Hort Innovation

Final Report

VegNET – Victoria, Gippsland (East Gippsland Food Cluster)

Project leader:

Dr Nicola Watts

Delivery partner:

Food and Fibre Gippsland Inc

Project code:

VG15047

Project:

VegNET – Victoria, Gippsland (East Gippsland Food Cluster) – VG15047

Disclaimer:

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Content

Summary

The East Gippsland Food Cluster (now known as Food and Fibre Gippsland) delivered the 'VegNet - Victoria Gippsland' project for Hort Innovation as part of the National Vegetable Extension Program. The aim of the project was to provide regional capacity building services for the vegetable industry in Gippsland.

As one in a suite of ten regional capacity building projects, it was supported by a coordination project, and, independent monitoring and evaluation expertise. The project benefited from the program approach, and the shared learning and collaborative strategy for capacity building and the adoption of research and development (R&D) for the Australian vegetable industry. VegNet – Victoria Gippsland worked well with the other project in Victoria (VG15048) responsible for growing vegetable businesses in the State's South-East, West, and Northern regions.

One month into the project, a full-time Industry Development Officer, Shayne Hyman, was engaged by the East Gippsland Food Cluster to design, develop and deliver the key activities and outputs of the project, namely:

1. Development of annual work plans
2. Design of extension activities targeting information needs of the target audience
3. Identifying gaps in adoption of knowledge and practices resulting from the vegetable R&D program
4. Delivery of extension events
5. Communication and engagement with growers and industry stakeholders, and
6. Project evaluation and reporting

Mindful of the seasonality of vegetable production in Gippsland, activities and events requiring growers to attend off-farm, and, at times travel more than one hour to participate, the harvest season from November until April each year, focused on on-farm delivery of the project plan. While some crops are harvested year-round, this respect shown to growers during their harvest season contributed to building trust and rapport, both critical components of effective extension projects.

The specific outcomes of the project were delivered as expected and outlined later in this final report. These outcomes are:

- Increased levels of engagement of Gippsland vegetable growers in the Vegetable R&D program
- Increased awareness of Gippsland vegetable growers of Vegetable R&D knowledge
- Increased application by Gippsland vegetable growers of Vegetable R&D knowledge, and
- Increased advocacy by Gippsland vegetable growers for the application of Vegetable R&D knowledge

Beginning with a database of approximately forty vegetable growers and industry stakeholders, that database has grown to in excess of 700. Another database for women in horticulture in Gippsland has developed from n=4 to >200.

There were many highlights during the delivery of the project, but one drew the national spotlight to the little town of Lindenow for the East Gippsland Vegetable Innovation Days in May 2017. More than 650 growers and industry representatives from Australia, New Zealand and The Netherlands visited the trial sites of new, innovative and favourite vegetable varieties from the top ten seed companies in Australia. The event won the Hort Connections National Award for Excellence in Community Stewardship in 2018.

This project has proudly contributed to the achievement of the Vegetable Industry Strategic Investment Plan 2012 – 2017 by increasing industry knowledge of R&D investments and providing a supportive environment in Gippsland to increase knowledge, engagement and adoption of the vegetable R&D program.

East Gippsland Vegetable Innovation Days 2017 Organising Committee (L-R) Shayne Hyman – VegNet Victoria Gippsland, Stuart Grigg – EGVID P/L, Andrew Bulmer – EGVID P/L, Daniel Hammond – Bulmer Farms, Lachlan Dumaresq – EE Muir & Sons, Samantha Strano – Bayer Crop Services, Noel Jansz – Elders, Rob Phillip - Rjjk Zwaan

Keywords

Vegetables; vegetable production; Gippsland; agricultural extension; R&D; research development and extension

Introduction

Gippsland encompasses six local government areas East of the Melbourne metropolis; the Shires of Bass Coast, Baw Baw, East Gippsland, South Gippsland, and Wellington, and Latrobe City. While the original project brief was to focus on vegetable production in the Lindenow Valley in East Gippsland, the Macalister Irrigation District in Wellington and around the Thorpdale area of Latrobe City and Baw Baw, an early variation was agreed to incorporate operations along the Tarwin River, in the Strzelecki Ranges, and protected cropping production around Warragul and Phillip Island.

Covering almost 42,000 square kilometres, Gippsland is known for its consistent rainfall, fertile river valleys, and in the East, its long annual vegetable growing period. The food and fibre sector contributes $7b to the overall $15b economic output of the region, with vegetable production and allied industry accounting for $400-500m.

The region is seeing increased conversion to vegetable production from other primary land uses, particularly dairy. There is also an increasing presence of interstate and out-of-region growers using their operations in Gippsland to ensure year-round supply of seasonal vegetables and mitigate risk, particularly involving weather. Certified organic production is on the rise although off a small base of less than 2% of total vegetable production in Australia.

Gippsland grows more than a quarter of Victoria's vegetables with sweet corn, beans, brassica and salad vegetables being the biggest crops. Seven of Australia's top ten babyleaf producers grow in Gippsland, many supplying the largest fresh cuts processor in Australia, Vegco, located at Bairnsdale. About 75% of vegetables used in Quick Service Restaurants along the Eastern Seaboard are grown, processed, packed and distributed from Gippsland.

Food and Fibre Gippsland's foundation members are some of the biggest growers in Gippsland and its predecessor, the East Gippsland Food Cluster (EGFC), has delivered projects to better understand and support growth and improve value in the vegetable value chain. General feedback from growers suggested that there was a lack of availability of extension support across the region for the vegetable industry, and an absence of shared understandings across the supply chain of best practice and innovation. Of particular interest were:

1. On-farm efficiencies including water and other inputs, automation and the supply chain
2. Value-adding to surplus and imperfect product with a focus on closing the loop, diversification, and alternative uses beyond food and agribusiness such as nutraceuticals
3. Monitoring and sustainability practices especially related to sensitive water catchments and RAMSAR sites
4. Market insights on which to make better pre-farmgate decisions
5. Labour and human resource practices to add greater security to vegetable production on a regional basis
6. Financial and other resource access to build for the future

These six areas were identified as key to regional capacity building and industry development when the organisation responded to Hort Innovation's Request For Proposals. Alignment between the aims of the VegNet project and other initiatives of the EGFC strongly indicated that impact could be maximised for all deliverables pertaining to the vegetable businesses across Gippsland and beyond.

