, further innovation could see less crop left to waste and more return on the product grown from our farms as well as new value-added or food and beverage manufacturing opportunities in the Northern Queensland region.

Through ongoing collaboration and innovation, it is hoped that the industry can make more efficient use of our resources and waste – resulting in savings for growers and the creation of a more sustainable future for our industry. We'll be sure to share more information on these initiatives as they gather steam in the new year.

Find out more

Please contact VegNET – North and Far North Queensland Regional Development Officer David Shorten on 0419 429 808 or email rdo@bowengumlugrowers.com.au.

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable Fund.

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG21000



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New VegNET Regional Development Officer for the Wide Bay-Burnett



There was water security relief following the December 2021 announcement by the Queensland Government to return Paradise Dam to its original height. Pictured is Paradise Dam as it is currently, with its spillway wall lowered by 5.8 metres.

The success of the second iteration of the VegNET project has put in place a solid footing to launch the next stage of vegetable industry extension, with VegNET 3.0 set to address key concerns and potential improvements for growers. VegNET – Wide Bay-Burnett Regional Development Officer Andrew Halpin provides an update on project activities, as well as a reflection on the 2021 season.

Wet finish to 2021

Like large areas of south-east Queensland, Wide Bay-Burnett experienced significant falls throughout November and December. These were welcome as it had been a dry year for the drought declared region.

It also came with increases to the region's water allocations, giving more certainty to growers. Growers in the Burnett sub-scheme had their allocations boosted from 22 per cent to 100 per cent as Paradise Dam reached capacity during this period.

Some harvesting of crops was affected, with many growers unable to access their paddocks for extended periods of time. This led to crops being unable to be harvested as well as waterlogged affected produce, with reports of up to \$20 million dollars in crop loss throughout the region with melon growers being some of the hardest hit.

Paradise Dam announcement

After prolonged efforts from Bundaberg Fruit & Vegetable Growers (BFGV) and other stakeholders, the Queensland Government made an announcement on Christmas Eve that it will return Paradise Dam to its original height of 37 metres by undertaking significant dam safety improvement works.

While the design and procurement phase will take up much of 2022-2023, it is hoped major works will commence in 2024. This is welcome news for the region's growers, who experienced the

dam's capacity being reduced to 57 per cent in late 2019. This was after the dam wall was lowered 5.8 metres due to safety concerns.

Value-adding facilities tour

With a focus on reducing organic farm waste, BFGV has planned a bus tour for early 2022 that will incorporate a visit to several value-add facilities as well as the Brisbane Markets.

Attendees will visit Freeze Dry Industries at Yandina on the Sunshine Coast and the Queensland Department of Agriculture and Fisheries' Pilot Food Plant in Coopers Plains, Brisbane.

The tour aims to highlight alternative options in the value-add space for our region's growers, as well as establishing new relationships between growers and processors.

It is hoped that this trip will help to facilitate emerging enterprises between industry stakeholders to deliver increased sales of produce out the farmgate.

These types of facilities have the ability to turn a once imperfect, unsalable product into a high-value niche product that consumers are willing to purchase at a premium price. It is also a great way to help Australians to consume their two fruit and five vegetable servings each day.

University collaboration

Post-harvest loss (PHL) is a significant factor in affecting growers across all regions. Central Queensland University has partnered with BFGV and VegNET

to conduct a survey to assist with its research into PHL.

The survey will investigate factors contributing to PHL. It is set to target vegetable growers and the wider supply chain including transport, processors, wholesalers and retailers.

This research aims to determine how collaboration between stakeholders can help reduce PHL. It is hoped that findings from this survey will provide Queensland's vegetable industry with strategic recommendations to develop coordination along the supply chain.

Other VegNET activities

Andrew Halpin attended his first conference as Wide Bay-Burnett RDO when he travelled to Melbourne to attend the APEN Conference in early February.

Andrew's visit coincided with a visit to the AUSVEG office, where he met with VegNET National Coordinator Sam Turner and the other VegNET RDOs. Part of this visit involved training to assist Andrew in delivering the best outcomes for the Wide Bay-Burnett region.

Find out more R&D

Please contact Andrew Halpin on 0407 366 797 or email vegnet@bfgv.com.au.

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable Fund.

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG21000



Gatton Research Station hosts plant health seminar for veg growers

In late 2021, VegNET – Southern Queensland’s Languages Other Than English Program hosted a grower seminar at the Gatton Research Station. The seminar provided thought-provoking discussion on a range of issues from water and soil pH levels to Integrated Pest Management for soil health. Zara Hall reports.

A recent VegNET grower seminar in the Lockyer Valley focused on spray technology and integrated pest management for soil-borne pests.

Clinton McGrath from the Queensland Department of Agriculture and Fisheries conducted a session on optimising spray performance. For example, Velifer (*Beauveria bassiana*) – a relatively new pesticide for management of thrips and whitefly in protected cropping – shows best longevity when stored in the fridge.

As Velifer contains live biological components, it should not be frozen but stored between 4°C and 20°C. Storage at 4°C (i.e., in the fridge) provides a shelf life of two years while storage at 20°C (i.e., in air conditioning) provides a shelf life of half that, at 12 months.

In addition, Velifer – like some other

biological products such as *Bacillus* sprays (*Bts*) – is killed by ultraviolet light, and is best sprayed when UV conditions are low (generally after 3pm in Queensland’s summer months).

Another aspect of Clinton’s presentation was a comparison of different farms’ water and soil parameters. In this hands-on session, growers tested water and soil pH from their properties using inexpensive pH kits available from the local hardware store.

The different pH levels ranged from about 6 (5.5-6 is generally considered ‘ideal’) through to 9.5 (very alkaline). This created a discussion about the impact that water quality can have on pesticide activity and nutrient availability. For example, strong alkalinity can affect availability of certain nutrients, including iron and zinc.

Dialling in from the west

Truyen Vo from the Western Australian Department of Primary Industries and Regional Development provided a virtual presentation. While most of us are now familiar with online meetings, part of that familiarity includes a begrudging acceptance of the frequent accompanying technology hiccups, slow regional internet speeds, and lag in connections associated with online meetings.

The newly installed technology at Gatton Research Station – through the Smart Farm program – was supported by fast internet and was encouragingly ‘plug and play’. Truyen was able to speak to growers via Zoom, and the conference facilities allowed good two-way dialogue between Truyen and producers.

Truyen led a discussion about Integrated Pest Management (IPM) for soil health, which included correct pest identification and use of resistant varieties.

Also discussed was the nematicide, Nimitz 480 EC (Fluensulfone), which represents an alternative mode of action and pesticide group (Group N-UN – Unknown) as part of a pesticide program for nematode management. For producers growing in soil-based medium, IPM remains an ongoing challenge. Local growers are expressing a desire to move away from nematicides for soil health, user safety and pesticide resistance management purposes.

This seminar was run as part of VegNET Southern Queensland’s Languages Other Than English Program. For more information, please contact VegNET – Southern Queensland on the details below.

Seminar participants test pH levels of farm water and soil and discuss the impact that pH can have on spray quality and nutrient availability. Image courtesy of Olive Hood.



Find out more

Please email ido@lockyer valleygrowers.com.au.

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable Fund.

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Project Number: VG21000



Sylvia Jelinek with Stephen Ng at the recent Australian-Chinese growers SLM workshop in the Sydney Markets. Image courtesy of Matthew Plunkett, Greater Sydney Local Land Services.

Key learnings from Australia's serpentine leafminer incursion

A highly persistent pest that affects vegetable, nursery and flower crops, serpentine leafminer (SLM) continues to be a priority for Greater Sydney vegetable growers. VegNET – NSW Regional Development Officer, Sylvia Jelinek provides an update on Greater Sydney's response to the challenges posed by SLM and why Integrated Pest Management is the only effective control method.

The situation

Serpentine leafminer (SLM; *Liriomyza huidobrensis*) is a pest insect with the potential to significantly affect a wide range of commercial crops (vegetables, broadacre, ornamentals and non-commercial hosts). It is categorised as a high priority pest in the vegetable and potato industry biosecurity plans.

SLM was first detected in Australia in Western Sydney, New South Wales in October 2020 and soon after in the Fassifern Valley, Queensland in November.

The inclusion of SLM into the recently completed Hort Innovation investment, *RD&E Program for control, eradication,*

and preparedness for vegetable leafminer (MT16004) has enabled a rapid response to these incursions in facilitating industry understanding of its significance to the vegetable industry.

The vegetable leafminer is present in a small location on the very northern tip of far-north Queensland and is being monitored closely by the Northern Australia Quarantine Strategy. It is also monitoring American serpentine leafminer, which was discovered in Western Australia in 2021.

Communicating outcomes

AUSVEG Project Officer Maddy Quirk said the previous vegetable leafminer

project was a good preparation tool that armed consultants, agronomists and extension staff.

A successful webinar was held in early 2021 with all the experts and is available to watch on YouTube: youtu.be/PGE3fvHsBBg.

The Greater Sydney Local Land Services VegNET – NSW team held a biosecurity workshop with AUSVEG and the NSW DPI under the Peri-urban Biosecurity Pilot project in March 2021. This event aimed to upskill the most affected vegetable growers in Greater Sydney with integrated pest management (IPM) techniques and monitoring tools.

The team also held a SLM biosecurity workshop for Australian-Chinese vegetable growers at the Sydney Markets in late November 2021. This event was booked out and many resources were handed out to the attendees. Reaching out to culturally and linguistically diverse background growers is imperative to educate and pass on management strategies and teaching that less is more when it comes to spraying for SLM.

Grower lessons

Sylvia caught up with Andy Ryland, an IPM crop consultant for Integrated Pest Management Consulting. Andy has been working closely with a vegetable grower in north-west Sydney who has suffered greatly from SLM infestations. He has encouraged the grower to take chances and embrace



Shannon Mulholland discusses SLM and IPM with growers at the Peri-urban Biosecurity Pilot SLM Workshop, which was held at the Greater Sydney Local Land Services 'River Farm'. Image courtesy of Sylvia Jelinek, Greater Sydney Local Land Services.

IPM tactics. With a consultant's guidance, the grower has been able to turn on-farm SLM infestations around – with less pest pressure than the first year of the incursion when SLM was at its peak.

While the grower was using the recommended insecticides, he was over spraying.

This knocked out the natural beneficial parasitoid wasp population. Now, the grower is scouting their own crops for pests and learning when best to spray which has been key to controlling SLM.

The validation from an IPM consultant helped build the grower's confidence in making appropriate decisions in SLM management. The grower has now halved their spraying while getting better control of SLM and is self-assured about using IPM on-farm. SLM isn't totally eradicated but is being controlled using naturally occurring parasitic wasps.

Sticky traps are very useful to pick up SLM adults. A well-timed insecticide spray will give better control than applying multiple sprays. Certain weeds such as milk thistle, clover, amaranthus and fat hen are also major hosts for SLM, and they need to be monitored. Managing SLM can be difficult when neighbouring growers are not making the effort to control pest levels.

Even though SLM is usually seen in autumn through to spring, some populations were still around during Greater Sydney's mild and wet summer. SLM is heat-sensitive, and populations can periodically be suppressed when hot days or heatwaves occur.

What we've learnt so far

Even though SLM has only been in Australia for 18 months, researchers have already learnt how to effectively manage it by carefully selecting recommended insecticides used appropriately with a sound IPM program.

So far, Australia has not seen SLM venture too far from coastal vegetable production areas. However, some farms in less desirable environments for SLM may have suitable on-farm micro-climates for the insect to flourish.

Shannon Mulholland is a Biosecurity Epidemiologist from the NSW Department of Primary Industries (NSW DPI) and has some sage advice for the vegetable industry.

"When the pest population is small, it is

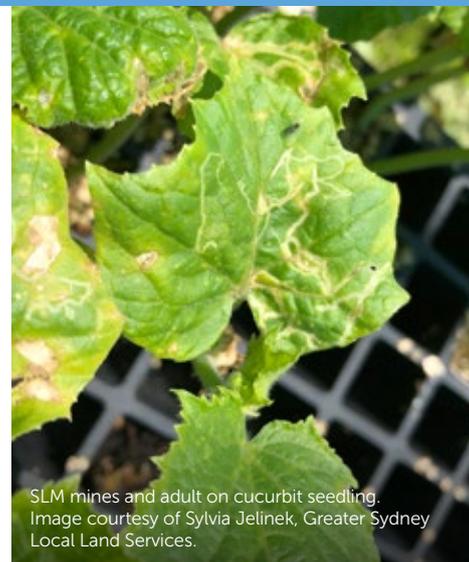
easy to manage – and it's the best time to control. Don't let it get out of control," Shannon said.

Meanwhile, Maddy Quirk was impressed at how well industry and government agencies came together during the incursion response in late 2020, especially being in a COVID-19 world. However, she added growers needed more lessons on SLM management.

Serpentine leafminer: Research, development and extension

Many research and extension activities have been launched since the detection of SLM. These include Hort Innovation multi-industry investments *Management Strategy for serpentine leafminer* (*Liriomyza huidobrensis*) (MT20005) and *RD&E Program for control, eradication and preparedness for Vegetable Leafminer* – 2017-2020 (MT16004).

- MT20005 will build on the initial work undertaken in MT16004, by refining the development and validation of tools including surveillance and diagnostic protocols; predictive forecasting for SLM risk assessment and management; identifying and monitoring parasitoids; and delivering an industry communication program, including the development of industry management plans, grower guides, and industry focused workshops. For further information, visit ausveg.com.au/biosecurity-agricultural/biosecurity/mt20005.
- MT16004 was developed in recognition of the extensive impact that vegetable leafminer (VLM; *Liriomyza sativae*) could have on the vegetable, nursery, melon and potato industries were it to move into production areas with no management plan in place. In 2019, the project underwent a variation to include RD&E activities on serpentine leafminer and American serpentine leafminer (ASLM; *Liriomyza trifolii*). Project partners included Cesar Australia, the University of Melbourne, Plant Health Australia, Northern Australian Quarantine Strategy (NAQS) and AUSVEG. For the final report and resources, visit ausveg.com.au/biosecurity-agricultural/biosecurity/mt16004.



SLM mines and adult on cucurbit seedling. Image courtesy of Sylvia Jelinek, Greater Sydney Local Land Services.



Adult serpentine leafminer (*Liriomyza huidobrensis*). Image courtesy of the NSW DPI via Central Science Laboratory.

- Other research and development in the pipeline include a project on parasitoid surveillance with Cesar Australia and improving diagnostics for exotic plant pests. NSW DPI is also looking into insecticidal resistance of SLM to determine better chemical control and resistance management options, as well as climate modelling and future predictive modelling. For comprehensive resources, visit the NSW DPI website.

Find out more R&D

Please contact Sylvia Jelinek on 0427 086 724 or email sylvia.jelinek@lls.nsw.gov.au.

Unsure of your SLM problem? Ask a consultant, send in a sample, look into resources available or contact your VegNET Regional Development Officer or AUSVEG's Maddy Quirk by emailing madeleine.quirk@ausveg.com.au.

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable Fund.

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG21000

Hort Innovation Strategic Levy Investment | **VEGETABLE FUND**



Protecting waterways in the Macalister Irrigation District

Drawing from opportunities presented from various R&D projects, growers in the Macalister Irrigation District are implementing various practices and strategies to protect the surrounding waterways from nutrient and sediment runoff, as well as increasing their water use efficiency. VegNET – Gippsland Regional Development Officer Bonnie Dawson provides an overview.

The Macalister Irrigation District (MID) in Central Gippsland provides secure water to some of Australia's largest salad producers. It is fed by Lake Glenmaggie and the Thomson, Macalister and Avon Rivers. What flows past – and off – these properties ends up in Lake Wellington at the start of the Gippsland Lakes system.

Protecting Gippsland waterways has been identified as a priority by the Regional Extension Advisory Group (REAG), as well as other growers and stakeholders in VegNET Gippsland's Regional Extension Strategy. As such, VegNET – Gippsland contributes to the Lake Wellington Land and Water Management Plan.

The focus is not just on water use efficiency, but also minimising sediment and nutrient runoff. These issues have been emphasised by one of the wettest years in living memory, in contrast to the drought of years' prior.

Buffer zones and effective drainage to protect surrounding waterways

A farm walk was held at Schreurs & Sons' Middle Tarwin property last year. On the day, attendees were shown design features that support the property to recycle water and nutrients and minimise its impact on the surrounding Tarwin River.

As a result, growers in the MID, including Hussey & Co and Riviera Farms, reported that they are now implementing or considering changes to the design of their drainage.

Other growers reported that as a result of attending, they intend to increase their plantings of wetland grasses and native

species in order to capture sediment and nutrients and therefore protect the waterways surrounding their properties.

VegNET – Gippsland is also working to build on existing connections with the local Landcare networks to support the identification and supply of appropriate plants for buffer zones in this area, which has also previously been modelled by Dicky Bill.

Biodiversity to support Integrated Pest Management

The VegNET – Gippsland REAG has also decided to promote the adoption of Integrated Pest Management to reduce growers' reliance on limited chemistry for pest control.

Native plantings will not only act as a buffer to minimise runoff into surrounding drains and waterways, but also have the potential to host beneficial insects. Growers who are participating in the EnviroVeg program will be recognised for their actions in the continuous improvement through their annual self-assessments.