Methodology

A program to grow Australia's vegetable industry, the National Vegetable Extension Network (later VegNet) commenced in 2016 and consisted of ten regional capacity building projects located as follows:

- News South Wales x 1
- Northern Territory x 1
- Queensland x 3 (Bowen Gumlu; Southern; and, Wide Bay Burnett)
- South Australia x 1
- Tasmania x 1
- Victoria x 2 (Gippsland; and, South East/West/Northern)
- Western Australia x 1

And, a national coordination/linkage project (VG15049) through which each regional project would compare, contrast and learn from each other. A series of quarterly conferences/meetings, virtual and face-to-face enabled the interchange and developed the knowledge base. Some training in extension design and delivery, and, monitoring and evaluation occurred. Participation at these events was mandatory.

The two projects located in Victoria liaised with each other and collaborated on a range of initiatives and events over the three-year term of the program. An agreed Statement of Intent has existed since 10 October 2016.

The VegNet – Victoria, Gippsland pledged to conduct the project ethically, apolitically, and ensure:

- Communications were in accord with Hort Innovation guidelines and linked with the national industry communications project (VG15027)
- Feedback and other information were provided to Hort Innovation on issues and opportunities facing the industry as and if they arose during the delivery of the project
- Support for Hort Innovation in achieving its objectives and strategies as required
- Support for Hort Innovation in achieving the industry's R&D objectives and strategies
- Support for Hort Innovation membership processes and reach
- Compliance with the conditions set out in the Deed of Agreement between Hort Innovation and EGFC

Resourcing for the project, as outlined in the budget in the research agreement, was adhered to throughout the project including:

- Project Leader 0.1 FTE and Industry Development Officer 1.0 FTE, recruited by panel selection including a representative of Hort innovation
- Travel within the region and to events and meetings, as required, outside the region
- Four major extension events over the life of the project
- Eight minor events per year
- Communications costs including advertising, graphic design, printing and subscription
- Project accounting and auditing costs

The role of the Project Leader has been to provide strategic oversight of the project and be the conduit between the EGFC (later Food & Fibre Gippsland) Board of Directors; support the complicated stakeholder engagement and change management aspects of the project; develop synergies and linkages between the project and broader regional development/EGFC activities; and monitor/evaluate the performance of the Industry Development Officer. The project activities were delivered by the Industry Development Officer in consultation with the Project Leader.

The target audience for the project was vegetable levy payers and industry stakeholders who provide advice to growers. For example, field officers, consultants, rural suppliers, service providers, etc.

Building on existing relationships and networks with vegetable growers and the industry in Gippsland and further afield, as required, a grower's survey was developed to check the assumptions on which the project proposal had been written and gather further information about their needs, readiness for change, and preferred forms of engagement. Surveying was conducted face-to-face to build the rapport and engender trust so that the project would start off positively, be honestly informed, and maximise participation. In addition, the stakeholder database was cleansed to ensure the data was accurate at any given point in time, and that it was built rapidly by referrals from growers and others in the industry.

A project matrix was used to plot the planned activities and deliverables across the three-year time frame and was later translated into annual workplans. Subordinate plans to support the success of the project were developed and revised periodically. They included:

- Project Log Frame and Monitoring and Evaluation Framework with input from VG15050
- Stakeholder Engagement and Communication Plan, and
- Risk Management Plan

As the project progressed, workplans became more standardised across the suite of VegNet projects yet still responsive to the differing needs of individual regions.

The project was launched at two events during the first year of operation – one in Central Gippsland (Sale) on 9 March 2017, and the other in Southern Gippsland (Korumburra) on 27 July 2017.

The key activities/outputs for the project were:

1. Development of annual work plans
2. Design of extension activities targeting information needs of the target audience
3. Identifying gaps in adoption of knowledge and practices resulting from the vegetable R&D program
4. Delivery of extension events
5. Communication and engagement with growers and industry stakeholders, and
6. Project evaluation and reporting

In addition, input into VegNet program evaluation has been provided as part of the mid-term review, for VG17006 - Strategic Review of the Australian Vegetable Industry's Extension and Training Programs, and at program meetings as the current program can to an end and ideas for a future program were being explored.

A change management methodology has underpinned the project with a view to supporting, influencing and encouraging Gippsland's vegetable growers to become more aware, interested, questioning, experimental, and advocating for the applications of R&D findings suitable to their businesses, and the broader industry. Industry stakeholders, particularly service providers, have played a crucial role in supporting and learning from the project to be other supporting voices for adoption of R&D best-in-class practices relevant to vegetable businesses in their association.

Links, and, in some cases strong links with other Hort Innovation research projects, particularly those current during the life of this project, have been forged. Moreover, the project has supported research initiatives/projects in the Gippsland region where opportunities presented, although not necessarily funded through Hort Innovation directly but indirectly though cash or in-kind contributions from this project.

Some key adult learning principles have been employed in the delivery of the project including:

- Telling is less effective than showing, and showing is less effective than doing
- The teacher is the learner even if these "lessons" are held "over-the-fence"
- Fun, food and affirmation provide the best framework for events, and,
- Feedback is vital for monitoring, evaluation, and project reporting, and a healthy, transparent project.

Regarding the latter, feedback was gathered formally and informally but routinely at every project event. It was employed in a 'Plan-Do-Check-Act' never ending management cycle for control and continuous improvement.

Outputs

A very productive project would best describe VegNet – Victoria, Gippsland. The project outputs are listed according to type below.

Workplans		
Due Date	**Description**	**Status**
1 May 2016	Agreement signed & returned to Hort Innovation	Milestone 101 achieved
1 November 2016	Year 1 Annual Operating Plan developed with Key Performance Indicators (KPI). Program logic and Monitoring and Evaluation (M&E) plan developed. Progress report on project achievements	Milestone 102 achieved
1 May 2017	Report against Year 1 Annual Operating Plan KPI. Year 2 Annual Operating Plan developed with KPI	Milestone 103 achieved
1 November 2017	Year 2 progress report on project achievements. Mid-term program review process confirmed with Hort Innovation	Milestone 104 achieved
I May 2018	Report against Year 2 Annual Operating Plan KPI. Year 3 Annual Workplan developed with KPI. Mid-term program review completed, and recommendations implemented as required by Hort Innovation	Milestone 105 achieved
1 November 2018	Year 3 progress report on project achievements.	Milestone 106 achieved