Soil moisture monitoring demonstration

Food & Fibre Gippsland was successful in a bid for funding from the Federal Government's Future Drought Fund to demonstrate soil moisture sensors to the local industry.

Delivered by VegNET – Gippsland, a Project Reference Group has been established bringing together Elders agronomist Noel Jansz, Agriculture Victoria irrigation specialists Alexis Killoran and Billy Marshall and Industry Development Manager Scott Botten, West Gippsland Catchment Management Authority's Anthony Goode, and AUSVEG VegNET Regional Development Officer Danielle Park.

The original aim of the project is to build drought resilience among Gippsland's vegetable producers by increasing the adoption of the technology. However, the wet conditions have meant it has been a challenging season to demonstrate increases in water use efficiency!

Understanding the property's drainage and potential flow of nutrients and sediment has become increasingly



Grower Walter Chadwick with VegNET's Bonnie Dawson.

important. As well as the CropX soil moisture sensors, host grower Tripod Farmers has been provided with soil and drainage mapping by Precision Agriculture to gain a more accurate understanding of property's drainage and risk of nutrient and sediment loss.

By involving the local Agriculture Victoria irrigation team and the West Gippsland Catchment Management Authority, it is hoped that the project will increase their awareness and capacity to support the expanding local vegetable industry – therefore increasing the vegetable industry's engagement with the local sustainable irrigation program.

The demonstration will continue until an on-site field day in June 2022, where grower Walter Chadwick and the Project Reference Group will sum up the learnings and reflect on the project. A series of resources summarising these learnings will also be developed.

AUSVEG VIC R&D Adoption award

The AUSVEG VIC Awards for Excellence is returning in 2022 and will be awarding a grower or industry stakeholder the R&D Adoption award. This sits alongside the coveted Grower of the Year accolade.

This award aims to highlight how Victoria's growers are benefiting from R&D outcomes on-farm – whether it's pre-harvest, post-harvest or sharing key findings with the wider industry. Keep an eye out for further details about the AUSVEG VIC Awards for Excellence, including key dates and how to nominate industry members.

Find out more

Please contact VegNET – Gippsland Regional Development Officer Bonnie Dawson from Food and Fibre Gippsland on 0407 683 938 or email bonnie.dawson@foodandfibregippsland.com.au.

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Project Number: VG21000



An update from VegNET – Victoria (North, West and South-East regions)

Hover fly identified in native vegetation insectariums in December 2021.

In this column, VegNET – Victoria (North, West and South-East regions) Regional Development Officer Danielle Park discusses the 2022 R&D Adoption Award, which will be handed out at the AUSVEG VIC Awards for Excellence. Meanwhile, it has been one year since the Werribee native vegetation insectaries trial started with early results now available to industry.

Seeking nominations for Victoria's R&D adoption champions

Victoria's vegetable industry is both innovative and resilient, as highlighted by the challenges faced over the past couple of years. It works to meet consumer demand in both domestic and international markets despite these challenges, driven by the passion of its growers to supply high quality produce.

In recognition of the innovation, nominations are being sought for the upcoming 2022 R&D Adoption and Industry Impact award at the AUSVEG VIC Awards for Excellence. This award aims to highlight how Victoria's growers are benefiting from R&D outcomes on-farm – whether it's pre-harvest, post-harvest or sharing key findings with the wider industry.

Hort Innovation works with industry to invest the vegetable levy and Australian Government contributions into R&D initiatives to help growers be as productive and profitable as possible through the Hort Innovation Vegetable Fund.

The award also provides an opportunity to highlight the role that R&D plays in vegetable production.

Please contact Danielle Park on 0432 324 822 or email danielle.park@ausveg.com.au if you have someone you'd like to nominate for this year's award.

A video of the highlights from the 2021 AUSVEG VIC Awards for Excellence, including the announcement of the R&D Adoption and Industry Impact award winner, is available here: ausveg.com.au/awards-for-excellence.

East Gippsland Vegetable Innovation Days 2020 received the R&D Adoption

and Industry Impact award at the 2021 AUSVEG VIC Awards for Excellence.

Werribee native vegetation insectaries trial

Over the past 12 months in Werribee South, Victorian vegetable growers have been trialling native vegetation insectaries on their farms to boost beneficial insect activity and better manage pests, prevent weeds, and reduce soil erosion.

Planted in autumn 2021, the Werribee native vegetation insectaries trials hoped to produce a range of benefits:

- Diversity and abundance of beneficial insects.
- Increased habitat and connectivity that better support native biodiversity.
- Reduced likelihood of harbouring pests and diseases that can affect crops.
- Reduced weed growth and maintenance.
- Improved soil structure, particularly on embankments, and reduced soil erosion.

Stephen Moore inspects establishment of the native insectariums in December 2021.



- Longer flower windows and reduced water requirements.

AAA Farms and Mason Fresh Produce worked closely with local agronomist Stephen Moore from E.E. Muir & Sons and Karen Thomas from the Port Phillip and Westernport Catchment Management Authority to design the site, source plants, and organise the plantings.

VegNET – Victoria (Northern, Western and South-Eastern) helped to facilitate discussions to kick off the trial back in 2019 and has since been instrumental in communicating progress and results back to industry.

A published case study outlines the trial development, some early results and next steps. It also provides some practical tips for vegetable growers to set up an insectary on their farm. The case study can be found here: ausveg.com.au/wp-content/uploads/2021/09/NVI-case-study-FINAL.pdf.

A workshop involving an inspection of the native vegetation insectaries is planned for autumn 2022. If you would be interested to learn more, please contact Danielle Park on the details below.

Find out more

Please contact VegNET – Victoria (North, West and South-East regions) Regional Development Officer Danielle Park on 0432 324 822 or email danielle.park@ausveg.com.au.

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Workshop attendees gather around the spray unit to discuss some of the maintenance fundamentals.

Out and about with spray fundamentals and cover cropping

Early summer is always a busy time for the vegetable industry in Tasmania. This year was no different, with VegNET – Tasmania hosting a number of events that focused on spray application fundamentals and cover cropping. Regional Development Officer Ossie Lang outlines some of the lessons learned and where more information can be found.

VegNET – Tasmania teamed up with the local Serve-Ag team for a spray workshop with Don Thorp from Horticultural Spraying Specialists. This workshop helped growers and spray operators focus on the fundamentals and how they impact spray application. Don's approach is, "if you're going to spend the time and money on applying a spray, why not put the effort in to get it right the first time?"

The fundamentals outlined included:

- Environment – weather and crop conditions.
- Product – active ingredient, quality of formulation, wetters.
- Configuration/Usage – speed, boom height, nozzle choice.
- Sprayer design – pump specifications, boom design.
- Target – leaves, florets, soil, stems.
- Operator – training and experience.

The operator sits at the centre of the fundamentals and ultimately will be key in the success of spray applications. While the environment is outside the operator's control, the conditions can be planned to ensure that the best possible timing is used. The product is generally determined by the operator results from advice given by agronomists and reputable chemical resellers.

The other three fundamentals – target,

sprayer design and configuration and usage – were the main topics of the workshop as they are within the control of the operator and all impact on the coverage achieved in the application.

Don reinforced that while the practicalities of farming meant that spraying isn't always done in optimum conditions, the more we get the fundamentals right, the better our chance of success and the longer we preserve the chemistry we have.

Following the classroom session, Don took the group into the field to demonstrate some of the simple things spray operators can do to improve spray coverage.

"The main thing I took away from the session was that you should continually check the unit and what you are doing to make sure you are getting your spray where it needs to be," one of the attendees and local grower, Scott Rockliff from Skelbrook Produce, said.

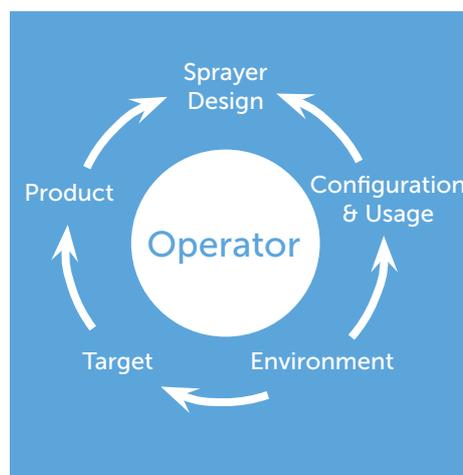
Cover crop focus

VegNET – Tasmania also assisted in the delivery of a cover crop farm walk at the Hagley Farm School demonstration site. This demonstration site is funded through a Smart Farms Small Grant.

The site is managed by the Tasmanian Agricultural Productivity Group (TAPG) in conjunction with the Tasmanian Institute of Agriculture and Serve-Ag. The demo site is currently a commercial paddock of peas. The farm walk gave participants the chance to see how the peas have established following a winter cover crop and to hear about the progress the paddock has made over the last three years, as well as how the cover cropping may have influenced that progress.

Permanent monitoring points were established and have been monitored through the life of the project. These are sampled every year and have been tested for soil microbial activity.

Figure 1
Spray Fundamentals from Matt Strmiska Sprayers 101.





Don Thorp from Horticultural Spraying Specialists pictured checking the coverage from the field with spray cards.

The first testing in 2019 showed microbial activity that was quite low, with a score of only 45 out of a potential 100. However, the last two test results in 2020 and 2021 have shown quite a turnaround, with activity levels scoring at 90 in the second year with a further increase to a score of 93 in 2021.

These increases have been achieved throughout commercial crops of poppy and ryegrass seed, with cover crops in between and then into the current commercial pea crop.

Further findings

The last cover crop was established in April 2021, using two different methods. These methods were direct drilling into the ryegrass stubble and a more conventional working of the soil and sowing into the worked ground.

The paddock was split in half to examine how these techniques may impact on the cover crop and the pea crop that has followed. The team has

taken penetrometer readings and canopy photos just prior to the sowing of the pea crop. Early indications were that the zero till method had less compaction below 10 centimetres but penetrability was similar to the conventional tillage in the top 10cm of the profile.

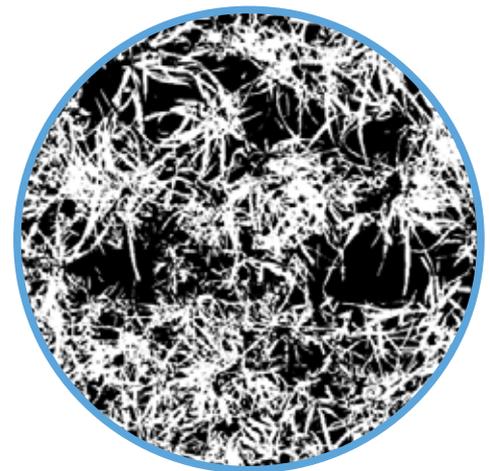
Based on canopy imagery, the cover crop establishment was slightly better in the zero till part of the paddock. These results will be compared against the yield mapping after the pea harvest to see the influence of the cover crop establishment methods on commercial production.

The microbial activity was tested for using Microbe Wise tests for soil from Microbiology Laboratories Australia, conducted by AgVita Analytical Services. The canopy photos were taken and analysed using the app Canopeo.

This cover crop project will be on show at the annual Ag Innovation Day hosted by TAPG at the Hagley Farm School. This is currently planned for 28 April. Sign up to the VegNET – Tasmania email list or follow us on social media to find out more.



Canopeo colour image of coverage.



Canopeo white on black image to determine percentage coverage. Images courtesy of Ossie Lang.

Find out more R&D

Please contact Ossie Lang on 0430 380 414 or email ossiel@rmcg.com.au.

Follow us on social media – Facebook: @VegNET_Tas and Twitter: @VegNET_Tas.

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Understanding and managing Cucumber green mottle mosaic virus

Cucumber green mottle mosaic virus is a plant disease that infects fruit and vegetables belonging to the family Cucurbitaceae, which was first detected in the Northern Territory in 2014. For six years, scientists from the NT Government investigated the spread, hosts, and management of the virus. VegNET – Northern Territory Regional Development Officer Amélie Corriveau reports on the research findings and implications for growers.

A healthy Asian melons crop in the Darwin region of the Northern Territory. Image courtesy of NT Farmers.



Pests and diseases are an ongoing challenge for plant industries as they can reduce fruit yield and quality, ultimately leading to severe economic losses for growers. Successful response to a pest or disease outbreak includes careful prevention, accurate diagnosis, and adequate management.

The *Cucumber green mottle mosaic virus* (CGMMV) infects fruit and vegetable crops belonging to the family Cucurbitaceae (cucurbits) such as watermelon, cucumber, melons, zucchini, pumpkin, squash, bitter and bottle gourds.

The virus can affect plants and fruits, and result in substantial crop losses. CGMMV can be easily spread and may remain viable for extended periods in plant debris and soil, or on vehicles, equipment, and tools.

In September 2014, the previously exotic CGMMV was detected in melon crops in the Northern Territory. The virus was subsequently detected in Queensland in April 2015 (melons) and in Western Australia in July 2016 (cucumbers).

The detection of CGMMV in the NT was followed by a six-year research program led by researchers from the Northern Territory Government's Department of Industry, Tourism and Trade (Hort Innovation-funded projects VG15013 and VM18008).

The researchers investigated the spread of CGMMV in the NT's cucurbit production, alternative hosts of the virus, and farm biosecurity measures to minimise its spread and inform future management. In November 2021, the researchers invited stakeholders to learn about the results of this research and discuss their management implications.

CGMMV spread

CGMMV is most likely to be introduced into a crop through infected planting or plant material (soil, seed, seedlings, rootstocks, grafts), and can be mechanically transmitted, including via contaminated farm equipment (e.g., secateurs, stakes), machinery (e.g., tractor), packaging materials, clothing, or hands of anyone pruning, handling, or touching plants. While it was previously thought that CGMMV could remain viable in soil for 12 months without host plants, the researchers recorded shorter infection periods of up to 36 weeks.

CGMMV can also be spread mechanically by birds and other wildlife. Most cucurbit crops are pollinator-dependent, requiring insect pollination for

successful fruit set and production.

In Australia, honey bees are regularly used to provide management pollination services to broadacre cucurbit cropping. When doing so, honey bees may come into contact with CGMMV when collecting pollen and nectar through their regular foraging activities and can spread the virus on to another plant (if they previously accessed infected plants).

While the researchers identified live CGMMV in beehives, there is no evidence that CGMMV affects the health of beehives.

Fortunately for growers and apiarists, the researchers found that CGMMV in beehives is not able to be transmitted by bees for the same period. That is, if a beehive is moved away from CGMMV infected plants for some time, the honey bees will be unlikely to introduce CGMMV into clean plants.

Therefore, the risk of pollinating honey bees transferring CGMMV by moving hives between cucurbit crops is low if there is approximately one-month resting period between sites.

Some weed species in the study areas were also found to carry the virus (wild melon, wild luffa, amaranth, pigweed, black nightshade, fat hen, wild gooseberry, sabi grass). However, more research is needed to find out if these weeds can spread CGMMV to crops.

Researchers found that CGMMV did not affect sweet corn, snake bean, capsicum, okra, sorghum and peanut, providing potential crop alternatives to growers.

Prevention methods

Optimal farm biosecurity measures are crucial for preventing CGMMV outbreaks. Biosecurity plans should identify the risks of transmission of CGMMV (on- and off-farm), and measures to address those risks. Effective measures to reduce the spread of CGMMV include restricting farm visitor access, minimising vehicle traffic on farm, using footbaths upon entry and exit on the property and closed amenities (e.g., shed, shade/greenhouses), cleaning and disinfecting tools, vehicles, and machinery.

While the provision of pollination services can improve both the quality and quantity of cucurbit production, the research also showed that bees can spread CGMMV. Therefore, allowing a 'rest' period before moving beehives to a new location can reduce the risk of introducing CGMMV into previously healthy environments.

Diagnosis

The virus can affect plants (e.g., mosaic-like mottling on leaves, wilt and runners, premature death) and fruit (abortion, yellowing, dirty red discolouration, flesh decomposition, malformation). The researchers were able to improve a field test to effectively detect CGMMV, but other viruses can bias the results.

At this stage, laboratory testing is still required to confirm CGMMV infection. There will be no symptoms or indications that a beehive contains CGMMV as it is a plant virus. The only way to confirm if honey beehives contain CGMMV is to test them in the laboratory using a series of molecular tests.

Disease management

Management practices are context-specific and can be developed to suit commercial or individual needs. It is essential that farmers, their suppliers, and all staff understand the risks of CGMMV.

The researchers recommend restricting the movement of plant material, seeds, soil, machinery and beehives across farms or agricultural areas to minimise spread. Sterilisation of vehicles, equipment, plant trays, tools and footwear can also be done using a chlorine (bleach) solution (1% concentration).

Other practices to limit the spread of CGMMV include burning or deep-burying infected/suspect plants and crop residues, and removing host weeds around cucurbit crops.

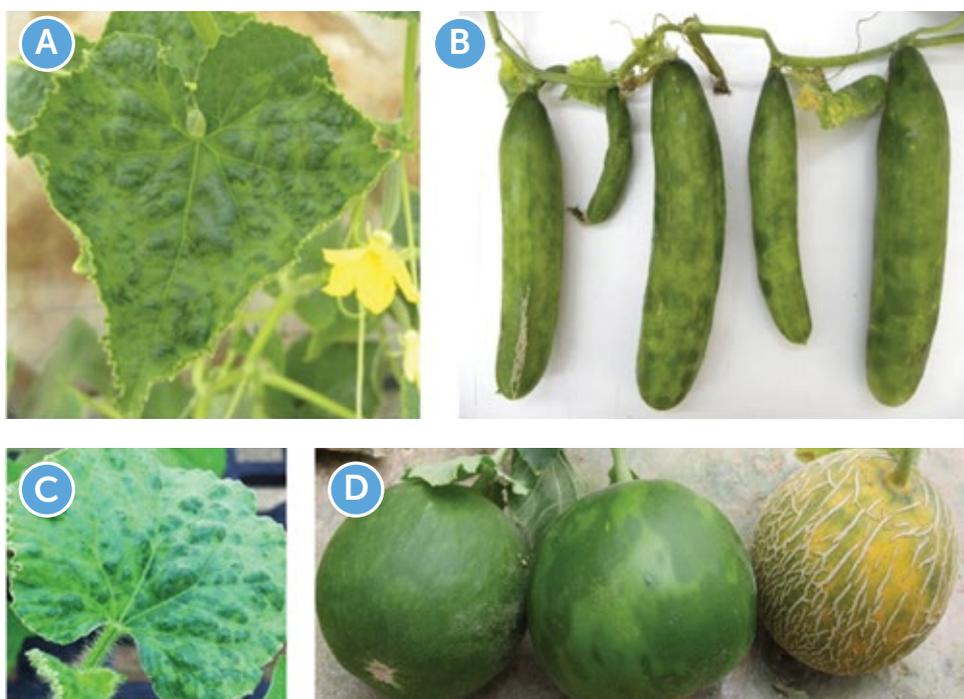
For growers, it is important to communicate the CGMMV status of your crop with your apiarist. Discuss potential contamination of the hives in past months and possible exposure on other farms. Ensure that hive materials (wax frames, honey) are not discarded in your or other cucurbit growing areas.

For apiarists, CGMMV is not known to affect bee health or hive strength. It is important to track the CGMMV status of the cucurbit crops you service. Keep accurate and concise records for all apiairy activities.

Use permanent marking to identify hives and their components, which will help track their movements and CGMMV status. If one or more of your hives have been exposed to CGMMV, separate contaminated from uncontaminated hives. Do not conduct hive maintenance on contaminated hives in a cucurbit growing area and attend last to contaminated hives in the workflow.



A European honey bee (*Apis mellifera*; Hymenoptera: Apidae), commonly pollinating cucurbit crops in Australia. Image courtesy of Mary Finlay-Doney, NT Government, Department of Industry, Tourism and Trade.



Symptoms induced by CGMMV on cucumbers and melons. Image courtesy of Reingold et al. 2016.

Sterilising vehicles, hive components and footwear is also recommended.

The research conducted by NT Government researchers has widened our understanding of the spread, hosts, and diagnostics of CGMMV. It has also provided growers, apiarists, and industry stakeholders with important management recommendations, and developed extension materials to assist in understanding and managing the virus.

More information on the two research projects, VM18008 and VG15013, can be found on the Melons Australia Biosecurity webpage: melonsaustralia.org.au/melon-biosecurity-resources/#on-farm-biosecurity-plan.

Additional details can be found in the Australian Honey Bee Industry Biosecurity Code of Practice: [\[Honey-Bee-Industry-Biosecurity-Code-of-Practice.pdf\]\(#\).](http://beeaware.org.au/wp-content/uploads/2017/09/Australian-</p></div><div data-bbox=)

For further details, please contact researcher Darsh Rathnayake by emailing darshana.rathnayake@nt.gov.au.

Find out more R&D

Please contact Amélie Corriveau on 0410 067 422 or email ido@ntfarmers.org.au.

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Hort Innovation Strategic Levy Investment | **VEGETABLE FUND**

VegNET – South Australia: Supporting hail-affected vegetable producers



Platform CEO and Co-Founder Oli Madgett speaks to attendees at the Ag-tech Meetup Breakfast in November 2021.

Hail damage was reported across South Australia in late October 2021, and AUSVEG SA continues to extend its support to affected growers and producers. Yanyu Liang provides an update on the response to this devastating weather event, as well as other SA vegetable industry activities.

State-wide hail damage response

AUSVEG SA continues to work on behalf of the many growers and farmers across the state affected by the October hail storms, which were particularly damaging for growers across the Northern Adelaide Plains.

In the immediate aftermath of the event, AUSVEG SA worked with many media and government stakeholders to ensure that key decision-makers understood the serious nature of the event and the devastation it caused for industry.

AUSVEG SA also briefed politicians from across all parties at the federal and state level on the issues.

On 29 October 2021, AUSVEG SA hosted the Minister for Primary Industries, the Hon. David Basham MP and senior executives from The Department of Primary Industries and Regions (PIRSA) to view the aftermath of the storms across many affected farms in the region (both greenhouse and field).

AUSVEG SA is in regular contact with PIRSA, the Minister for Primary Industries and Regions and other industry groups and will be working with the government to communicate resources and information to the industry.

Growers with any questions and concerns can contact AUSVEG SA CEO Jordan Brooke-Barnett on 0404 772 308.

Connecting SA horticulture producers to ag-tech startups

AUSVEG SA hosted its first ever Ag-tech Meetup Breakfast on 11 November 2021

at the SA Produce Market Café.

The event brought together a number of SA ag-tech startups and vegetable and horticulture producers, with the aim to build an understanding about the problems facing our sector and potential opportunities and solutions available through emerging technology. In attendance were innovative companies working in field robotics, drone imagery, sales data and artificial intelligence, and they were keen to meet with the industry.

Attention ag-tech developers

Expressions of interest are open to ag-tech developers who would like to evaluate and validate their products at PIRSA's ag-tech testbeds, which are located on its demonstration farms. Establishing testbeds is the latest activity under the State Government's \$7.6 million ag-tech program.

For approved trials, PIRSA will contribute time and expertise of technical and research staff as well as access to farm fields, paddocks and crops, and access to co-working space. Ag-tech testbeds will be set up on the State Government's demonstration farms to conduct rigorous, replicable testing of new technologies as part of the development process.

For further information about trialling your ag-tech product or solution, please visit pir.sa.gov.au/primary_industry/agtech/testbeds or contact Senior Ag-Tech Extension Officer Robyn Terry by emailing robyn.terry@sa.gov.au.

Emerging Leaders Program set to launch

AUSVEG SA and VegNET SA are pleased to announce that our first informal meeting for the Emerging Leaders Program was successfully hosted in SA Produce Market on 3 December 2021.

A key focus of this program is to establish an emerging leaders communication format to support greater engagement and communication between young people in the SA horticulture industry. Members of the Management and Advisory Boards attended the meeting to discuss the appropriate timing and format for the event.

It is likely the event will be held over three hours on a farm in September or October this year, which will allow for sit-down presentations in a shed followed by a field walk and refreshments. Planning for this event is well-underway, and VegNET SA will continue to provide updates.

We strongly encourage young growers and staff members from large growing businesses – who want to improve their interaction with peers and access leadership development opportunities – to get involved.

If readers have any questions regarding R&D or suggestions for workshops or field days, please contact VegNET – SA on the details below.

Find out more

Please contact AUSVEG SA Chief Executive Officer Jordan Brooke-Barnett on 0404 772 308 or email jordan.brooke-barnett@ausveg.com.au.

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Project Number: VG21000



Helping to build resilient Western Australian vegetable production systems



WildEye soil moisture and tensiometer installed at a grower's property in Carabooda, WA.

Working in collaboration with vegetablesWA and AUSVEG, Western Australia's new Regional Development Officer Michael Bartholomew introduces himself to readers and highlights the priority focus areas for VegNET 3.0 in the west.

We all know the agriculture paradigm: challenges are getting larger, threats are getting closer, work's getting harder, and margins are getting smaller.

Applied to an industry like mining for example, this would be signalling impending doom – but not for agriculture. Australian agriculture's resilience in the face of these dynamic challenges has been a proven fact since its beginning.

Regional development and extension programs are nothing new, but with significance of a safe and reliable food supply being of unsurpassed importance in the face of population growth, climate change and economic competition; these programs are only set to get bigger and better with time.

Personified problem solving

A big step forward in the development of these crucial extension services is VegNET 3.0 and its national team of Regional Development Officers (RDOs), a team of which I am pleased to be a part of.

Holding a Bachelor of Agribusiness from Curtin University and having been exposed to diverse agricultural systems my entire life, I am looking forward to further developing and evolving my knowledge and to share it with those around me.

Based at vegetablesWA, I will be working closely with Truyen Vo to be brought up to speed with the extension projects and share in the enormous network he has spent so long building. This is so I can hit the ground running and make an impact where it's needed most.

Backed by an enormous network of highly experienced individuals, I'm set

to be spending long days applying my up-to-date knowledge of local and global agricultural systems to deliver comprehensive and individualised support to the Western Australian horticulture industry. This is all in addition to sharing my findings with the network of RDOs around the country, and I can't think of anything more fulfilling.

On my desk right now are three projects. But over time these will grow, change and adapt to the most important and pressing matters facing WA growers. Here's a little about each.

Water and fertiliser use efficiency

Large discrepancies in water use have been observed across farms in the same growing regions with very little difference in yield. As fertigation is a key form of nutrient application in these growing regions, the unoptimised use of water extends to costly fertiliser wastage.

Pressures from recent groundwater restrictions and increasing operating costs have seen this as a priority development area. Maximising water use efficiency is now not only financially and environmentally important, but legally. Preliminary actions have included the deployment of soil moisture sensors and analysis of management techniques to better understand the scale of the issue on individual farms.

Plant protection and biosecurity management

Highlighting the synergy between proactive and reactive management comes the differences between pest and disease management and biosecurity.

Cucumber green mottle mosaic virus, tomato-potato psyllid and fall armyworm have been recent biosecurity concerns in WA growing regions. Our initial findings indicate that more can be done to proactively prevent the incursion of new pests and disease, with too much of the balance of focus being applied to reactive management approaches once the damage is already done.

We are working to arm growers with the means and resources to develop and integrate biosecurity plans into their production systems to minimise the risk surface to the whole industry.

Communication

The triple bottom line of agriculture has such a dynamic impact on its functioning and can have enormous implications for business if not handled correctly.

The most important tool in managing these externalities is communication – communication between growers, RDOs, industry, politics, and society. The complexity of these networks means that often the required information (such as emergency weather, market, and biosecurity updates) is not often passed on efficiently enough to reach their target in time.

Strengthening these knowledge transfer pathways and building new ones are at the forefront of this project.

Find out more

For more information, please contact VegNET – Western Australia Regional Development Officer Michael Bartholomew on 0427 373 037 or email michael.bartholomew@vegetableswa.com.au.

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable Fund.

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG21000



Photography by Oliver Eclipse.

Overcoming barriers to produce in the Red Centre

Central Australia is not a place you would expect vegetable production to be taking place. However, for almost three decades Moe McCosker defied the doubters and overcame many challenges to successfully grow a range of vegetables in a hydroponic setting on his Alice Springs property. Michelle De'Lisle speaks to Moe about his horticultural journey, the issues he faced as a grower and his current venture.

Moe McCosker has ridden the highs and lows of horticultural production for over three decades. First as a grower in his right with his leafy green and Asian vegetable operation Territory Lettuce, and now as a manager of Central Fruit & Vegetable Wholesalers in Alice Springs.

Moe has been a trailblazer for growing vegetables in what is known as the 'Red Centre.' However, his path to vegetables wasn't straightforward.

Moe arrived in the Northern Territory from country New South Wales in 1975, where he worked as a plumber while his wife Angela ran a florist shop in Alice Springs.

Moe's career took a different turn in the early 1980s when he joined Angela in the retail industry when they purchased a second florist shop, before deciding to enter the world of horticulture and operate their own flower farm.

Later in the decade, the couple concluded that flower production wasn't a viable proposition, so Moe switched his attention to growing hydroponic vegetables. In 1992, Territory Lettuce was born.

Early days

The McCoskers purchased a five-acre property in a new area of just out of Alice Springs and started building their hydroponics business.

"Initially we started off with about 20 tables, which was about 5,000 holes. We went through a lot of trials and tribulations – weather knocked us around in the first year or two. We didn't quite understand the issues of fertiliser and what happens when things get too warm," Moe says.

"We eventually overcame the weather challenges, and we started playing with cooling towers for our water. The water in Alice Springs is relatively hard, and in 1999, we put in a desalination unit, which made a big difference.

"Summer was never a good time for us. But for 9-10 months of the year, we were growing some really nice product, which we were selling into the local cafes and restaurants around town. Then we ended up getting a bit bigger."

In about 2009, the McCoskers took over Central Fruit & Vegetable Wholesalers with a couple of other business partners.

By this time, Territory Lettuce had up to about 200 tables and close to 100,000 holes.

"It was a fairly substantial little business," Moe says.

The challenges

However, there were ongoing issues that Territory Lettuce faced, and these became more pronounced over time.

"We got to the stage where it just became too hard to deal with supermarkets, predominantly because of our geographical location. And being a small operation, the economy scale isn't there to what you need it to be," Moe explains.

"There were input costs and then getting our raw production into town was always a cost – way above anybody else's in the capital cities or in metropolitan areas."

The COVID-19 pandemic didn't make things easier for Moe and his growing operation.

"It came to a situation where the business wasn't viable. Add in the challenges of the last couple of years due



to COVID – we got to the stage where we couldn't compete with the prices from southern growers. Finding staff was also hard, so we bid farewell to growing commercially in Alice Springs," Moe says.

Moe's advice for anyone looking to take on the challenge of growing vegetables in Central Australia is simple: Do your research and understand your costs, such as water, freight and the probability of growing for a small market.

Wholesale focus

Closing Territory Lettuce wasn't to be the end of Moe's career in horticulture. Instead, he has thrown all his effort into building Central Fruit & Vegetable Wholesalers, which now employs 14 staff.

The business has its own premises comprising of up to 700 square metres of cool room facilities and brings stock in daily from the Adelaide Produce Markets.

"We source whatever we can locally within the Northern Territory, and we do bring a bit in from Queensland during good seasons," Moe adds.

Being a fresh produce wholesaler in Central Australia invites different challenges. Moe's business doesn't just serve the population of Alice Springs, it makes deliveries to several of the indigenous communities – and some of those can be seven or eight hundred kilometres from town.

This means those remote businesses need to get their orders in on-time or risk not having fresh produce for weeks.

"And if there are rains around, it can be 4-5 weeks before trucks can get into some of these communities and they have to air freight items in," Moe says.

This occurred recently – heavy rain across outback South Australia in late January and early February impacted Moe's business for a couple of weeks, with trucks unable to reach Alice Springs from Adelaide.

"The first week was the hardest. The truck left Adelaide as normal on Monday morning, got to Glendambo (about 590km north of Adelaide) and couldn't go any further," Moe says.

"They had to go another way, so what I ordered on Monday for Tuesday morning didn't arrive until Friday afternoon."

Central Fruit & Vegetable Wholesalers couldn't deliver produce out to remote communities as they too were cut off by floodwaters. Some businesses chose to air freight produce, while others waited until stock was able to arrive.

At the time of writing, road freight was slowly returning to normal between South Australia and the Northern Territory.

"It's just one of those things – once you've been in the industry for a number of years, you say, 'oh well' and grin and bear it," Moe says.

Price of items can also be an issue for customers.

"A lot of people say, "you're a bit expensive." But I tend to buy top of the range products that I know are going to last those customers when they get out there to the remote communities,"

Moe says.

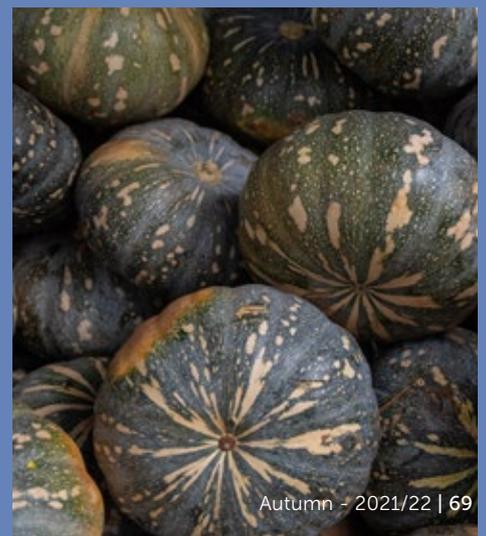
"Most of these businesses only get a load once a fortnight. We're trying to make sure they're getting product that will last that time."

Career reflection

Despite the many challenges, Moe is proud to have grown vegetables and his ongoing contribution to the Central Australian/Northern Territory horticulture industry is to be applauded.

"The most rewarding thing for me is the fact is that when I initially started growing vegetables, I was told it could not be done successfully. Well, I think I have proved that wrong," Moe says.

"We were successful for a lot of years. And now, with the wholesale side of things – we've built a nice little nest egg for my wife and children, which makes anybody feel happy."





Veggies and fruit the 'Pick of the Crop' in pilot program

A pilot program that has been rolled out across three Queensland regions is proving a hit with students, teachers and parents. The 'Pick of the Crop' program is focused on creating a love of nutritious vegetables and fruit in schools across Queensland and was established as a Health and Wellbeing Queensland signature program to tackle the ongoing and persistent low intake of vegetables among children. *Vegetables Australia* reports.