Project Governance and Program Participation Please note that the Project Leader meet with the Industry Development Officer, at a minimum, fortnightly for the life of the project		
Activity	**Date**	**Status**
EGFC Board Meetings reports (written and presented)	August 2016, 2017, 2018 October 2016, 2017, 2018 December 2016, 2017 January 2017, 2019 February 2017, 2018 April 2017, 2018 June 2017, 2018	Reports delivered, recorded and accepted

Quarterly Program teleconferences/ meetings with all regional capacity projects	17 August 2016 25 October 2016 6 February 2017 16 May 2017 11 September 2017 6 December 2017 6 March 2018 20 June 2018 18 September 2018 10 December 2018 2 April 2019	Teleconference Sydney meeting Teleconference At Hort Connections Townsville meeting Teleconference Teleconference At Hort Connections Devonport meeting Teleconference Teleconference

Events		
Date	**Description**	**Attendance**
3 August 2016	Soil Wealth Gippsland Farm Walk (supporting AHR and VG13076 Soil condition management – extension and capacity building)	35
24 August 2016	Compost Insights -site visits to two facilities involved in commercial composting	8
6 September 2016	Postharvest Management of Vegetables (VG13083 Identifying and sharing postharvest best practice on-farm online) – workshop	10
13 September 2016	Looking Back to Look Forward – business breakfast focussed on regional investments	60
19 October 2016	The first Gippsland Growers' Forum including VG15030 Growing Leaders, VG15019 Demographic research for the vegetable industry (Phase 2), Profitable farming in high rainfall zones, AUSVEG Vic update	23
9 March 2017	Gippsland Growers' Forum #2 & Project Launch including VG15028 Vegetable industry education and training initiative, VG15076 Creating value from edible vegetable waste, DIY Biosecurity Plans, and, Vegetable Strategic Investment Plan (SIP) Workshop	30
15 March 2017	MAJOR EVENT – Gippsland Irrigation Expo 2017 delivered in collaboration with Agriculture Victoria, Southern Rural Water, Murray Goulburn and others, including displays of new and innovative irrigation technology and allied services	300
15 March 2017	Irrigation Masterclass #1 delivered by Dr Kelvin Montagu, Colo Consulting. A three-hour intensive seminar on irrigation for vegetables	8

15 March 2017	Irrigation Masterclass #2 delivered by Dr Kelvin Montagu, Colo Consulting. A three-hour intensive seminar on irrigations for vegetables	7
3 & 4 May 2017	MAJOR EVENT – East Gippsland Vegetable Innovation Days 2017, Industry Networking Dinner, Masterclass on Spinach production and VG12104 An intelligent farm robot for the vegetable industry	>650
5 May 2017	Paddock to Plate Tour – Produce harvested from the EGVID demonstration sites prepared by professional chef and sampled by growers, restaurant, food service, and other chefs.	14
27 July 2017	Gippsland Growers' Forum #3 & Project Launch in Southern Gippsland presenting DIY Biosecurity Plans, VG15028 Vegetable industry education and training initiative, Occupational Health & Safety (OHS) and risk mitigation, and Gippsland Regional Agrifood Employment Programme (GRAEP)	46
16 August 2017	Spray Efficacy Demonstration delivered by Scott Matthew, Senior Solutions Development Lead, Syngenta	20
19 September 2017	Bringing New Product Ideas to Life workshop delivered by Monash University Food Innovation Centre	16
21 September 2017	Vegetable Extrusion Demonstration and discussion for VG15076 Creating value from edible vegetable waste	10
18 November 2017	Omeo Agricultural & Pastoral Show 2017 including a stall to raise awareness of the project, the Cluster and meet new growers	>70 interactions
23 November 2017	MAJOR EVENT – Gippsland Women In Horticulture Advance, a one-day conference for women only focussed on water, waste and wellness and including VG15030 Growing Leaders	40
22 March 2018 (Morning)	Agrifood Update @ Lindenow to provide information about the horticultural code of conduct, and, an overview of a study into opportunities for collaboration along the vegetable value chain VG15076 Creating value from edible vegetable waste	18
22 March 2018 (Afternoon)	Agrifood Update @ Maffra to provide information about the horticultural code of conduct, and, an overview of a study into opportunities for collaboration along the vegetable value chain VG15076 Creating value from edible vegetable waste	10

27 April 2018	Gippsland Growers' Forum #4 including VG16009 Adoption of precision systems technology in vegetable production, VG12104 An intelligent farm robot for the vegetable industry, and VG17000 Vegetable business benchmarking	17
2 May 2018	Biosecurity capacity building in regional communities forum in collaboration with BS15004 Facilitating the development of the Australian Strawberry Industry (temperate regional delivery), MT16004 RD&E program for control, eradication and preparedness for vegetable leafminer, VG15048 VegNet – Victoria, South East, West & North	32
18 July 2018	Process Mapping short course at Leongatha	13
15 August 2018	Process Mapping short course at Bairnsdale	17
23 August 2018	MAJOR EVENT – Gippsland Women In Horticulture Conference, a sequel one-day women only conference focussed on	32
16 November 2018	Omeo Agricultural & Pastoral Show 2018 including a stall to raise awareness of the project, the Cluster, meet new growers and catch up with existing contacts	>60 interactions
20 February 2019	Information Session for VG16086 Area Wide Management of Vegetable Diseases: viruses and bacteria	5
5 March 2019	Quality Improvement and Error Prevention workshop	5
30 April and 7 May 2019	Workforce Planning in the Agrifood Sector over two days of intensive training	POSTPONED

Training Support & Coordination for VG15028 Vegetable industry education and training initiative		
Date	**Description**	**Attendance**
12 March 2018	Irrigation Basic Skills Training delivered in Newry	15
31 May and 7 June 2018	Negotiations and Influencing workshops delivered in Sale	15
5 and 6 June 2018	Chemical Handling training delivered in Wonthaggi	12
2 August 2018	VegInnovations workshop delivered in Sale	12
6 September 2018	Pest and Disease Identification workshop delivered in Lindenow	23
20 and 21 September 2018	Chemical Handling training delivered in Lindenow	12

Communication and Engagement In addition to email, phone and face-to-face contact activities that were too numerous to record, the following print, digital and media activities occurred		
Type	**Description**	**Status**
Fact Sheets & Case Study	The six required of the project have been produced as follows: • Clustering: A regional framework for improving vegetable industry outcomes • East Gippsland Vegetable Innovation Days • Checklist for Events • Pests, Diseases & Disorders Field Identification Guides • Win-Win Employment Outcomes • Climate Change Land Capacity & Capability Project – Pilot (Case Study)	All proofs ready awaiting Hort Innovation checks prior to printing and publication/distribution. All form Appendix 2
Media Releases	Rural and regional newspapers and radio are trusted sources of information. The project used same to promote events, report activities and raise awareness	Total number of media releases distributed was 21.
eNewsletters	The first issue of VegNET Gippsland eNews was published in August 2017 using Campaign Monitor software. The design and content were curated content specifically for the target audience	Total number of issues of eNews and allied announcements was 25 Analytics can be found in Appendix ….
Twitter	@gippy_growers commenced on 17 May 2017 after some testing using another handle	Number of Tweets = 176 Followers = 187 Likes = 601 Follows = 69
Facebook	The project shared the page of the host organisation, the East Gippsland Food Cluster (now Food & Fibre Gippsland) to ensure resourcing content generation was adequate	Total number of posts pertaining to the VegNet project was 54.