In July 2019, Health and Wellbeing Queensland was created by the Queensland Government to increase the focus and emphasis on health promotion in Queensland, particularly around healthy weight through nutrition, physical activity and wellbeing, as well as addressing health inequities across the state.

Although it is an independent organisation, Health and Wellbeing Queensland works in partnership with government and the broader community to reduce risk factors that lead to chronic diseases. It has been given a mandate to develop a new way of working that requires innovation, partnerships and an element of risk taking that government is not well-placed to deliver.

The organisation is also one of 12 key partners of the Fruit & Vegetable Consortium, which exists to provide the strategic direction and collaborative

action required to achieve a significant and sustained increase of Australian consumers' fruit and vegetable intake.

One of Health and Wellbeing Queensland's programs is 'Pick of the Crop', a primary school-based, whole-of-school healthy eating program that focuses on improving children's vegetable and fruit intake.

Community collaboration

The original idea for Pick of the Crop was to provide opportunities for children to be exposed to vegetables and fruit, particularly throughout the school day.

It then progressed to connecting schools and students to local producers, as Health and Wellbeing Queensland Principal Lead – Public Health Nutritionist Mathew Dick explained.

"Growers in Queensland were having a difficult time because of the drought, so it was a way for us to bring together a number of different portfolio areas – health, education and agriculture – and centre that around what's happening in the school grounds," Mathew said.

"We consulted with bodies such as Growcom and the Queensland Department of Agriculture and Fisheries to work out where we'd deliver Pick of the Crop. From those consultations, we identified growing areas of Bowen and Bundaberg, but we also needed to implement the program in a dense, urban environment.

"The Logan area was an obvious choice for us – a high population, lots of schools and a culturally diverse food scene."

While fruit intake is important, vegetables are seen as a more crucial component of this program.

Consumption figures are critically low – with just six per cent of Australian primary school-aged children meeting the recommended daily intake of vegetables.

School connections

Pick of the Crop is a locally designed program, and each school sets its strategic direction with positive results.

"Each school is very individual, and it's based on what they're doing at the moment – what's in their capability and capacity," Health and Wellbeing Queensland Senior Public Health Nutritionist Charlotte Morrison said.

Education and sustainability are key to program activities.

"The stories that are coming back to us now are diverse, and it's great to see the actions. We have Gardening Grannies, where a local community member comes in to one Bundaberg school and helps support the garden. She talks to the students and helps to make sure they are planting the right crops," Charlotte said.

"We've also linking in with local community groups; in Logan, there's community centres that may be based on-site at the schools working with the parents to host cooking or education sessions."

Participating community groups also take on other programs that may be run by different organisations.

"We didn't want to just come in as another program – it's identifying what schools can use that's already out there," Charlotte said.

"For example, there's the CSIRO Taste & Learn program and the OzHarvest FEAST program. The schools may contact a local nutritionist who comes in and



hosts parent sessions or classroom work. It's looking at what's out there, and we at Health and Wellbeing Queensland support schools to find those initiatives and organisations that fit with their current activities."

Children on farms

Matthew, Charlotte and the Pick of the Crop team have been working with Bundaberg Fruit and Vegetable Growers and Bowen State School to organise farm excursions for school children, which has proven successful when integrated with the teaching and learning components.

"When the kids visit the farm, it's not all about fruit and veg – it's also showcasing how it is produced and the process, including packing and transportation," Charlotte said.

"The kids really valued that, and some of those schools that we're working with have children who will enter the

agriculture sector. It's integrating the healthy eating with giving children the skills, confidence and knowledge of what agriculture is all about."

Anecdotally, program feedback has been extremely positive.

"A lot of the teachers have reported that children have asked if they could go to the garden to pick some lettuce for their sandwich, or they're bringing in better packed lunches with more fruit and vegetables," Charlotte said.

"Kids are willing now to try the different vegetables. Teachers are seeing the kids engaged and those are the stories that really help us who are planning and working on this program know that it's doing its job."

What's in store

The Pick of the Crop program is expanding within Bundaberg, Bowen and Logan in 2022.

"We've expanded from the original set of schools that we had. We started with 60 that were eligible, and we're increasing that to 100 this year," Charlotte explained.

"We'll continue to work with the schools that have been with us in 2021, and we've got knowledge from 12 months of implementation that we can bring into this year."

Vegetable growers interested in hosting students in one of the Pick of the Crop regions can contact Mathew Dick on 07 3234 9929 or email mathew.dick@hw.qld.gov.au.

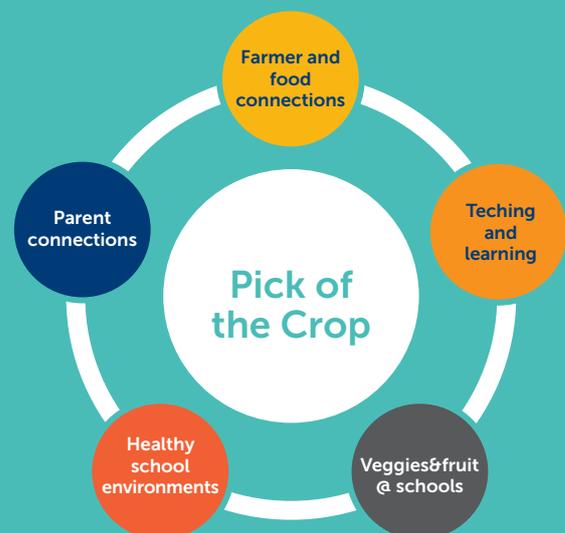
Find out more

For further information or to check out school resources, please visit hw.qld.gov.au/pick-of-the-crop.

Pick of the Crop

Health and Wellbeing Queensland has developed the Pick of the Crop program based on five priority components:

- Establishing farmer and food connections.
- Teaching and learning about vegetables and fruit.
- Introducing fruit and vegetable snacks in schools – for example, through Munch & Crunch/Brain Breaks during the day.
- Identifying and involving the whole school environment – for example, canteens or tuckshops and school gardens.
- Establishing parent connections.



Introducing the Carbon Series for Aussie vegetable growers

The Soil Wealth and Integrated Crop Protection (ICP) project works with growers to put soil management and plant health research into practice. To kick off 2022, the Soil Wealth ICP team has developed the Carbon Series to provide a high-level overview of carbon farming in Australia and how it can apply to vegetable growers, particularly through improved soil carbon management practices. *Soil Wealth ICP Phase 2 (VG16078)* is a strategic levy investment under the Hort Innovation Vegetable Fund.

Phrases such as 'carbon neutral', 'carbon accounting', 'soil carbon sequestration' and 'carbon emissions reduction' are becoming increasingly common when policymakers talk about Australian agriculture. These terms can be summarised under the heading of 'carbon farming'.

Carbon farming in Australia is constantly changing. Generally, it refers to a deliberate set of agricultural practices or land uses to increase carbon stored in the soil and vegetation (sequestration), and reduce greenhouse gas emissions from livestock, soil or vegetation (avoidance).

Carbon farming can offer landholders financial incentives to reduce greenhouse gas emissions within their production system or sequester carbon, in addition to achieving economic and environmental co-benefits through increased productivity and sustainability.

Carbon farming can range from a single change in land management – such as introducing no-till cultivation, cover crops or changing grazing management – to a whole-of-farm integrated plan which maximises carbon capture and reduces emissions.

The good news is that vegetable growers can build on their existing production processes, particularly around improving soil health, to make the transition to carbon farming. Growers should consider the management of carbon in their growing operations not only to reduce greenhouse gas emissions, but to increase productivity through sustainable soil management practices.

Carbon farming involves practices that:

- Improve the rate at which carbon dioxide (CO₂) is removed from the atmosphere and converted to plant material and/or soil organic matter
- Reduce greenhouse gas emissions, measured as CO₂ equivalents, from agriculture.

About the Carbon Series

A new four-part Carbon Series (pictured below) from the Soil Wealth ICP project breaks down the practicalities of carbon farming for vegetable growers and looks more closely at soil carbon management. It provides links to further information and project resources on the following topics:

- Part 1: Carbon farming and its relevance to Australian vegetable growers.
- Part 2: Soil carbon and carbon sequestration.
- Part 3: Carbon emissions in vegetable production.
- Part 4: Carbon accounting and the Emissions Reduction Fund.

These articles can be accessed at soilwealth.com.au/resources/global-scan-and-reviews.

You can also tune into a podcast where the team speaks to Mulgowie Farming

Company and Carbon Friendly about their journey to develop carbon neutral sweet corn in Queensland. Access the podcast here: soilwealth.com.au/resources/podcasts/the-carbon-series-developing-carbon-neutral-sweet-corn.

To wrap up the series you can watch the webinar recording on carbon management on vegetable farms – emissions, sequestration and beyond: soilwealth.com.au/resources/webinar-recordings/carbon-management-on-vegetable-farms-emissions-sequestration-and-beyond.

Food for thought

While carbon farming is a possible option for many Australian vegetable growers, the practicalities of implementing this approach on-farm will depend on the individual circumstances of each business and its goals.



Managing soil carbon – a key player in overall soil health – can increase productivity and reduce the cost of production with the added benefit of reducing greenhouse gas emissions. There may also be marketing benefits for a business and the creation of a more resilient farm from a climate and consumer perspective.

While there may not always be direct financial benefits from reducing greenhouse gas emissions and carbon sequestration, there can be co-

benefits around increased resilience and sustainability including increased biodiversity and water use efficiency, and reduced waste, pesticide and fertiliser use.

To make an informed decision about carbon farming, vegetable growers will need to consider their individual business goals and production circumstances – from the scale of the business to opportunity costs of changing farming practices – and keep on top of changes in the sector as they arise.

Find out more 

Please contact project leaders Dr Gordon Rogers on 02 8627 1040 or gordon@ahr.com.au and Dr Anne-Maree Boland on 03 9882 2670 or anne-mareeb@rmcg.com.au.

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG16078



New focus topics underway for Soil Wealth ICP in 2022!

The Soil Wealth ICP team is in full swing tackling the focus topics for the project in 2022. The team is continuing to dig into the complex world of **soil biology and how it relates to the entire farming system**, including its relationship with integrated crop management practices, soilborne diseases, irrigation, pest management and nutrition management.

The project is also focusing on **integrated pest management (IPM) both in the field and in protected cropping systems**. Growers are being taken back to basics to explain soil health's role in IPM, discussing the management of chemicals to minimise resistance and exploring supply chain requirements including tolerance levels for the presence of beneficial insects.

You can find all new events, resources and demo site information that align with these areas of importance to vegetable growers and the wider industry at soilwealth.com.au.



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Moffatt Fresh Produce Quality Assurance Manager, Eileen Odgers.

Rising through the ranks of quality assurance

Moffatt Fresh Produce is a fifth-generation, family-owned grower and packer of carrots, onions, celery, beetroot and pumpkins. Packing facilities are based in the fertile Fassifern Valley located on the Scenic Rim, an hour from Brisbane. The business has expanded in recent years with growing sites across the Fassifern Valley, Lockyer Valley, Darling Downs and Stanthorpe regions. It now supplies produce to Woolworths, Aldi, Coles, Hello Fresh, market customers and export markets.

This makes Eileen Odgers a vital key to the business' success. Eileen is Moffatt's Quality Assurance Manager, and her tasks include facilitating third-party audits and ensuring compliance to Food Safety Standards and Customer Requirements. Moffatt's packing facilities are currently certified with the Harmonised Australian Retail Produce Scheme (HARPS), Freshcare, Safe Quality Food (SQF) and SEDEX.

Eileen Odgers arrived in Australia over a decade ago from Ireland, and initially worked on-farm to secure a Working Holiday Visa. Today, Eileen calls Australia home and holds the Quality Assurance Manager position at Queensland-based operation, Moffatt Fresh Produce. *Vegetables Australia* speaks to Eileen about her role, the challenges faced and her thoughts on the Australian vegetable industry.

"We are also an Export Registered Establishment and accredited for export to Taiwan. Recent years have seen continuous developments in food safety standards and legislation, which has kept me busy developing, writing and implementing new policies and procedures for our sites," Eileen explains.

"Working closely with our Quality Control Coordinator, I oversee and maintain our on-site Food Safety Management system.

"We have a small team of Quality Assurance Officers, who – using the iAuditor app – ensure compliance to customer specifications and legislation. This is done through various inspections in our packing facilities, including finished product assessments, weight verification checks and packaging & date coding verification checks.

"My role as the Quality Assurance Manager is busy and at times challenging, but ultimately rewarding."

Journey to Down Under

Eileen first became involved in horticulture 13 years ago as a backpacker visiting Australia on a 457 Working Holiday Visa.

"I was required to undertake 88 days of agricultural work to secure my second-year Working Holiday Visa. I was involved in the production of potatoes and onions, returning to this company for a second harvest season where I was offered a permanent sponsored position," she says.

"It was a multi-faceted role that involved areas of quality assurance, compliance and operations. On my travels around this beautiful country, that I am lucky enough to now call home, I have also been involved in the production of mangoes and avocados." Eileen holds a Master of Business Studies Management and has furthered her skills that now include lead auditor, internal auditing, and quality assurance and



food safety management qualifications. These all contribute to the managerial responsibility and important decision-making processes required daily as Moffatt's Quality Assurance Manager.

Eileen has been at Moffatt for over five years and has seen plenty of changes during that time.

"When I first started with the company, our two main products were carrots and onions. I have participated in the expansion of the business with the following new products: Dutch carrots, beetroot, bunched beetroot, pumpkins, celery and most recently, celery hearts and celery sticks. I've helped integrate these into our quality management systems," she says.

As Quality Assurance Manager, Eileen explains that implementing a new product is a long process that requires the development and verification of the product process flow; development of a HACCP Analysis for the product; shelf-life verification & packaging trials and accompanying pre-requisite programs.

Each customer has a different process and unique requirements to ensure all specification and legislative requirements are met.

Finding solutions

In Eileen's role, the biggest challenge is increasing food safety compliance and the strengthening of food processing legislation.

"In this current climate, food defence and food fraud are more important than ever before," she says.

"The knock-on effect is an increase in workload for me, which includes updating policies and procedures in line with changes, implementing new requirements

throughout the business and providing additional training for staff."

Moffatt has implemented innovative solutions to address the challenges that the business faces.

"Moffatt has embraced the use of apps and technology throughout the business, including inductions at reception to farm operations, farm maintenance and servicing, as well as preventative maintenance in our packing facilities to the quality and compliance of the finished product," Eileen says.

Eileen sees opportunities for growth in the vegetable industry, particularly in the automation and robotics space.

"The ongoing labour shortage has really highlighted how much horticulture relies on overseas workers as the predominant casual labour source. There are in-field and packing shed operations in this industry that could be automated but are still being carried out manually," she explains.

"I believe this is partly due to the high cost associated with automation and robotics. More affordable technology for farming and packing would help relieve some of the ongoing labour challenges."

Providing opportunities

Eileen believes opportunities for education is the key to encourage more women into horticulture.

"I would like to see further funding in female leadership development; for example, programs such as the Women & Leadership Australia and Hort Innovation scholarships that are currently on offer for applicants," she says.

"The increasing input costs associated with farming, production and freight means there is now simply too many

conflicting expenses for businesses in this industry. There is a need to increase the number of full scholarships available that cover 100 per cent of the program fees.

"I am excited to see the continued growth of women in leadership positions across the management spectrum. It is important that we are not defined by our gender."

Passion for horticulture

Eileen says the most enjoyable aspect of working in the horticulture industry is the continuous on-the-job learning.

"No two days are the same in my role, and each day brings a new challenge to overcome. It helps to build resilience and provides great job satisfaction," she says.

Eileen is proud to be an integral part of some of Moffatt's key programs that have been implemented in the past five years, including accreditation to HARPS and SQF.

Some further highlights for Eileen have been developing a quality management system for a newly built packing facility with a medium care processing room, and modernising Moffatt's quality assurance and control records from manual to electronic.

"Completing these projects has been a huge undertaking that required a big team effort. They have provided invaluable learning opportunities," Eileen says.

The final word

According to Eileen, it is an exciting time to part of the horticulture industry.

"Consumers have a renewed interest in the origins of their fresh produce, and safe Australian grown fresh vegetables are more important than ever before," she explains.

"This industry will continue to face ongoing challenges – like the extreme weather we are experiencing – but farmers have incredible resilience and ability to keep going.

"I'm eager to witness continued advances in areas such as technology, improvements in environmental issues like water and soil health, and securing a stable labour stream to maintain the industry."

Regenerative agriculture approach paying off for veg growing operation

After 30 years of growing vegetables in southern Queensland, Rob Hinrichsen is well-placed to assess the impact of soil health on his farming operation. Rob founded vegetable production and packing company, Kalfresh, with his father in the Fassifern Valley. The operation has expanded considerably over the years to supply produce year-round. In this article, Rob speaks about his soil health journey and what lies ahead.



The passion Rob Hinrichsen brings for growing healthy, tasty, nutrient-rich food centres around healthy soil. Kalfresh is well known for growing carrots, but also produces onions, green beans, sweet corn, baby capsicums and pumpkins.

Crucially, whenever there is a gap in the crop rotation of greater than two months, the operation will put in a cover crop rather than leaving the ground bare.

“With our summer-dominant rainfall, cover crops provide ground protection during the wet season. It’s then much better for our soil – if we do get any form of runoff – to stop the siltation and removal of nutrients from the farm,” Rob explains.

“Also, during the heat of summer, we’re actually capturing that sunlight and turning it into carbohydrate and pushing it into the soil, which is a far better outcome.”

Cover crops are mostly simply direct-drilled into beds when the beans and sweetcorn have been harvested, making the most of residual moisture.



Innovation at work

Controlled traffic farming is also a focus for Kalfresh, and Rob believes it is making a big difference. However, it hasn’t been easy, as the operation originally needed to adapt the technology from industries such as cotton to fit horticultural systems.

“We’re in a very rich, nutritious clay-based soil and driving on it with large machines just destroys it. As soon as we could get our machinery off where we’re going to grow our crops and put it on dedicated lanes, the soil just responded almost immediately,” he says.

From there, Rob and his team evolved to making their own compost and they are now applying it on Kalfresh land at least once a year. It’s a healthy soil systems approach that works in tandem with cover cropping and using biological products.

“We started making a compost out of used mushroom substrate, which is very high in all kinds of minerals that we need on the farm, and we also used chicken manure,” Rob says.

Another big focus for Kalfresh has been to reduce the waste that comes out of its packing sheds. Some of it can be fed to cattle, while some – such as waste onions – is used to make a more long-term humic-style compost.

When asked whether he believes cover cropping is worth it, Rob has a very simple answer – the process has to be treated as an investment.

“Treating the cover crops well and growing the biomass is important. But all that being said, I’ve seen some amazing things happen in multi-species cover crops that don’t happen in normal cropping,” he explains.

Sustainability focus

It has been an evolving journey. The original aim was to grow as many tonnes of cover crop as possible, before shifting to promoting on-farm diversity with multi-species cover crops as a way of maximising soil carbon and reducing pest pressure.

“It’s actually the carbon that the cover crop captures out of the air – and exudes from its roots as a component of the carbohydrate it uses to attract different fungi and bacteria – that is actually bringing our carbon level up, more so than ploughing in tonnes and tonnes of biomass,” Rob says.

The original spark to focus on soil health came from Rob’s involvement in the Bayer group Partnering With Innovation (PWI). Rob recently shared his soil health journey on HortCast, a Bayer podcast that delivers horticultural news and insights from innovative growers and consultants through a portable and informative show.

Rob told HortCast that his focus in the future is on strip tillage and controlled traffic harvesting. There’s still plenty left in his soil health journey, and he’s excited by the prospect.

“Soils are ancient things and changing them takes time. Even the issues that we’re seeing, or we have seen on our farm, are the result of 100 years of agriculture – and now we’re trying to reverse it,” Rob says.

“It’s like turning a ship; it takes time. And like I say, it’s an investment in the future.”



Find out more

To listen to HortCast, please visit crop.bayer.com.au/news-and-insights/hortcast.



Pictured (from L-R) Lockyer Valley Growers Group President Michael Sippel, Hort Innovation Head of Extension Jane Wightman, The Hon. Mark Furner MP, Minister for Agricultural Industry Development and Fisheries and Minister for Rural Communities with AUSVEG Deputy Chair Belinda Frentz and DAF Director of Vegetable, Systems and Supply Chains Research, Development and Extension Ian Layden.

Smarter farming on the horizon for Australian veg growers

In November 2021, it was announced that a multi-million-dollar 'Smart Farm' will be established in Gatton, Queensland. The Queensland Department of Agriculture (DAF) is partnering with Hort Innovation in the delivery of this project. The facility will give growers unprecedented access to the latest ag-tech on the market. Michelle De'Lisle speaks to DAF's Ian Layden about the Smart Farm and what it will offer the Australian horticulture industry.

The Smart Farm facility in Gatton is set to combine technologies that encompass the entire farming system. This includes protected cropping, field robotics and sensors – paired together with post-harvest, supply chain and export development work.

It will comprise a 'hub' in Queensland, and a series of 'satellite' farms where equipment or development work that suits various crops or regional needs will be trialled.

Queensland Department of Agriculture (DAF) Director of Vegetable, Systems and Supply Chains Research, Development and Extension (RD&E), Ian Layden, is the thought-leader behind the concept, and he explained why establishing the Smart Farm is crucial to the vegetable industry.

"While the vegetable industry will always have the need for pre-farmgate agronomy-based R&D in areas such as pest management – they're critical problems that growers face daily – we needed something a bit more future-

focused that was looking over the horizon, bringing together the field, pre-harvest, protected cropping, post-harvest and export environments," Mr Layden explained.

"We'll be looking at things like unique packaging, testing varieties for certain markets, working with seed and protected cropping companies and ag-tech companies."

Mr Layden added that the project – along with an additional \$2 million of capital funding provided by DAF – has allowed researchers to prioritise new skills and staff posting to service the industry and help to position growers for future challenges and opportunities.

"It allows us to reimagine the RD&E services and establish critical research infrastructure, such as a multi-bay climate-controlled glasshouse, which will enable current and new crop protection work to take place in modern facilities that industry and researchers need to solve grower problems."

Growing the concept

When Mr Layden was appointed DAF Director of Vegetable, Systems and Supply Chains RD&E in late 2018, he began thinking about the Smart Farm initiative and what it could offer the industry.

"From a government and state agency research point of view, our Gatton Research Facility is the jewel in the crown in terms of vegetable RD&E in Australia – but to better support industry into the future it needed an injection of new thinking and infrastructure," he said.

"I set about developing more conceptual plans and talking to industry as well as local grower groups including Lockyer Valley Growers, and road testing some of these ideas.

"With the Queensland Government investing close to \$9 million over five years, this is a flagship initiative – and with an investment of this scale, we wanted to test the concept with Hort Innovation. In those discussions, it became clear that →



DAF Development Horticulturist Aneesh Karunakaran pictured assessing a sweet corn crop in the Fassifern Valley, Queensland.

Adoption focus

Mr Layden pointed out that the project's goal is to help growers adopt new practices, whether it be protected cropping, production or supply chain practices, with an opportunity of including robotics.

It will leave a long-lasting legacy for the vegetable industry.

"The benefit of the Smart Farm is that it continues to cement the critical importance of vegetable focused RD&E. It secures future R&D for the vegetable industry, investing in not just facilities, but people – developing the next generation of vegetable researchers," he said.

Mr Layden added that this investment will look to 'de-risk' the ag-tech adoption for growers.

"Most growers will tell you there's a lot of ag-tech out there on the market. Some of it looks really promising, others less so. We'll have the ability to try and de-risk some of that technology, so people can see it working in front of their eyes in local conditions," he said.

"There's a lot of potential within digital horticulture and ag-tech; however, there's still an element of market failure that exists. This type of investment can try and take the risk out of it for industry, and members can see it working and then adopt it themselves when they're feeling more comfortable."

Industry collaboration

All activities will be directed by industry demand, and a range of industry partners will be consulted in the procuring of tools for use through the facility and on commercial farms.

"We've installed a Smart Farm server, which means tech companies and growers can access the sensor data that we're in the process of deploying," Mr Layden said.

"For example, soil moisture bore monitoring technology, bore height and water quality condition, which is an issue in the Lockyer Valley.

"We're also developing a control tower with project collaborators Hitachi Vantara. This will be a customised interface decision support tool, where information coming in will be analysed and aid in data-driven decision making.

"There is an advanced weather network that DAF set up around 18 months ago in the Lockyer Valley and Darling Downs, which is comprised of 50 weather stations established in partnership with the Bureau of Meteorology and Telstra. This data will be available to all growers and soon we'll be asking local growers to help us fine tune how that data is displayed."

Meanwhile, another ag-tech component to the Smart Farm will be a retractable roof protected cropping structure.

while Gatton would be a focus of the initiative, the work in protected cropping, post-harvest and agricultural technology more generally would be of benefit to a range growers across Australia."

DAF then worked with Hort Innovation to develop the concept under the Hort Frontiers Advanced Production Systems Fund.

"In hindsight, going to Hort Innovation and having to slightly rethink the concept has been a good thing. While it's early days, tying this project in with a Research and Development Corporation will provide a much better legacy, direction and shape for growers," Mr Layden said.



DAF protected cropping trials at the Ayr Research Facility, Queensland. Images courtesy of the Queensland Department of Agriculture and Fisheries.



Eggplants grown with protected cropping in north Queensland.



DAF Senior Development Horticulturist Dr Julie O'Halloran tests the latest drone technology in the Fassifern Valley, Queensland.

Growers will be able to visit the Smart Farm once it's fully operational, with the DAF team aiming to host a minimum of one open house event annually across the project's lifespan. It is also hoped that through working with the VegNET 3.0 project inbound and outbound study tours can occur.

Get in touch

Mr Layden and the project team would like to hear from growers and other horticulture industry members.

"If they want to access the site or if they want us to talk to them more one-on-one about the possibilities that an initiative like this offers, and how it might apply to them, I encourage them to reach out," he said.

The first step will be to have a rolling Expression of Interest (EOI) process where growers and technology providers can register their interest.

"We'll be asking growers across Australia to register interest in becoming a demonstration farm and/or interest in a problem they would like to see solved. We expect the EOI process to 'go live' in early March. Similarly, we will ask technology providers to express an interest in the project," Mr Layden said.

"This model is quite novel and unique today – but in five years' time, we hope it's just seen as a way forward for a mix of RD&E in vegetables and other crops.

"We have ideas about expanding this concept to other parts of the state; possibly working in more of a tree crops environment in Mareeba or Bundaberg – which are both powerhouses of horticultural production."

"The plan is to have multiple roof openings to allow a number of trials to be running concurrently and under different environments. That'll be a fully automated system," Mr Layden explained.

"The project has received excellent support from protected cropping companies, and – in conjunction with seed companies like Rijk Zwaan and Lefroy Valley – there is great potential to optimise and showcase the possibilities of protected cropping in the sub-tropics, and link that to supply chain work."

Grower involvement

Vegetable growers have already started to get involved in the Smart Farm, with growers interested in accessing post-harvest expertise as well as interest in undertaking robotic weeding trials.

"We've also been approached by protected cropping growers wanting to test varieties for certain markets. We can grow those field crops now in our research site or at their place and move them through into a post-harvest or simulated supply chain environment, as well as testing different packaging," Mr Layden said.

Throwing support behind ground-breaking facility

Hort Innovation Head of Extension Jane Wightman said the technologies showcased through the Gatton Smart Farm will help growers across Australia better manage plant growth and production, improve supply chain efficiency and customer satisfaction.

"Horticulture is the fastest-growing agricultural sector in Australia – with a 27 per cent hike in value over the past five years to \$15.1 billion, and our modelling shows that figure could double by 2030," she said.

Ms Wightman said technology adoption will be key to keeping pace with this rapid growth; however, that can prove a challenge.

"It can be difficult to navigate the digital agricultural marketplace and to know where to invest," she said.

Ms Wightman echoed the sentiments of the Queensland Department of Agriculture's Ian Layden, who said the Gatton Smart Farm will help growers to 'de-risk' ag-tech.

"This will enable them to select and experience the latest technologies firsthand and understand the costs and benefits of adoption," she said.

Find out more R&D

For further details or to register your interest in Gatton Smart Farm activities, please contact Ian Layden on 0409 495 737 or email gattonsmartfarm@daf.qld.gov.au.

More information can be found at daf.qld.gov.au/agtech/be-inspired/smart-farms/gatton-smart-farm.

Driving ag-tech adoption across Australia is funded by the Hort Frontiers Advanced Production System Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from the Queensland Department of Agriculture and Fisheries and contributions from the Australian Government.

Project Number: AS20007



Hort Innovation vegetable fund investments (levy projects)

Ongoing investments 2021/22

Project code	Delivery partner	Project title	Project description
MT21008	Plant Health Australia	National Bee Pest Surveillance Program: Transition program	<p>This investment is delivering a national coordinated bee-pest surveillance program to help safeguard honey bee and pollinator-dependent industries in Australia. The National Bee Surveillance Program was established in 2012, supported by the previous <i>National Bee Pest Surveillance Program</i> (MT12011) and <i>Enhanced National Bee Pest Surveillance Program</i> (MT16005).</p> <p>The program will conduct surveillance for 13 pests that impact honey bees (mites and beetles), and pest bees that could either carry hitchhiking parasites or could themselves cause detrimental impacts to honeybees. The program activities include upgrading sentinel hive arrays, strengthening relationships with surveillance operators and more. The surveillance is designed to enable the early detection of high-priority pest incursions that can impact on honey bees, providing the best opportunity for successful pest eradication.</p>
MT21003	Kantar Insights	Consumer demand spaces for horticulture	<p>This investment is identifying and prioritising opportunities to engage consumers and build demand across the domestic market for fruits, nuts and vegetables. It will deliver a framework that can be used by industry to inform their decision-making around product development and marketing campaigns. The project team will compare the current 'state of play' against identified opportunities and prioritise based on potential impact.</p> <p>The framework will be informed by research into:</p> <ul style="list-style-type: none"> • Current market landscape and competitive dynamics. • Consumer segmentation. • Consumer occasion-based needs. • 'White space' opportunities where consumer needs are currently unmet.
VG21000	AUSVEG	VegNET 3.0	<p>This investment is tasked with keeping Australian vegetable growers informed about current R&D activities, results and resources – supporting the adoption of industry best practice and bolstering vegetable productivity and profitability in key growing areas across the country.</p> <p>The program is nationally coordinated by AUSVEG and delivered 'on-the-ground' by regional development officers (RDOs) in key vegetable-growing regions who are responsible for developing and executing regional extension plans. This includes identifying each region's key priority issues and key regional resources and links - a critical step in ensuring growers receive assistance and information that meets their needs and will help them grow better crops and operate more efficient and profitable businesses.</p>
VG16037	The University of Queensland	Novel topical vegetable and cotton virus protection	<p>This project aims to minimise the economic impact of pest infestation in both vegetable and cotton businesses*, through the development of an innovative topical protection medium, BioClay. The high-tech BioClay spray acts like a vaccine, to naturally attack specific crop pests and pathogens using non-toxic, biodegradable clay nano-particles that activate the plant's own immune system.</p> <p><i>*The project involves co-funding from the Cotton Research & Development Corporation (CRDC), and other parties</i></p>

Project code	Delivery partner	Project title	Project description
MT20005	Queensland Department of Agriculture and Fisheries	Management strategy for serpentine leafminer, <i>Liriomyza huidobrensis</i>	This project is developing and delivering targeted R&D specifically for serpentine leafminer in response to the incursions detected in late 2020. The project is building on the initial work of recently completed <i>RD&E program for control, eradication and preparedness for vegetable leafminer</i> (MT16004).
MT18008	The Department of Primary Industries and Regional Development, Western Australia, in collaboration with others	National tomato potato psyllid and zebra chip surveillance	<p>Tomato potato psyllid (TPP) is one of the world's most destructive horticultural pests. This is because the psyllid acts as a vector for the bacterium <i>Candidatus Liberibacter solanacearum</i> (CLso), which is associated with 'zebra chip' disease and 'psyllid yellows' in solanaceous plants.</p> <p>In 2017, TPP was found to have established in Western Australia, but not to have spread further. This investment supports a critical national surveillance, identification and reporting program for the pest and CLso across Australia on behalf of the horticulture industry. Highly collaborative across states and territories, the program is designed for the early detection of and preparedness for TPP should it cross from Western Australia into other regions.</p>
LP16000	Women & Leadership Australia	Advancing women's leadership across the Australian Horticultural Sector – Pool 2	This investment provides women in the horticulture industry the opportunity to apply for leadership development courses. The scholarship funding delivered through the project is intended for women across all levels of leadership experience and covers up to 60 per cent of their program costs. The courses on offer are provided by Women & Leadership Australia and include Leading Edge, Executive Ready and the Advanced Leadership Program. Each course is targeted at a different experience level, and they aim to provide participants with skills such as how to heighten presence and influence, manage team dynamics, drive performance and lead innovation and change.
VG17003	Western Sydney University	National Vegetable Protected Cropping Centre	<p>In November 2017, the nation's first state-of-the-art vegetable glasshouse-production research centre was launched.</p> <p>This project continues to facilitate work at the facility, with the aim of manipulating inputs to create the optimum environment to drive maximum harvest windows and overall yield for a variety of vegetables, then share this information with Australia's growers. Through this facility, industry also aims to attract new entrants to horticulture careers by offering students access to some of the most advanced technology currently available.</p>



Dark head with Y-shaped light marking on FAW larvae. Image courtesy of Shutterstock.

Fall armyworm management guide for vegetable crops

A management guide for fall armyworm has recently been developed by AUSVEG, with assistance from the Queensland Department of Agriculture and Fisheries. The guide is now available to growers and industry in an online and hard copy format. AUSVEG Biosecurity Officer Zali Mahony reports.

Fall armyworm (FAW) is a significant threat to horticultural production globally and is now posing a risk to Australian horticulture. A destructive pest that attacks more than 350 plant species overseas, fall armyworm was first detected in Australia in January 2020 and travelled from the Torres Strait to Tasmania in just 14 months.

What to look out for

FAW larvae look similar to other armyworms present in Australia. However, there are two distinguishing features of FAW larvae that can be used for identification:

1. Four dark spots at the end of their body arranged in a square.
2. Dark head with an upside down, pale Y-shaped marking.