A gap in the delivery of consistent communication for the Victorian vegetable industry was identified late in 2016 and resulted in a submission to Hort Innovation and the subsequent variation to VG15048 VegNet Victoria – South East, West & North, namely the 'AUSVEG VIC website redevelopment through VegNet'. In concert with VegNet - Victoria Gippsland and AUSVEG VIC, the AUSVEG VIC website was redeveloped to ensure consistency of communication across the State of Victoria, a framework for easy access of research, development and extension (RD&E) information and an events calendar. Also, the Victorian VegNet projects jointly sponsored the R&D Adoption Award for Excellence adding RD&E specific award to the series bestowed annually by AUSVEG VIC.

Database

Assumption #1 – Communication, engagement, and relationship management relies on the integrity of the contact information contained in the database

Assumption #2 – In line with Australia's National Privacy Principles, personal information will not be released without express permission of the owner

Date	Description	Number
July 2016	Original information was held by the East Gippsland Food Cluster. Contacts involved in vegetable production were distilled to form the database	41
July 2017	Further additions were made based on details gathered at events delivered and events attended by the IDO and Project Leader. A database administrator was secured to keep the database clean, accurate and make new additions, for four hours per fortnight	349
July 2018	More events, more additions and corrections. Requests to be added to the database were made, on average, one per fortnight	512
2019	The total number does not include approximately 40 entries requiring updates or data problem solving	668

Research Project Regional Visits	
Date	**Description**
Numerous	VG15076 Creating Value from Edible Vegetable Waste: Starting in October 2016, CSIRO visited with growers visits over three days and attended an industry dinner, followed by attendance at numerous project events.
Numerous	VG15027 Vegetable Industry Communications Program 2016-2019: AUSVEG Communications team attended three of the four major events and reported aspects of the project in Vegetables Australia in 7 editions. AUSVEG Biosecurity Team visited for a two-day tour of the region & grower visits in July 2018.
March 2017 & October 2018	VG15070 A Strategic Approach to Weed Management for the Australia Vegetable Industry: Two visits involving two growers.
February 2018	VG15004 VegNet – Far North Queensland: The Industry Development Officer visited for three days and attended the AUSVEG VIC Executive

	meeting, Boomaroo Women In Horticulture luncheon and grower meetings.
October 2018	VG16063 The EnviroVeg Program 2017-2022: A four-day visit involving growers, service providers, and an industry dinner.
October 2018 & February 2019	VG16086 Area Wide Management of Vegetable Diseases - Viruses and Bacteria: One three-day visit and another four-day visit with multiple researchers at grower meetings, an industry dinner and an Information Session.

The outputs of the project exceeded those agreed in the research agreement, making the service delivery schedule more diverse and inclusive, encompassing a broad range of vegetable production operations including mixed farming, organic, and startups in addition to the medium to large scale intensive businesses. The thinking behind this approach was about definitely about increasing productivity and profitability and facilitating opportunities for collaborative endeavours. The project was also mindful that biosecurity issues are a huge threat to vegetable production as evidenced by the recent Tomato Potato Psyllid incursion in West Australia: Vectored threats do not stop at farm fences.

Outcomes

The East Gippsland Food Cluster has been an industry-lead organisation since inception and it is anticipated that the new organisation, Food & Fibre Gippsland, will continue this journey. A guiding principle of the VegNet – Victoria, Gippsland project has been that it is first and foremost about the vegetable growers – the vegetable levy represents their commitment to innovation and best practice, to reform and development. Their growing/processing/value adding operations are their property, conducted on their property and service providers including researchers and extension professionals need to be invited and preferably welcomed, on-farm. Project outcomes depend on it.

At the end of 2018, the VegNet Coordinating Project facilitated a uniform end-of-project survey across all regional projects. The findings of the survey indicated that Industry Strengthening had been an outcome of the Gippsland project particularly in regard to strengthened networks and a greater appreciation for significance of region's vegetable industry. More specifically, survey respondents reported an, "…. increased knowledge of vegetable R&D, innovation and technology with 80% of vegetable growers in Victoria, Gippsland aware of the program, events, and key messages promoted in the regional context".

Abrahams P, Strategic Review of the Australian Vegetable Industry's Extension and Training Program (May 2018) commissioned by Hort Innovation (VG17006) interviewed a range of stakeholders and reported that linkages had been established to the National vegetable training initiative to support knowledge acquisition and practice change in the region.

The contractual outcomes of the project are:

- Increased levels of engagement of Gippsland vegetable growers in the Vegetable R&D program
- Increased awareness of Gippsland vegetable growers of Vegetable R&D knowledge
- Increased application by Gippsland vegetable growers of Vegetable R&D knowledge, and
- Increased advocacy by Gippsland vegetable growers for the application of Vegetable R&D knowledge

Engagement, awareness, application and advocacy, in change management orthodoxy, are most often seen as a continuum and co-dependent.

The VegNET – Victoria, Gippsland project has been successful in all four.

Engagement between Gippsland growers and the Vegetable R&D program has increased substantially. The project commenced with a database of about forty and it has grown to several hundred in almost three years. The majority of the database are not persons directly growing vegetables, but they are connected to the supply and value chains and have a role to play in engaging with vegetable growers, disseminating information and building/maintaining relationships. The advantage of many familiar voices giving an important message over one voice, is self-evident.

The table below documents the way the database has been employed and segmented in the software being utilise

by the project, Campaign Monitor, to engage with the different cohorts.

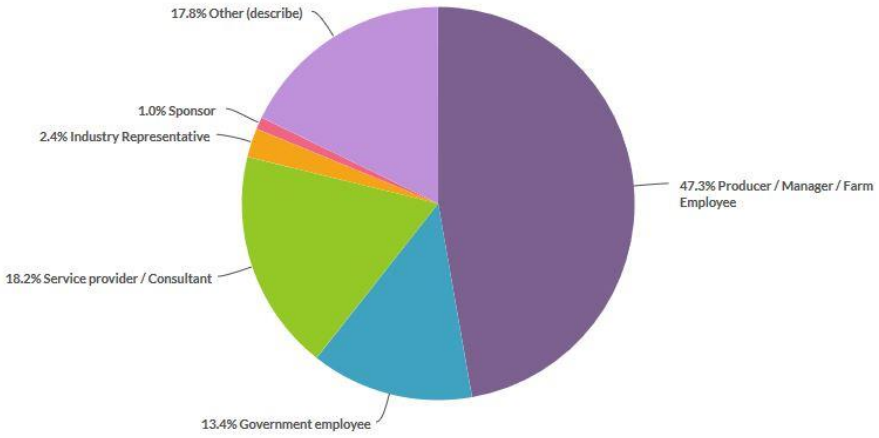
Table 1: Project Database

Cohort	Number today: Active	Number today: Inactive	Number at commencement
Total project	671	61	42
Gippsland Women in Horticulture	201	19	4

The database informs face-to-face, phone, email, and electronic news interactions and the reach of the electronic news is swelled by online sharing, publication across a range of social media platforms including Facebook, Linked In and Twitter, posting on the AUSVEG VIC website, and uptake by other VegNet projects around Australia.

Of the 27 events held, 12 had researchers directly involved in the Vegetable R&D program present and most often presenting their findings and the benefits to growers. More than 1,430 people attended project events, and some were encouraged/influenced through the project to attend events staged by VG15048 (the other VegNet project in Victoria) and other industry events such as Hort Connections. The chart below **(Which group best describes your role)** indicates that of those attending events who completed feedback forms, almost 50% were involved in vegetable production.

Which group best describes your role:



Legend	
	47.3% Producer / Manager / Farm Employee
	13.4% Government employee
	18.2% Service provider / Consultant
	2.4% Industry Representative
	1.0% Sponsor
	17.7% Other (describe)

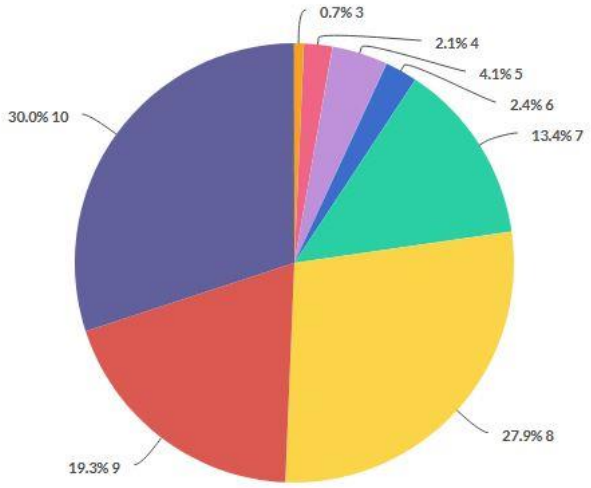
From the 1,430 Gippsland event attendees, about 300 completed feedback forms were received and these were entered into the database hosted by the Monitoring & Evaluation Project advising the VegNet Program, lead by J Coutts. The survey tool used was submitted to the Monitoring and Evaluation Project for comment in 2016 and was assessed as appropriate to the needs of the project. The data gathered is explored further later in this report.

Abrahams, P (May 2018) found that, "Both delivery partners and informed growers made considerable comment on the lift in profile of Hort Innovation levy projects and the role of the levy". This is reflective of the program and, importantly, the ten projects that comprise the program.

The report also stated that, "Demonstrations, farm walks, field days, and one-on-one interaction were the growers' preferred extension activities. The result is not surprising as these activities enable growers to interact with one another, visibly see the results of the R&D and create an environment that supports and facilitates adoption of innovation. 'Relevance is the prerequisite for exceptional' (Webb N, What Customers Crave, 2016)"

The feedback from Gippsland events indicated that participants viewed the information available and knowledge transferred as an average, 84% relevant to their enterprises. Assuming a correlation between 'relevance' and 'awareness' exists, then this result bodes well for the project's events and the increased awareness of Gippsland vegetable growers of Vegetable R&D knowledge. Moreover, the outcome is not accidental as feedback, both formal and informal was used to continuously improve the project throughout the contract period. The chart below **(Overall, how relevant would you rate the event to you and your enterprise)** illustrates the rank of relevance used by the attendees where 10 is 'extremely relevant' and 1 equals 'not relevant at all'. Note that there were no ratings of 1 or 2 across all events.

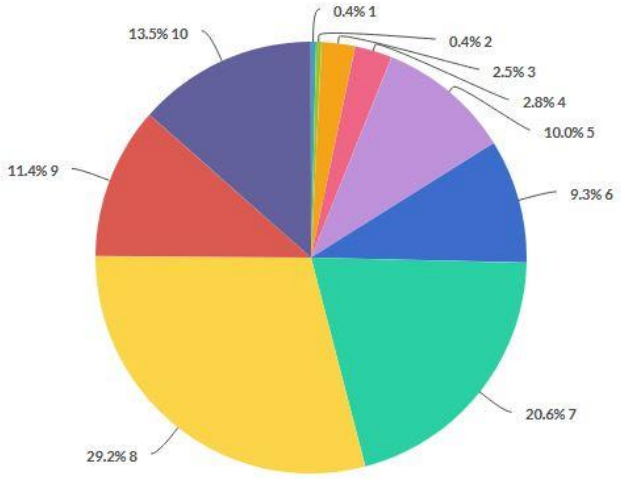
Overall, how relevant would you rate the event to you and your enterprise?



Legend – Relevance Rank			
	10 (Highest) = 30%		5 = 4.1%
	9 = 19.3%		4 = 2.1%
	8 = 27.9%		3 = 0.7%
	7 = 13.4%		2 = 0%
	6 = 2.4%		1 = 0%

Awareness of Vegetable R&D knowledge is also impacted by exposure to new information/findings/data in that first-time exposure is directly linked to an Awareness rating and is compounded by a greater understanding of the information being presented. The chart below **(At the event what level of new knowledge or understanding did you gain?)** indicates that approximately 75% of respondents thought their knowledge or understanding had been increased between ranks 7 and 10, on a 1 to 10 scale.