Four dark spots on FAW larvae. Image courtesy of Russ Ottens, University of Georgia, Bugwood.org.

Integrated pest management approach

The key to efficient control of FAW is an integrated pest management (IPM) program, inclusive of an artillery of sustainable practices. Cultural farm practices, biological control or conservation of natural enemies – as well as biopesticides and conventional insecticide applications – offer opportunities for future management of FAW.

Although there are chemicals that are available for control of FAW, the pest is known to quickly develop insecticide resistance to certain chemical groups. For example, evidence collected from Western Australia claims that FAW populations are resistant to group 1A (Carbamates) and 1B (Organophosphates) insecticides. Viable biological control options for FAW populations in Australia are currently being studied; however, research is in its early stages.

Monitor your crops regularly

Early detection of FAW ensures a quick response and accurate timing of control methods. Regular crop surveillance and monitoring for FAW eggs and larvae is the foundation of a successful IPM program and helps minimise damages and reduce harvest losses.

For more information on chemicals available to control FAW, biological control options and crop monitoring techniques, download a copy of *Management of fall armyworm in vegetable crops in Australia*: ausveg.com.au/app/uploads/2021/12/Final-pdf-standard-faw-guide_compressed.pdf or email Zali Mahony on the details below if you wish to receive a hard copy.

Find out more



Please contact AUSVEG Biosecurity Officer Zali Mahony on 03 9882 0277 or email science@ausveg.com.au.

Investigating property insurance costs, including panels and cool stores

If you have a cool store on your property, you might have noticed that your property insurance has increased substantially over the last few years. The reason behind it is that most insurers think your cool store is going to catch fire and as a result, they load your premiums to manage their expected risk. Further to this, insurers have been raising premiums and at the same time reducing the amount of risk (or exposure) that they hold. It's not uncommon on larger risks to now require multiple insurers to cover your cool store.



Get really covered and expect the unexpected.



Insurance can be overwhelming.



EPS panels come in 11 different types.

Insurers are most likely taking a far too conservative view of your risk assessment on your property, and AB Phillips understands that your panels may need to be reviewed differently to the existing risk analysis. Our perspective can present your risk to insurers in a different light, usually resulting in premium reduction, or opening markets that haven't been available to you in the past.

EPS panels have got a bad reputation

Most cool rooms keep their cool because they're insulated with Expanded PolyStyrene (EPS) panels. EPS panels have gained a bad reputation among insurance underwriters over the past 10 years because EPS panels have been involved in over AU\$1billion of property insurance payouts from large fires.

This has meant that a number of underwriters have removed themselves from the EPS Panel market. It's also meant that the remaining underwriters are left holding more of the risk themselves – something they don't like to do unless they raise their premiums to reduce their exposure.

Types of EPS

When most insurers hear EPS, they think 'fire risk' and they react accordingly. However, there are 11 different types of EPS panels – something that isn't widely recognised. Among those 11 types of

panels, there's the dangerous ones that are a fire risk, and the ones you've most likely got insulating your cool store, which are less hazardous.

EPS panels are mostly assessed for risk overseas

Insurers and actuaries are a very professional group of people who spend a lot of time assessing and analysing risk using historical claims data as part of their analysis. Many times, the historical data used in their current risk assessments can be misleading as upgrades to properties and technological advances are not taken into consideration. The risk in terms of EPS Panel is not currently viewed in a segmented way, but as one risk – regardless of your panel type.

Finding a solution

Over the last few years, the AB Phillips team has educated and trained its staff in property insurance, particularly in relation to insulated panels and cool stores.

We have refined the understanding of the risk profiles of different types of panels with the underwriters. So they know when we come to them looking for a policy, we'll be able to give them a better understanding of how much risk they are really taking.

We are also the endorsed insurance provider for the Insulated Panel Council of Australasia Ltd. We work closely with the Council to ensure we assist all

members and affiliates when it comes to insurance for anything that contains insulated panels.

We also don't just try to insure a business short-term. We take the time to make an analysis, order a survey and ensure we provide a long-term strategy to keep businesses open with affordable insurance.

Minimising risks

As well as helping insurers understand there is more than one type of EPS panel, we have also gained a stronger sense of what the red flags will be for these insurers. It's why we like to work with our clients before looking for a policy – giving them advice around additional risk reduction that makes it easier for our underwriter partners to offer a realistic and long-term policy.

By doing all this – improving understanding, reducing risk, and working with you before taking to the underwriter – we can help you get the most affordable premium for your coverage, potentially saving you thousands of dollars a year.

Find out more

If you would like to know more about how to make your EPS Panel insurance more affordable, please visit the AB Phillips website: abphillips.com.au/industry-specialities-eps-insulated-panel-insurance, call 1300 242 136 or email insurance@abphillips.com.au.

Commodity Profile:

Beans

35,641 tonnes

of beans were produced at the value of \$74.6AUD million in the year ending June 2021. The wholesale value of the fresh supply was \$82.1 million, with \$69 million distributed into retail and \$13.1 million into food service.

Source: Australian Horticulture Statistics Handbook 2020/21

44%

of Australian households purchased green beans with an average of 497 grams bought per trip.

Source: Australian Horticulture Statistics Handbook 2020/21

Concluding in 2018 was a project that set out to identify ways to increase the average yields of the target processing vegetables, which includes green and yellow beans. Five factsheets were developed, based on the information collected during the project. To view the factsheets and final report, search 'VG16011' on the InfoVeg database.

In 2016, a project entitled *Characterisation of a Carlavirus of French Bean* was initiated to determine the cause, nature and management of the disease caused by this Carlavirus. The major green bean varieties currently used are highly susceptible to the virus. Thirty-four bean varieties were assessed for virus tolerance and agronomic characters in three field trials. To read the final report, search 'VG15073' on the InfoVeg database: ausveg.com.au/infoveg/infoveg-database.

Veggycation® advises that the optimum post-harvest storage temperature for beans is 5-7.5°C. Lower temperatures result in chilling injury – opaque discolouration, pitting on the surface and rusty brown spots. Higher temperatures result in faster deterioration. Beans stored at >10°C lose chlorophyll, and soften and shrivel more so than those stored at <10°C.

Export Opportunities for Carrots, Sweet Corn, Beans, Broccoli and Baby Leaf – Symposia commenced in February 2014 and encompassed four seminars from 2015-2018. The focus of the project was developing and running a series of seminars that were designed to build the knowledge and capabilities of exporting vegetables to levy-paying growers in the industry. Read more by searching 'VG13072' on the InfoVeg database.

According to Veggycation®, beans should be harvested when the fruit is bright green, the pod is fleshy, and seeds are small and green. Beans should be well formed and straight, bright in colour with a fresh appearance, and tender but firm. They should snap easily when bent.

The Good Mood Food states that beans are a source of biotin and carotenoids (antioxidants), that help them to boost your mood and add goodness to any day. Green beans are in season during summer but available all year.



Sclerotinia can be a real concern for growers in mild, wet conditions.

About Syngenta

Syngenta is a leading agriculture company helping to improve global food security by enabling millions of farmers to make better use of available resources. Through world-class science and innovative crop solutions, our 28,000 people in over 90 countries are working to transform how crops are grown. We are committed to rescuing land from degradation, enhancing biodiversity and revitalising rural communities. To learn more, please visit syngenta.com.au and goodgrowthplan.com. Follow us on Twitter at twitter.com/SyngentaANZ.

Offering a new solution for sclerotinia control

In this 'Ask the industry' column, Syngenta Technical Services Lead Brandy Rawnsley discusses the causes and symptoms resulting from the soil-borne fungal disease, Sclerotinia, and the methods of protection that are now available to Australian potato growers.

Sclerotinia may be more problematic over the coming months for potato growers, with higher than average rainfall prolonging wet soil conditions during the growing season. Sclerotinia is a soil-borne fungal disease, so can be hard to control and often arises late in the season when stems contact infected soil.

Sclerotinia produces black sclerotia that can survive in soil for up to 10 years and infect new plantings. For this reason, the disease can be very difficult to control – especially under pivots with a history of disease.

The disease is more serious under milder temperatures (15–21°C) and prolonged wet weather conditions, particularly on susceptible varieties. Excessive irrigation or water-logged areas of the paddock are more susceptible to infection and dense crops favour infection due to poor air circulation.

Sclerotinia sclerotiorum have large black sclerotia (1-2 centimetres long) that can resemble rat dung at the base of the plant. Symptoms on stems include white fluffy mycelium and soft rot, which leads to stem and plant death. The fungus also has spores that can be spread by wind

and in high humidity can even cause soft rot on higher leaves of the plant.

Growers now have a new solution for *Sclerotinia sclerotiorum* with the introduction of MIRAVIS® Prime fungicide.

MIRAVIS® Prime combines the powerful active ingredient pydiflumetofen (Group 7) with fludioxonil (Group 12), with both actives having powerful activity against sclerotinia. It also delivers optimum protection against target spot (*Alternaria solani*) and botrytis, so provides an effective choice for disease defence control in potatoes.

Providing protection

Pydiflumetofen works internally, moving very quickly into the waxy cuticle of the leaf and giving long-lasting protection. Fludioxonil is a contact fungicide and protects the surface of the leaf. Having these two modes of action means MIRAVIS® Prime can attack fungi at multiple sites with the added benefit of resistance management.

A preventative fungicide program – together with cultural practices such as crop rotation and irrigation frequency – will provide the best protection

against sclerotinia.

Up to two applications of MIRAVIS® Prime can be applied per season. Foliar sprays early in the season inhibit the fungi entering the plant from the soil, while a later season application (post-flowering) stops the disease before symptoms appear.

Recent use of the product in the Griffith region of New South Wales showed outstanding control of sclerotinia, even in high disease pressure situations. Target spot was also controlled, giving potato growers confidence of achieving full yield potential.

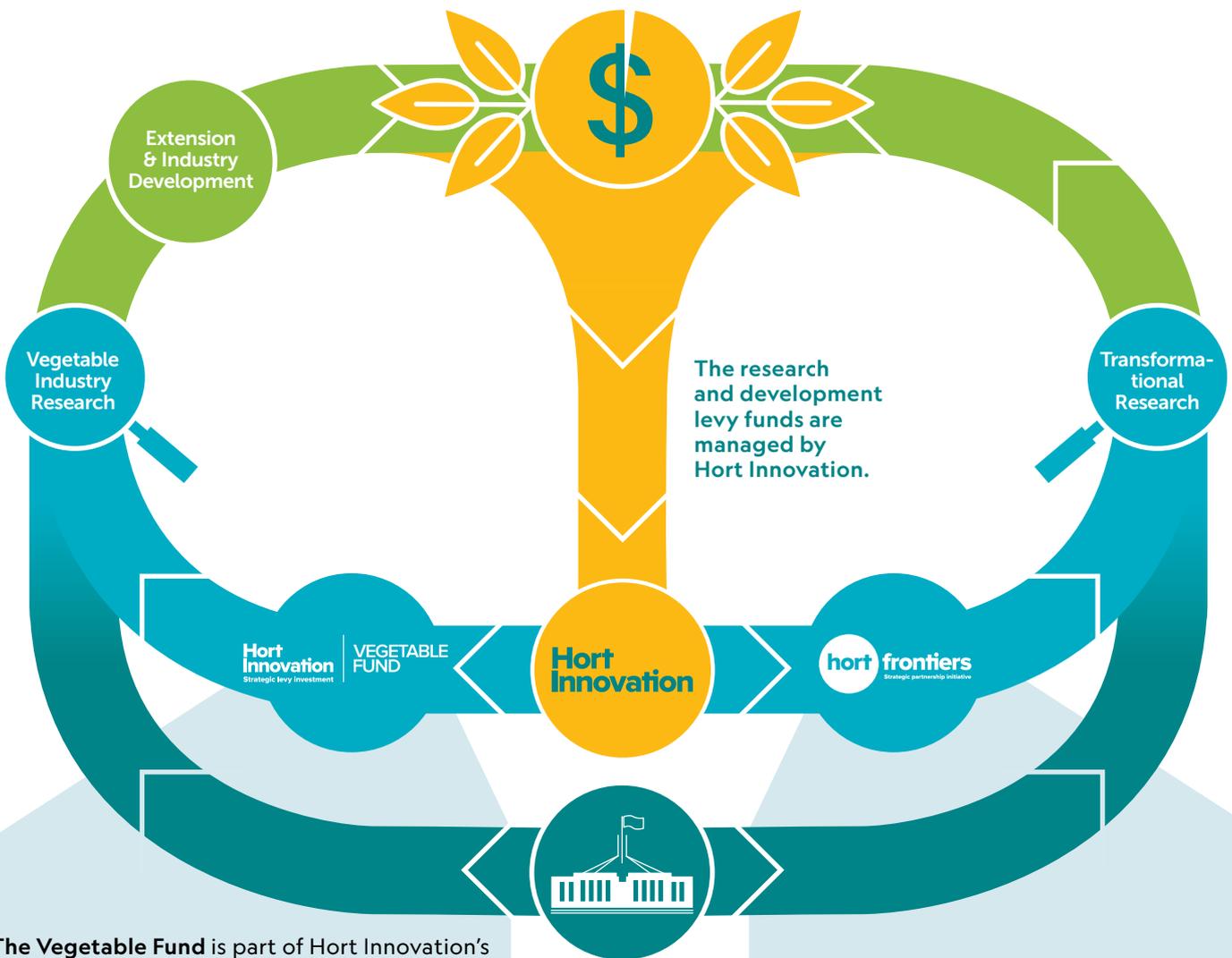
Find out more

For more information or to ask a question, please contact your local Syngenta Territory Manager, the Syngenta Advice Line on 1800 067 108, visit syngenta.com.au or email Vegetables Australia: communications@ausveg.com.au. Please note that your questions may be published.

The R&D content for this article has been provided to *Vegetables Australia* to educate Australian vegetable growers about the most relevant and practical information on crop protection technologies and their on-farm applications.

How does the vegetable R&D levy work?

Vegetable growers currently pay a levy of **0.51%** at the first point of sale.



- + **The Vegetable Fund** is part of Hort Innovation's strategic levy investment activities.
- + All of these investments are made with advice from the industry's Strategic Investment Advisory Panels (SIAPs) and informed by the industry's Strategic Investment Plan.
- + The Vegetable Fund invests in R&D that is designed to directly benefit growers in the vegetable industry.
- + Research projects are supported by a multi-platform industry communications project, as well as a comprehensive extension project (VegNET) to support growers, and to increase awareness and adoption of research outcomes.

The Federal Government also provides funding

- + **Hort Frontiers** is a strategic partnership initiative and does not involve grower levies, unless an industry chooses to become a co-investor.
- + These projects have a long-term focus and are designed to solve major and often complex challenges to secure the future of Australian horticulture.





Packaged products like strawberries are inspected in the production environment.



Oranges on the production line pictured being inspected.



Tomatoes are another commodity that must be checked before leaving the production environment.

Providing the right tools to meet product inspection standards

The increasing demand for high-quality, fresh convenient produce has meant that product inspection standards must be adhered to. Many businesses now require the correct weighing and inspection equipment as well as reporting and data capture solutions. *Vegetables Australia* reports.

In today's convenience era, fresh produce has expanded to cover more than just fruits and vegetables purchased by the unit or kilo. This category now includes packaged items, such as sliced fruits and vegetables, individually packaged salads, salad mixes, herbs, and many more.

These products must be inspected to ensure that contaminants and underweight products do not make it out of the production environment.

Because of the variety of growing and processing operations, the fresh produce industry often inspects products for a wider range of contaminants than other manufacturing operations, including not just metal, but stones, dense plastics etc.

Additionally, the nature of the seasonal business can be very demanding and require zero downtime to keep production running smoothly, requiring product inspection equipment that can stand up to heavy use.

There is no rest for the weary in the fresh produce industry. Between the seasonality and the shelf-life of products, there's little room for error – especially with pressing demands for higher productivity and profitability coming from every angle.

Despite these unique challenges, 100 per cent product inspection is still the gold standard when brand reputation and customer satisfaction are on the line.

Here are some issues commonly faced.

Size and shape differences

No matter if your differences are due to changing products from season to season

or just sorting by size within the same product, having such a variety can cause challenges for many companies with outdated inspection equipment.

Having advanced instrumentation that is also easy to changeover between products helps increase efficiency.

Non-metallic contaminants

Gone are the days of inspecting for metallic contamination only. Due to changing consumer demands and evolving packaging scenarios, such as in-field packing, companies must also inspect for materials like stones or plastics.

This is especially common with foods like potatoes and asparagus.

Uptime requirements

Due to the short season and shelf-life of many products, it is increasingly important to have reliable inspection equipment that can adjust to your needs quickly and easily.

Additionally, the high throughput necessitates quality and accuracy of not only the detection of contaminants or weight issues, but also ease of use when training new seasonal employees.

More than just produce

Beyond handling and inspecting fresh fruits and vegetables, many companies have expanded into new categories such as pre-packaged salads.

This element adds new aspects to

the production line, including retail packaging, more touchpoints for possible contamination during processing, and a more complex environment that may require different standards.

Fresh produce manufacturers face a wide variety of issues and complexities, which is why A&D Inspection empowers companies with modular designs and handy maintenance kits come with all the critical spare parts that might be necessary when you don't have time to wait for a call-out.