At the event what level of new knowledge or understanding did you gain?



Legend – New Knowledge / Understanding Rank			
	10 (Highest) = 13.5%		5 = 10.0%
	9 = 11.4%		4 = 2.8%
	8 = 29.2%		3 = 2.5%
	7 = 20.6%		2 = 0.4%
	6 = 9.3%		1 = 0.4%

Coutts, J, Mid-Term Review, National Vegetable Extension Network – VegNET (April 2018) advised that in the Gippsland project, "Stakeholders thought the project has been quite effective at undertaking activities increasing the knowledge, engagement and adoption of the vegetable R&D program". This is a significant outcome given that more Gippsland growers were engaged in this review (n=6) than any other growing region in Australia (nearest being n=4 for VegNet NSW) as evident in the Table 2 below **(Respondents to Mid-term Review)** provided by the study.

Informed persons interviewed by region:

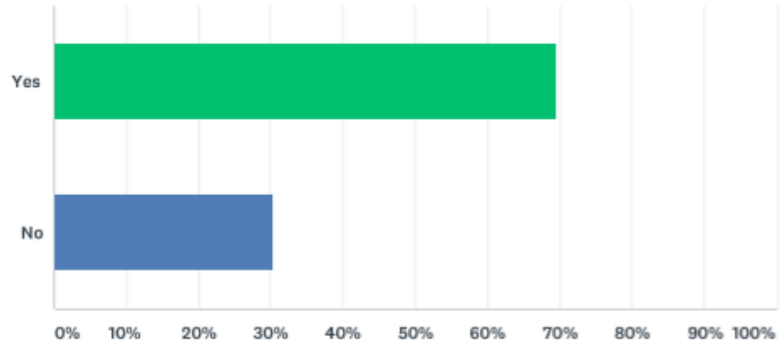
Project	Growers	Government, Uni & NRM	Industry	Total
VG15004 - Bowen Gumlu /FNQ	4		3	7
VG15040 – Wide Bay Burnett	3	1	1	5
VG15041 - Lockyer /SE Qld	2	2		4
VG15042 - NSW	4	3	3	10
VG15043 - WA	1	3		4
VG15044 - NT	1	1	1	3
VG15045 - SA	3	1		4
VG15046 - Tasmania	2	2	3	7
VG15047 - Gippsland	6		3	9
VG15048 - Victoria	1	2	2	5
Total	27	15	16	58

Table 2: Respondents to Mid-term Review (Coutts J, April 2018)

Coutts, J, again summarised, "Without the project it was agreed that there would be less communication and promotion of events, less grower participation and less awareness of where grower levies are being spent… and the level of research undertaken".

The end-of-project survey conducted in December 2018 and facilitated by the VegNet Coordinating Project clearly shows in the responses to Q7 **(As a result of the above VegNET activities, have you made any changes …)** the extent of practice/advice changes made (approx 70%) as a result of participation Gippsland VegNET events.

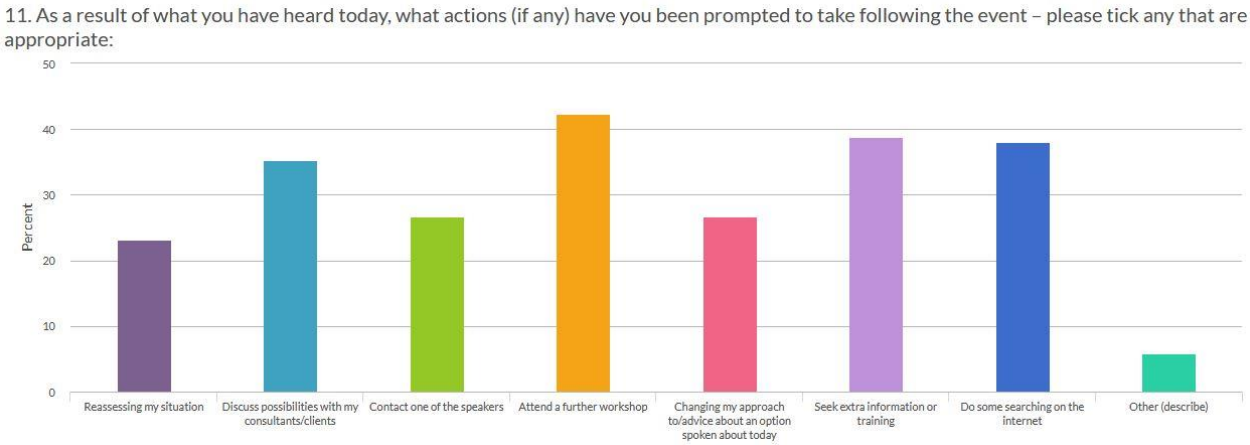
Q7 As a result of the above VegNET activities, have you made any changes to your work practices (or in the advice you provide) or adopted any new technologies in the last 3 years?



Feedback forms from the events conducted, on average, almost one per month and including the VegPRO training facilitation, more than one per month for the term of the project, indicated that respondents intended to undertake a range of further activities resulting from their participation. See the responses to Q11 **(As a result of what you have heard today, what actions…)** below. Those indicative of project outcomes pertaining to application and, potentially, advocacy of Vegetable R&D knowledge include:

- Changing my approach to/advice about an option spoken about today
- Seek extra information or training
- Reassessing my situation

The bar chart illustrates the extent to which respondents will take these actions amongst the full suite offered.



Bar Chart Legend L-R	
	Reassessing my situation
	Discuss possibilities with my consultants/clients
	Contact one of the speakers
	Attend a further workshop
	Changing my approach to/advice about an option spoken about today
	Seek extra information or training
	Do some searching on the internet
	Other (specify)

While not as simple and concise as the results from the end-of-project survey, the bar chart offers further information about how practice/advice change might occur.

Now that the VegNet – Victoria, Gippsland project has been completed, the statistical advice available and the anecdotal evidence suggest that the project has made a contribution to the Strategic Investment Plan through practice and behavioral change, adoption, access to new information/technology, improved product quality, and incremental improvements stimulated through R&D.

Monitoring and evaluation

The VegNet – Victoria, Gippsland project's Monitoring and Evaluation Plan (Appendix 3) was written with assistance from VG15050 Regional Capacity Building to Grow Vegetable Businesses (VegNET) – Training & Evaluation delivered by J & R Coutts and approved in October 2016. The opportunity to utilise the online database HIAYourData was taken up and all feedback data from the project's events was entered and referred to during the course of the project. In addition, some grower survey data was also uploaded. Thorough analysis of the data using a recognised software package like SPSS was not undertaken during the course of the project however using the reporting tools available in the database gave sufficient information to gauge what respondents thought was working well, and ideas for improvement or gaps for investigation.

On such gap identified was the need for challenges to growing baby spinach to be addressed following a Masterclass on the topic delivered at the East Vegetable Innovation Days in May 2017 including the slow pace of genotechnological advances and societal acceptance at that form of technology in Australia, and the rapid development of types of downy mildew evident in intensive production and evading traditional forms of remediation. The identification of this gap resulted in VG17004 Vegetable Knowledge Transfer at 2018 International Spinach Conference which enabled 14 growers and industry experts to visit Murcia, Spain, a crucial region for Europe's spinach production, and attend a conference and meetings. Further work is planned at another International Spinach Conference to be held in Gippsland in May 2020.

Late in 2017, an extensive mid-term evaluation was undertaken commenced, with results becoming available to individual projects in April 2018, and somewhat late to make major changes to the workplan due on 30 April 2018. In summary, Coutts J, found, "Stakeholders thought the project has been quite effective at undertaking activities increasing the knowledge, engagement and adoption of the vegetable R&D program. Without the project it was agreed that there would be less communication and promotion of events, less grower participation and less awareness of where grower levies are being spent and the level of research undertaken".

More specifically, stakeholders gave targeted feedback in the review on what their experience of the value of the project's events by type as follows:

- "Presentations and workshops: Being able to meet one-on-one with processors and other stakeholders in the industry has led to building relationships in the region. Particular mention was made of a presentation on local water supply and workshops on stratification and water efficiency as well as the Strategic Investment Project by Hort Innovation, the conversations they were having with the growers.
- Field days: Brilliant way of bringing all of the local industry together; classic event, where you bring people from all over the country. Particular mention of the Leafy Vegetables Field Day.
- Networking opportunities (including grower meetings) as well as establishing partnerships or contacts in the agronomy sector; chance to talk to the processors one-on-one and set up any future relationship possibilities.
- Promoting connections within the supply chain: Including waste management, farm management, supply chain partners, anyone who was involved in horticulture/agriculture."

With regard to communication outputs of the project, "Stakeholders thought all project communications including phone calls, electronic newsletters, newspaper articles and industry champions were useful methods of sharing information with industry. Social media was also rated highly with one interviewee commenting that… If I see anything of interest on Facebook, I will like it and share it to continue that information going through to other farmers".

The sophisticated analytics available using the Campaign Monitor software informed the project about the specific interests of growers and other stakeholders via data collected on links that they followed and the number of times the links were followed. This data proved to be a valuable insight into what readers found interesting and whether they were prepared to take a further action beyond reading the brief article in the eNewsletter. Unfortunately, if the eNewsletter is opened in a browser, this information is unable to be collected, and using a browser to view the eNewsletters would account for close to 10% of readers.

Anecdotally, the project has been informed that an average open rate for an eNewsletter of its type is between 20-30% whereas 47.8% of the database, on average, opened the eNewsletter known as "VegNET Gippsland ENews". The table below offers further information to support the finding.

Sent Campaign Reports

CAMPAIGN	SENT	RECIPIENTS	OPENED
April 2019 Issue	15 Apr	668	35.68%
March 2019	30 Mar	671	31%
Introducing Food & Fibre Gippsland	21 Mar	685	37.67%
February 2019	28 Feb	569	50.09%
January 2019 eNews	25 Jan	549	47.16%
December 2018	22 Dec 2018	543	39.59%
End-of-project survey	9 Dec 2018	545	46.47%
November 2018	20 Nov 2018	546	44.16%
October 2018	14 Oct 2018	529	49.43%
Reminder GWIH 2018	17 Aug 2018	199	48.48%
APEN 2018 Roadshow	9 Aug 2018	107	60.2%
July 2018	31 Jul 2018	512	47.15%
GWIH 2018	30 Jul 2018	192	54.45%
Improving Through Process Mapping	5 Jul 2018	499	46.45%
June 2018 eNews	15 Jun 2018	478	49.04%
April 2018 VegNET Gippsland eNews	25 Apr 2018	480	44.59%
March 2018 eNews	31 Mar 2018	475	41.81%
Agrifood Update #1 & #2	7 Mar 2018	478	53.75%
February 2018 eNews	20 Feb 2018	473	50.77%
January 2018 eNews	31 Jan 2018	452	52.15%
GWIH Reminder	20 Nov 2017	183	49.44%
GWIH Advance 231117	30 Oct 2017	179	60.67%
October 2017	9 Oct 2017	381	50.67%
September 2017	5 Sep 2017	374	52.04%
August 2017 VegNET Gippsland eNews	11 Aug 2017	349	51.79%

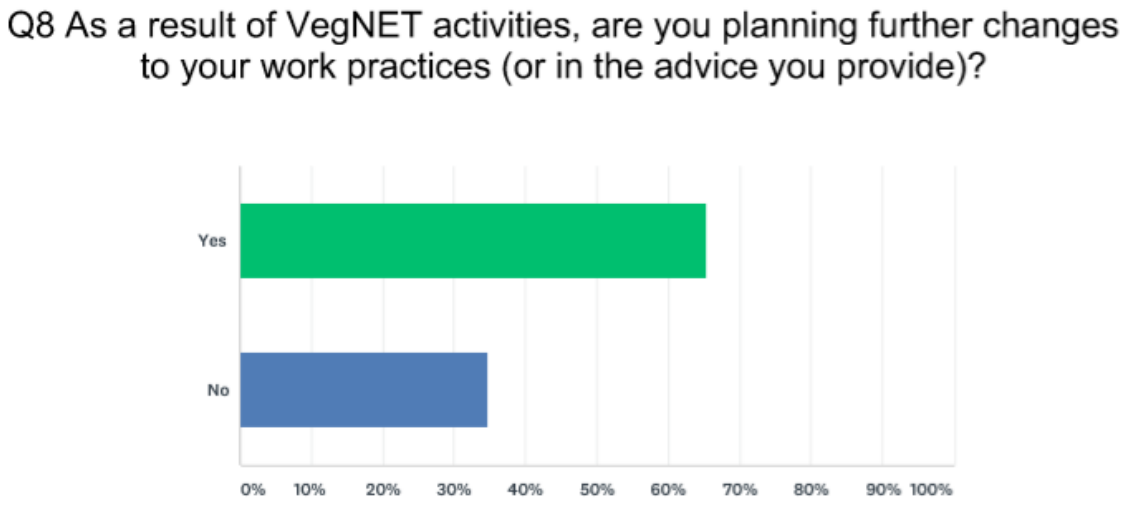
Table 3: Growth in eNews reach and Open Rates

The projected benefited from an additional review undertaken by Abrahams P, in mid-2018. This review strategically examined the effectiveness of a number of funded programs but, "….in particular VegNet and VegPRO, in terms of their relevance, engagement, ability to deliver benefits, structure and governance, identification of gaps and recommendations for future programs".