About A&D

A&D is an established global company that has been a trusted provider of long-lasting and reliable measurement instrumentation for over 40 years.

Its checkweighers, metal detectors and x-ray systems are suitable for direct food contact and are rated to handle fresh fruits, vegetables, and packaged goods with ease.

Reliable detection levels and built-in audit trails give manufacturers peace of mind. The intuitive software and user interface is easy to configure, making product setup and changeover as simple as pressing a button.

Manufacturers around the globe are using A&D's customised inspection solutions to fit their unique applications.

Find out more

Please visit andweighing.com.au or call 1800 241 434.



Overcoming pandemic challenges with Growcom's Fair Farms

Growcom's Fair Farms is an industry-led, national training and certification initiative that is cultivating fair and responsible employment practices in Australian horticulture. The program provides support and training to farm employers and a pathway to independent third-party audit and certification. Additionally, the program has played an important role in helping growers during the COVID-19 pandemic. *Vegetables Australia* reports.

Mulgowie Yowie is in the process of obtaining Fair Farms Certification, and the business recently spoke candidly about how it has been dealing with the effects of the COVID-19 pandemic.

Mulgowie Yowie farm owner and Growcom member, Shannon Moss, is – like many farmers – dealing with the harsh reality of COVID restrictions. Shannon said the hardest thing to deal with due to the pandemic – besides the economic problems – was staffing.

In addition to ensuring he had enough staff for harvest, Shannon said he knew he needed to ensure compliance with any requirements to do with payroll and workplace health and safety, particularly with COVID constantly threatening disruptions to the workplace.

"Staffing is my number one problem," Shannon said.

"From a business point of view, as an owner I get nervous when there's staffing issues. We don't have a real population of workers to fall back on."

Mulgowie Yowie Salads will usually have a good mix of overseas and local workers, but during the pandemic has had to rely heavily on local workers.

"I'll get a few of the local boys when they finish school to work here. Even my son is here now working while on a gap year," Shannon said.

"I'll end up with enough staff and I work really hard at that."

Lending a hand

While staffing has been hard, Shannon said he has been able to get through it by focusing on staff retention and engaging with Growcom's Fair Farms program to ensure he was doing everything he possibly could to ensure his employees and business were safe.

"This year we did a lot of work on workplace, health and safety," Shannon said.

"We have set procedures on training, the induction process and the VEVO checks (identity checks). We've already done that without Fair Farms, but Fair Farms gives us a better checklist.

"I think that's where Fair Farms comes into it – it's a checklist, what you need to do to get through an audit.

"Fair Farms is a local form of SEDEX."

Fair Farms offers training through its online learning platforms, which has modules that cover everything from understanding labour hire risks to how to properly induct a new employee.

Shannon acknowledged it was incredibly important to look after his staff for business continuity and their own wellbeing. He credited his decision to register for certification with Growcom's Fair Farms program as just good business sense.

"I know it's important to have all these things to make sure the business

is protected – for work cover and insurance – and I don't want to work in a business where it isn't a happy working environment too," Shannon explained.

"At the end of the day, I've got to put my business hat on and I'm in the business of selling product. It's all about dollars and sense."

Next steps

Mulgowie Yowie Salads has completed the first initial steps towards receiving Fair Farms Certification, which includes completing an online self-assessment to identify training needs, and Shannon plans to go through audit as soon as his farm manager is back from holiday later this year.

Find out more

To find out more about Growcom's Fair Farms program and any special offers it may be offering, please visit fairfarms.com.au.

Visit fairwork.gov.au and growcom.com.au for more information regarding your obligations as an employer.

Fair Farms is developed and delivered by Growcom with support from the Federal Department of Agriculture, Water and the Environment and AUSVEG.



Boron: An essential element that is tough to manage

With a fine margin between deficiency and toxicity – and easy leaching out of the soil profile – boron works with calcium to build a strong cell structure in plants to prevent symptoms like internal flecking in potatoes or hollow heart in brassicas. It also has a prominent role in pollination and is needed for proper root elongation. *Vegetables Australia* investigates.

Boron management in vegetables has often been problematic. Fully soluble forms of boron that can be blended into fertiliser mixes must be applied at modest doses to manage the risk of toxicity.

However, one or two leaching events can eliminate boron from the soil profile, particularly in sandy soils. Foliar sprays are also an option – but with boron being needed constantly through the plant’s growth cycle and crops like potatoes

being unable to translocate boron easily – frequent applications are required.

One solution is to use a slow-release form of boron.

Omnia Specialities is the Australian distributor for OrganiBOR, a boron product containing calcium and magnesium borate that are citrate soluble rather than water soluble. It is also a certified input for organic producers.

“Mined in the Andes in South America,



Boron deficiency leads to hollow heart in cauliflowers. Image courtesy of the International Plant Names Index.

the boron in OrganiBOR slowly leaches from the mineral granules into the soil solution. This gives a great safety profile to the product, with far less risk of toxicity,” Omnia Specialities Innovation & Development Manager Andrew Doecke explains.

“This was demonstrated in a recent independent glasshouse trial on capsicums. Two water soluble forms of boron applied to the soil at planting at a rate of 2.5 kilograms per hectare of elemental boron showed visual toxicity symptoms and significantly decreased plant growth (as shown in Table 1). However, this product showed no toxicity symptoms.”

More importantly, OrganiBOR increased the weight of the capsicum fruit over control, whereas the toxicity of soluble boron reduced fruit growth.

“Calcium content was also statistically increased by the application, which indicates the correct balance of boron supply leading to healthy root growth and calcium uptake,” Andrew says.

Table 1

Capsicum plant weights by month.

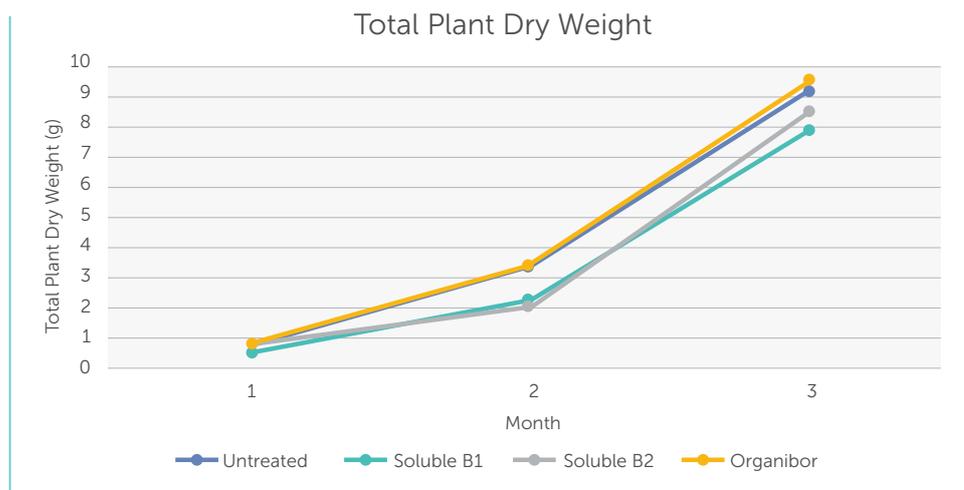
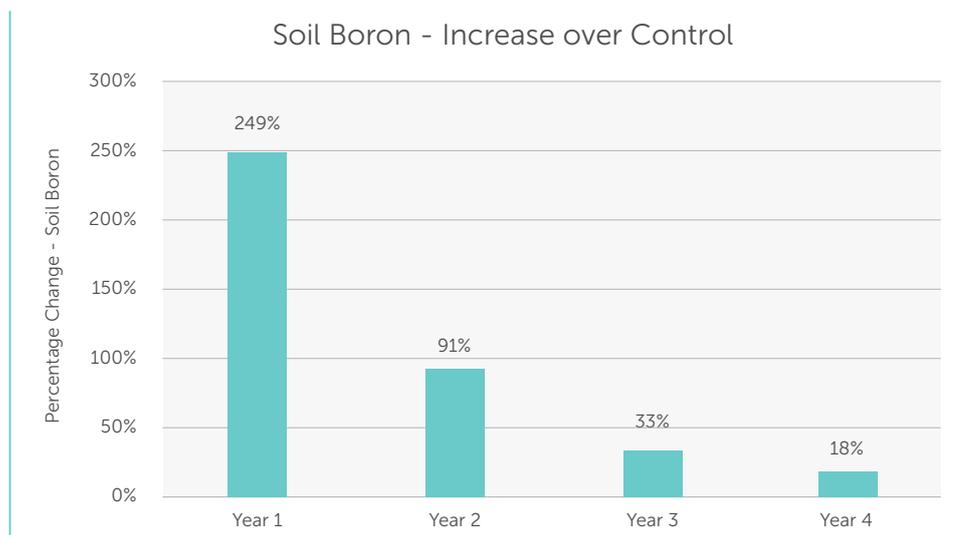


Table 2

Soil boron level increases by year after application into almonds. Increases in soil boron levels could still be seen four years after application of OrganiBOR into almonds at Robinvale, Victoria.



The bottom line

Growers have consistently seen good boron availability for at least two seasons per application of OrganiBOR.

“This makes it a ‘set and forget’ product where the soil can be treated every two years, using soil tests to monitor levels, regardless of how many crop cycles are carried out. The combination of ease of use, crop safety and consistent boron supply to the crop make this the premier boron solution for vegetable crops,” Andrew concludes.

Find out more

Please visit omnia.com.au/agronomists to contact your local Omnia Specialist Agronomist.



Building a successful tropical fruit growing operation

Han Shiong Siah’s family has been farming at Lambells Lagoon since arriving in 1987 from Malaysia. Originally growing Asian vegetables on eight hectares, the operation has evolved and expanded over the past three decades. Tropical Primary Products is now set on 125 hectares of production land growing a range of tropical fruit with a focus on its own breed of mangoes as well as jackfruit and durian.

How did you first become involved in the horticulture industry?

Like most who grow up on a family farm, I was involved in horticulture from quite a young age – I’d pick fresh produce on weekends and school holidays.

It was not until I completed my degree in agriculture science and returned to the family farm in 2009 that I become more involved with the horticulture industry.

This started with going to Northern Territory Horticulture Association (NTHA) meetings and then progressing to becoming a Board Director.

I was then elected to the Northern Territory Mango Industry Association (NTMIA) Board. In 2014, I joined the Australia Mango Industry Association (AMIA) Board as Northern Territory and Northern WA Director. I took a small break from NTHA when it combined with NT Agriculture, which led to the formation of the Northern Territory Farmers Association (NT Farmers). I returned to the NT Farmers Board a few years later.

Name: Han Shiong Siah
Location: Lambells Lagoon, Northern Territory
Works: Northern Territory Tropical Primary Products
Grows: Tropical exotic fruit including mango, durian, jackfruit, pomelo and water apples

What is your role in the business? And what are your responsibilities connected to your role?

I'm the Farm Manager. My day-to-day duties include supervising the picking crew during mango season to tailoring and completing the spray and nutrient regime. During the off-season, I undertake general maintenance, which includes keeping the weeds under control to slashing the grass that grows during the wet season. There is never a dull day on a tropical fruit farm.

You moved to Australia in 1987, and your parents initially grew Asian vegetables. Why did they decide to move away from veg and grow tropical fruit instead?

My family migrated to Darwin in 1987 for their children's education (three sisters and myself).

My mother (Siew Yoon Hew), known to locals as 'Mrs Siah', came from an agricultural family that harvested rubber from rubber trees before opening a nursery to supply oil palm seedlings, which was an emerging industry.

The family was interested in tropical fruit. My uncle would travel to Malaysia to bring back tropical fruit, and my

parents' original plan was to grow tropical exotic fruit, with Asian vegetable as an intermittent cash crop until the trees were in production. Once us children moved off to university, our parents transitioned to a perennial tree crop as it was much easier to manage.

What are the biggest challenges you face when growing tropical fruit, and how do you overcome them?

Weather. Darwin is unique in that we have a distinct wet and dry season. However, the dry season is a bit too dry and cold (under 10°C) for the durian trees, to a point where some trees will lose leaves – to about an 80 per cent drop. If we lose too many, the trees will die.

We overcome this challenge by increasing the humidity in the tree canopy with water misting as well as making sure we have enough water and nutrients to survive the harsh dry cold spell. It can be trial and error.

What's most unique about growing tropical fruit in the Top End?

Being able to grow some true rainforest tropical crops in a climate that has

distinct wet and dry seasons. Being hotter on average than tropical far-north Queensland, the main advantage is that we can get products to flower and fruit about three months earlier than the Queensland crops, which means we can get to market earlier. However, there is a lot more work involved in these true rainforest trees to survive the harsh climate up in the NT.

Where do you receive your on-farm practice advice and information from?

Most of the advice for unique tropical fruit comes from reading up on overseas practices and other regions and then seeing if it can be adapted to suit our local environment. This would be fertilising and water regiment.

Having completed an agriculture science degree at the University of Adelaide, I was able to bring back techniques I picked up from southern states. These included improving irrigation and power efficiency and improving leaf nutrient testing – moving to more efficient single level micro and macro nutrient application based on tree needs. These practices have saved the farm lots of money in the long-term as well as improved the soil and tree health.





You received a Nuffield Scholarship in 2015, and as result published a report entitled *Alternate and Cost-Effective Methods to Control Flying Feral Vermin*. Why did you focus on this subject for the report?

I focused on this topic as I had major issues with magpie geese coming out from the wetlands during the hunting season and damaging my mango and other horticultural crops. With urban encroachment and restrictive use of firearms on-farm to control these birds, I wanted to look at other non-lethal, cost-effective methods of controlling them.

What were the highlights of your scholarship experience?

Being able to travel the world was the main highlight. I was able to visit 10 countries during my travels, which ranged from the U.S.A., the Netherlands, Kenya and South Africa.

I was able to see how farming practices differ to Australia, and how something we take for granted here is hard to come by in other parts of world. I also saw how farmers come up with unique solutions to problems, such as the juice company in Kenya that buys fruit from small-scale farmers and also provides free agronomic support to them. There were vineyards

roaming with wild boars to provide pest and weed control in the wine district of South Africa.

These are memories I'll cherish for life, such as visiting Crater Lake in Oregon, U.S.A. to being on safari at the base of Mount Kenya and visiting old Prague Town.

As for my topic, the scholarship afforded me the opportunity to investigate new emerging technology such as laser/light deterrents as well as unique sound distress technology. I also saw flying robotic bird drones that looked and flew like a real predator and would scare away smaller birds.

Some unique methods were picked up, including looking at installing small bird huts in-field to attract migrating birds of prey that will stay in the area and scare/attack those fruit eating birds in cherry fields of north Michigan. My report is freely available on Nuffield website for reading.

For the farmers out there, Nuffield Scholarship is journey of lifetime you will

never want to miss. The connection and experience you gain from six months of travel will help develop your personal and business skills. Most farmers know a Nuffield Scholar, so have a yarn to them – ask them about their journey and go for it.

What new innovations, research and/or practices has your business implemented recently? Have you implemented any practices on your own farm as a result of your Nuffield Scholarship?

After my scholarship, I thought there were a few ideas that we could try on-farm.

First was to introduce a handheld Agrilaser as well as a goose distress box from USA. Furthermore, I am looking into bird deterrent grasses used at airfields/airports to provide a taste deterrent for geese while they roam around grass before attacking the fruit.

However, there is always never one silver bullet that will fix my problem. We still use an ATV to keep birds off the field; however, we have reduced the usage since my scholarship. The latest innovation we tried is putting up black weed mats on the fence line, which stop geese from looking through our fence from my neighbour's farm and reduce the occurrence of fence jumping.

In 2019, you worked with NT Farmers and the VegNET – Northern Territory Regional Development Officer on a series of biosecurity videos as part of the 'Biosecurity Champions Initiative.' How important is biosecurity to you, and why?



Growing unique rare tropical fruit in Northern Territory has been a long journey for us. Once my parents decided to move to Australia to establish a farm, they started to bring in Clonal budwood for grafting on to local tropical fruit tree plants. That journey was not an easy process. Having successfully brought these grafted trees into Australia, the plants would have to sit in quarantine for up to two years. We lost many good varieties in process of quarantine.

Even after that process, nothing was perfect – we successfully brought pomelos into Australia and grew them on farm for a few years, only for the deadly citrus canker disease to be detected on our pomelo trees in early 90s.

We watched our citrus trees bulldozed and burnt, and the farm and region were barred for growing citrus for three years until we were given the all-clear.

In April 2018, the dreaded citrus canker returned to the NT in nursery plants, and we were staring down the barrel of another bulldozing and burning.

However, with the help of NT Farmers and government agencies, many citrus farmers in our region – including us – had trees surveyed and we came back clear. We quickly introduced strict on-farm biosecurity protocols when it came to citrus products. Within five months we were able to restart interstate trade with agreed protocols. As of April 2021, NT successfully eradicated citrus canker again and we've been able to trade freely.

The citrus canker outbreak has caused the business to make major modifications to comply with new export protocol for our pomelo. This would have been avoided if citrus canker was not detected in Australia.

Another major biosecurity concern for us and our emerging durian industry is durian seed borer, which is epidemic in Southeast Asia.

We are blessed in Australia not to have these borer, which develop inside the fruit. There is no successful method of control. If borer enters the country, it will have a drastic effect on the durian industry as we won't have chemicals to control the borer – and we will lose our key advantage for growing durian in Australia.

Durian seed borer cannot be visibly detected without opening the fruit up.

Current import protocols state the whole durian must be frozen as it ensures that borer is killed by freezing.

However, some importers will run the risk of falsely declaring fresh whole durian as frozen and have brought in fresh whole durian against the Biosecurity Import Conditions system (BICON) directive. They have been successfully picked up by the biosecurity team. If this isn't detected, the risk of durian seed borer entering Australia is high and can destroy the Australian durian industry – and other horticultural industries.

What motivates you to be involved in industry activities, and what are the benefits for you and your business of being engaged with others?

Being able to provide advice that will shape the future of our industry. What motivate me to work with industry is always keeping abreast of news and ideas. Having an early warning from industry will help you ride out the rough water during a crisis.

Furthermore, a farmer meeting and talking to fellow peers might pick up techniques that can be adopted quickly; otherwise, you may get left behind. If it wasn't for government researchers trialling techniques on our farms, we wouldn't have introduced Integrated Pest Management and beneficial bugs, leaf nutrient testing and single level nutrient application.

Being involved in industry activities helps us keep up to date with farms in this ever-changing environment.

What do you both enjoy most about working in the horticulture industry, and how do you maintain your enthusiasm?

Enthusiasm is not easily maintained in our industry. We have our ups and downs from a good season with great returns to having oversupply and very low returns.

I enjoy being an introvert while sitting on the tractor for hours, listening to a podcast and thinking up ideas to trial next. A fellow peer once told me, "The best ideas come while sitting on a tractor", and I hold truly to that.



Days on the farm are never same. I enjoy a challenge thrown at me. This could involve working out the most efficient way to load trucks of equipment to move between farms during mango season; troubleshooting and repairing broken machinery; or having fellow farmers visiting and asking how we farm. Every day is different, which keep me on my toes.

Where do you see yourself in five years' time?

I hope to be still working at Tropical Primary Products. I also hope to further improve the NT horticulture industry and shape a prosperous future for Top End farming.

However, five years is a long time, and it is uncertain how things will turn out. As the last two years have shown us, having to adapt and change on the fly is key to our survival.

As a primary producer, we take pride in our work and the knowledge that we are feeding the nation; if not, the world.

Find out more

To read Han Shiong Siah's Nuffield report, please visit: nuffieldscholar.org/reports/au/2015/alternate-and-cost-effective-methods-control-flying-feral-vermin.



Growing forward together

A message from Haifa Group CEO, Motti Levin.

One of Haifa's core values is 'Farmer's Mind' and to think like a farmer, you must be acquainted with farmers' reality. Haifa's sales offices worldwide, staffed mainly by local teams, maintain close relations with farmers and address the local characteristics of the market and farming practices. In addition, the local presence allows for maximum efficiency and flexibility of logistics and supply.

Haifa has 16 subsidiaries, enabling us to serve more than 100 countries around the world. We started our activity in Australia more than 30 years ago. The opening of a subsidiary in Australia in 2009 reflects the organisation's understanding that a dedicated presence is indispensable to meet the rising local demand and serve the market properly – and it's still proving that today.

Addressing global challenges

Sustainability is a part of our DNA. Since its establishment in the mid-1960s, Haifa has specialised in precise plant nutrition that maximises efficiency and reduces environmental impact of uncontrolled fertilisation.

The solutions we offer naturally tie into global efforts towards better farming practices, which can feed a growing world population with depleting resources while facing climate change challenges. Global food demand is growing. We have to find ways not only to increase yields, but also to do it efficiently with zero tolerance for environmental impact.

In 2019, Haifa Group set itself the goal of being part of the global effort and to

act in accordance with the principles of the UN Sustainable Development Goals (SDG). By applying innovative, pioneering and ground-breaking measures that integrate the three economic, social and environmental dimensions, it is working to achieve the 17 principles of the Sustainable Development Program.

Handling COVID-19

I am proud to say that as a result of recognising the threat and size of the pandemic early, we were able to quickly adjust. We have continued to supply products globally while protecting the health and safety of all our employees.

As part of it, we've made special adjustments at production sites and applied creative thinking to overcome logistical challenges. We made it possible for employees to work from their homes when needed, and changed the shift schedule for site employees so that exposure was decreased and operations could survive if an infection occurred.

An activity that has benefited from the COVID situation is our knowledge sharing. While sales teams could not travel and meet growers face-to-face, we took the time to create a wealth of digital materials that deliver professional knowledge and advice on-line.

Ownership change

Tene Investments Funds is a strategic investor that is deeply acquainted with the world of agricultural technologies. It has additional investments in the sector

worldwide. Dr Ariel Halperin – the founder and Managing Partner – used to act as Netafim's Board Chairman, so we believe Tene's partnership will be instrumental to helping our expansion plan to double production and to reach new heights.

The fact that Trump Group remains the leading shareholder reflects its confidence in the company and faith that the involvement of Tene will take it forward.

New ammonia plant

Ammonia is a main raw material for Haifa's production. Accordingly, the construction of our ammonia plant is a major and strategic investment.

With self-production of ammonia and long-term contracts for potash supply, Haifa Group is going to be stronger and more solid than it has ever been.

The ammonia plant project is being carried out by Saipem, which has rich global experience in the building of infrastructures, including ammonia plants. The technology employed in the new plant is that of Haldor Topse, so all best practices have joint forces together and we're excited to accomplish this important project by the end of 2023.

Find out more

Please visit haifa-group.com/haifa-australia.

Tasmanian Farmers and Graziers Association

The Tasmanian harvest is in full swing and early reports indicate exceptional quality across many cultivars. Pea harvest went better than expected after a challenging planting season, with yields and quality running at or above average.

Two rain events in January slightly delayed some harvest and curing but thanks to a dry December, it had little effect. Beans, onions, carrots and brassicas are also coming on-line at the time of writing.

With our temperate climate and mostly free draining soils the harvest season runs for months and particularly important to this is the safety of everyone as the days drag on.

The TFGA has been developing a Heavy Vehicle Code of Practice that aims to bring truck safety to the front of everyone's mind. Unlike most other industries, our trucks regularly go off road and can be subject to less-than-ideal conditions. Loading takes place in all manner of events and guessing the weight or knowing if your oversize load is allowed on the road is sometimes

challenging.

We urge everyone to always consider safe practices, particularly those involving heavy vehicles and harvesting machinery. There is a constant requirement to check your loading and the vehicles condition as we are all part of the Chain of Responsibility for Heavy Vehicles.

Many farmers are becoming concerned about supply and pricing for key inputs for next season already. Our supply chain is under huge pressure and is struggling to adhere to the ever-changing COVID requirements.

Tasmanian farmers cannot continue to subsidise the market, with costs of production soaring to new heights the farmgate price must dramatically increase to maintain a sense of profitability.

Fuel is bought at whatever price, toilet paper is stripped from the shelves, pricing for other goods and services has ballooned – so why is it that our processors and pack houses struggle to gain a few extra cents at

the checkout, while other commodities are experiencing record pricing?

This year will be one of the most important to Tasmanian growers. For our industry to maintain volume, it's a simple equation: the price paid to farmers must rise significantly.



Nathan Richardson
Tasmanian Farmers and Graziers
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NSW Farmers' Association

Workforce woes continue to be the primary concern of the New South Wales horticulture sector, as the latest COVID-19 outbreak causes headaches throughout supply chains.

With more and more workers falling ill with the virus or being deemed close contacts, shoring up a sufficient workforce has been a logistical challenge for many businesses.

The isolation exemption given to agricultural and food service workers means close contacts can still show up for work if they return a negative Rapid Antigen Test (RAT) result, but the next battlefront is in finding the elusive tests. NSW Farmers first called for these tests to be made free or heavily subsidised for fresh food workers in September last year, and it's disappointing to see delayed action from the Australian Government on the issue.

The latest disruption comes after almost two years of halted international travel, which seriously limited the movement of overseas workers and resulted in fewer pickers and packers on fruit and vegetable farms. The sector has moved on the issue and has partnered with government to

deliver programs such as the AgCareerStart 'Gap Year', which seeks to attract young people to the sector. The National Farmers' Federation (NFF) run program involves a 10-to-12-month stint in a regional area to build industry connections.

The national adoption of a dedicated Agricultural Visa in late 2021 was a significant breakthrough for the horticulture sector.

NSW Farmers is a founding member of the NFF-led Horticulture Council, which drove advocacy on the Agriculture Visa to see a dedicated migration avenue for overseas workers wanting to work in Australian agriculture.

Not only would this make it easier for farmers to find workers, but it would also seek to eliminate any underpayment or mistreatment of workers through applying stringent eligibility criteria for farms wanting to participate. The program is currently moving forward with a handful of Approved Employers, with the first phase focusing on low-skilled workers as a trial for the visa program before it becomes fully operational.

NSW Farmers has also been pushing on behalf of its members against recent changes to piecework arrangements

under the *Horticulture Award 2020*. We are concerned the Fair Work Commission's decision to introduce a floor hourly rate will impact Australian growers' ability to compete with importers. The administrative burden and higher workforce management costs will be an impost on horticulture businesses – the majority of whom do the right thing by their workers.

Meanwhile, NSW Farmers looks forward to joining a contingent of producers in attending the Hort Connections conference and trade show in June.



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Around the states

Growcom

Over 80 growers and industry supply chain members joined Growcom in November 2021 for the first round of Future Fields consultations across regional Queensland, helping to shape the future of the fresh produce sector and supply chain over the coming decade.

Announced in late September last year, the Queensland Government is working collaboratively with the fresh produce sector to develop a shared vision for the future of the industry and supply chain for the next decade, and to agree on a strategy and program of work to turn that vision into reality.

Growcom is charged with bringing key stakeholders along the supply chain together and guiding the development of the new industry strategic plan, called Future Fields.

The regional consultations generated many robust and meaningful discussions around how we ensure Queensland has all the right conditions, resources, skills, and attitudes required to make us the preferred place to grow a horticultural business.

Some of the key challenges identified by industry to date are expanding export markets, the simplification of meeting multiple market requirements, and sharing a more positive story about our industry with consumers and the public.

Growers are also keen to make better use of both organic and inorganic waste, improving connectivity so new technology can be applied, and creating new products by better understanding changes in consumer preferences.

Also being identified are opportunities to collaborate for the purpose of pushing down the price of inputs and pushing up the price of produce through collective bargaining.

The margins in the industry right now – together with a renewed spirit of collectivism that responding to a global pandemic has created – means there is appetite across horticulture for working more closely together.

One of the aims of Future Fields is to create the space and conditions to allow this collaborative work, across the supply

chain, to flourish.

Further regional consultations were also held in the Lockyer Valley and on Sunshine Coast in early 2022. All consultations are aimed at first identifying, then shaping up those challenges and opportunities we as an industry will focus our energy and attention on over the next couple of years.

To find out more about Future Fields, please visit futurefields.info.



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vegetablesWA

In Western Australia, we had been preparing for the reopening of the interstate borders on 5 February, and were looking forward to easier movements of produce, inputs and workers across Australia.

The WA Government's decision to postpone the relaxing of the hard border has generated mixed responses from the public and vegetable growers in the state.

vegetablesWA is working with industry and the WA Government to learn from the rest of Australia's experiences, so we are best prepared for the COVID-19 situation. Definitions of close contacts, access to rapid antigen tests and isolation times are key questions that we are seeking clarity on behalf of industry.

In other news from the West, vegetablesWA is pleased to welcome Michael Bartholomew to the team. Michael will be delivering the WA components of the Hort Innovation-funded *VegNet 3.0* project and brings new knowledge and enthusiasm

to the project. Michael will work with our experienced extension officer Truyen Vo to gain experience and we look forward to him developing and providing valuable assistance to the WA vegetable industry. Turn to page 51 to read more about Michael.

The Building Horticulture Business Capacity project, which builds on the success of the Vegetable Benchmarking project, is up and running with more than 20 vegetable growers already participating.

The project – funded by the WA Department of Primary Industries and Regional Development, the Agricultural Produce Commission and Hort Innovation – has been expanded to include other WA horticulture industries, with the pome industry the first to sign up. vegetablesWA is working with Planfarm to deliver the project, which connect horticultural businesses with professional business analysis and advice.

As 2022 gets underway, vegetablesWA will be developing a strategic direction that will involve a range of engagement with

our grower members and stakeholders. We will be sending out a survey through our communications over the coming months, so be sure to have your say about the services and priorities that you feel vegetablesWA should focus on.



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NT Farmers Association

The end of the Northern Territory 2021 growing season was marked by another very sweaty build up followed by much welcomed rain in December. As growers prepare their next season, the NT Farmers Association is getting ready for another action-packed year!

To continue supporting growers with their businesses, NT Farmers welcomed new staff in 2021. The team can assist with many aspects, including workforce, sustainability, permits and approvals, diversification, outreach, biosecurity, pests and diseases, agronomy, research and development – and more.

NT Farmers is undertaking a Cooperative Research Centre for Developing Northern Australia (CRCNA) partnership-based project to support the NT's key export stakeholders in agriculture.

Despite an advantageous geographic location, competition with existing export routes – that are benefiting from large trade volumes – challenges direct export opportunities from the NT. This project uses a coordinated inter-sector approach to identify export opportunities, understand industry benefits and engage with decision-makers to achieve profitable outcomes.

To help develop the next generation of leaders in our industry, NT Farmers – in partnership with Entegra Signature Structures – launched the Kenneth Rayner Scholarship. This offered a final year university student, studying agriculture or horticulture, a scholarship of up to \$11,000 with industry mentorship and work opportunities. We wish the successful student, Ellie Ireson, all the best with her studies.

More recently, NT Farmers delivered Educational Agritech Workshops to Darwin and Katherine students and welcomed visitors to the Innovation Zone Convention, which was held in Darwin.

Students had the opportunity to learn about refractometers to measure fruit sweetness, use of drones for agriculture, and potential career opportunities.

The Food Ladder program in Ali Curung ran despite COVID-19 impacting some lessons at the hydroponic greenhouse. NT Farmers collaborated with 'George the Farmer' to produce educational videos for kids to learn about NT crops.

Meanwhile, the Top End's beekeepers and growers are working together to build a mutually strong industry. Demand for pollination services is going up with the number and quality of horticultural crops being produced. NT Farmers is exploring diversified income streams for growers with high-value horticultural crop viability studies planned for 2022.

Collaboration between NT Farmers' Water Efficiency and Sustainability Project and VegNET 3.0 is enabling the establishment of more soil moisture monitoring sites. Project officers will install soil moisture probes at vegetable sites towards the end of the wet season. These sites will include snake bean, bitter melon and okra growing operations.



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Around the states

AUSVEG SA

AUSVEG SA continues to work closely with its members after a busy Christmas period where production has been severely impacted by COVID-19.

We will continue to be available to assist and have been communicating a number of changes to protocols for growers, including allowing close contacts to return to business sooner and provisions for growers to access priority rapid antigen tests (RATs) through SA Health.

AUSVEG SA sits on a number of regular cross-industry meetings with government and is making regular representations on behalf of industry; however, we understand current frustrations with issues like restrictive regulations and a lack of supply of RATs in South Australia.

AUSVEG SA is always available to assist

individual businesses navigate the current challenges – and has been involved in making representations on behalf of businesses for further exemptions above and beyond general regulations in instances where food supply may be affected.

In other news, AUSVEG SA has been working with both sides of politics in the lead up to the South Australian election to ensure our industry interests are reflected in the election platform of both parties in the lead up to the election.

Key priorities include addressing water infrastructure constraints, such as fair pricing for the Northern Adelaide Irrigation Scheme, and securing ongoing commitments from both sides of politics towards ensuring access of international labour schemes.



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AUSVEG VIC

The recent outbreak of the Omicron COVID-19 variant has put a stranglehold on vegetable growing operations in Victoria. There have been reports of business owners, line managers, truck drivers, tractor operators and harvest workers testing positive, and the virus is spreading quickly.

Some businesses are reporting staff shortages of up to 40 per cent due to the COVID-19 outbreak in Victoria.

The long wait times for PCR test results and lack of available Rapid Antigen Tests (RATs) for the horticulture industry is resulting in crops being ploughed into the ground or destroyed. This is due to the lack of available workers to harvest and process the produce for market.

AUSVEG VIC is engaging with the Victorian Government to increase the availability of RATs for the vegetable industry due to the perishable nature of the food product and huge cost to Victorian growing businesses. The horticulture industry requires enough supply of RATs to ensure the consistent supply of fresh produce to Australian consumers, and workers can be comfortable knowing that they are working

in a safe environment.

AUSVEG VIC has also produced a series of instructional COVID-Safe practice videos that have been translated into multiple languages for Victorian horticultural workers. These videos aim to promote education around COVID-safe practices in the workplace and how to communicate these messages effectively.

To view the videos, please visit ausvegvic.com.au/covidsafe. We encourage all Victorian vegetable and potato growing operations to share this link and its content with their employees.

On a personal note, I would also like to take this opportunity to thank the AUSVEG VIC Executive Committee for the past two years that I have worked with them.

I am concluding my work at AUSVEG VIC and have thoroughly enjoyed my time getting to know Victoria's vegetable and potato growers and representing their interests at state level. A special thank you to AUSVEG VIC President Paul Gazzola and Vice President Rick Butler for their leadership and guidance. It has been greatly appreciated.



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