The strength of the report from a participating extension project's perspective is in the quite detailed discussion of various types of extension models, their application and effectiveness. This information would have been very useful at the beginning of the project and may have curtailed some of the early teething problems of the program and the projects. Greater context and knowledge would have expedited the development of the program logic and the monitoring and evaluation plan.

What may have been seen as a shortage in technique was more than capably made up by the project delivery with Abrahams stating that in respect to practice change in VegNet – Victoria, Gippsland, growers are, "…. realising their own goals and learning needs and taking action to remediate" and there is, "increased collaboration between vegetable growers and all stakeholders in the vegetable value chain".

These observations were supported by the end-of-project report facilitated by the VegNet Coordination Project as seen in the responses to Q8 **(As a result of VegNET activities, are you planning further changes …)** below.



Clearly, a need exists to continue to monitor and evaluate the progress being made as growers make decisions to trial, adopt and advocate for change based on what they have learned through the VegNet project and the broader national extension program. It would be advantageous to encourage growers to do this for themselves, in the absence of an ongoing VegNet program and consistency in delivery partners, although some training or skill development may be required. Writing a case study may well be a skill to benefit all in the vegetable industry.

Demystifying research through extension goes some of the way to a full appreciation of the value of research and development, as does the normalising of the components of research – asking a question, perhaps foretelling an answer to the question, working out how to answer the question by gathering information through methods like trial and error, and finally to answer the question, if possible, or propose another way forward. Being involved in research (engaging) will improve awareness, promote application (when there's more than just financial skin the game) and participation will improve understanding and grow confidence to advocate for wider adoption.

The Gippsland project has been involved in some research albeit at a sub-regional level with this construct about fostering an appreciation for research at the core of it. The development of the Lake Wellington Land and Water Management Plan for the next ten years was the first time a focus group of vegetable growers had been actively consulted in the work to develop a more customer inclusive plan. The Land Capacity and Capability study in Bass Coast, that has grown into a major piece of research on climate change in agriculture, brought to the fore the need to understand the land, the soil, the water, the weather to get the best return on hard work and investment rather than relying on expensive and potentially environmentally harmful inputs to modify the land, the soil and the water. The in-kind and modest financial contributions to these endeavours have, in effect, made a statement about how important research and development is to vegetable productivity and profitability in Gippsland. Vegetable growing, processing, value-adding and diversification is a growth industry in Gippsland and integral to community and the region.

A final word from Abrahams P, "This program has continued to develop the social capital required to drive change. Social capital can be considered the investment required to have cohesiveness of people within a social network. It comprises of trust, sharing of ideas and facilitating cooperation to develop strong grower networks. In fact, social capital facilitates extension. It takes time, and established networks have some level of social capital".

Recommendations

In the results of the grower survey conducted in the first year of the project, it is noteworthy that they identified their biggest problems/issues as those relating to business management, typically, low margins, labour, raising capital, succession planning, markets. Only water and weather deviated. Further, growers listed these as problems/issues for today, in twelve months, and 3-5 years hence. If levy-funded R&D is to be truly responsive to the big problems/issues faced by growers then, amongst these growers, links must be established between the research and business imperatives.

The end of project survey results called for a continuation of the VegNet project in Gippsland without interruption. Stakeholders agreed that the continuation of the project is crucial as is the need for an Industry Development Officer. It was noted that six out of the top ten salad producers in the country operate out of this region, so to have a dedicated resource disseminating information and building trust and a profile across the region is critical going forward.

Other recommendations from Gippsland include:

- VegNET/VegPRO integration
- Process for gap identification at the ground level be 'hardwired' into Hort Innovation processes
- Mechanism for ensuring all current levy-funded projects inform VegNET & collaboratively develop extension activities where there are none/ customise for regional adoption
- Cross-regional activities to address businesses operating on a multi-state/national footprint
- Professional development for new Industry Development Officers on extension models for horticulture, basic MERI analysis skills/tools
- Contract variations when the project plan has to come second to major weather events (cyclones), acts of nature (floods), criminal activity (arson, farms raids)
- The "R&D Review" to be continued

It takes a long time to build strong working relationships and there's a difference between liking someone and trusting that they have your best interests top of mind. VegNet is increasingly accepted as a brand and VegNet extensionists as the face of Hort Innovation funded R&D. For the first two years of the project these were not evident but by the third year a change had started with more phone calls in than out; more re-tweets on Twitter; growers referring other industry folk to the project or the IDO; growers asking for specific information; apologies being offered for non-attendance at events – all indications, albeit anecdotal, that the outcomes of the VegNet – Victoria, Gippsland project have been worthy of the strategic investment by Hort innovation.

Finally, VegNet shared the Facebook page of the East Gippsland Food Cluster for the duration of the project and the most organically successful of the VegNet posts pertains to VG16086 Area Wide Management of Vegetable Diseases - Viruses and Bacteria. Social media is important for R&D reach, stakeholder/community engagement, building awareness, documenting application and as a very timely forum for advocacy.

Post Details

East Gippsland Food Cluster Inc
Published by Shayne Hyman [?] · 21 February ·

Meet Dr Fiona Constable, AgVic, and John Fletcher, both plant pathologists working on a massive, collaborative project over four years, focussed on viruses and bacteria in vegetable crops and how to manage them. The weather has kindly dealt with a lot of potential threats but the scientists are out in field, at Bulmer Farms, Lindenow, Gippsland today, scouting and surveying anyway.

Performance for your post

619 People Reached

95 Reactions, comments & shares

79 Like	**35** On post	**44** On shares
7 Love	**1** On post	**6** On shares
5 Comments	**5** On Post	**0** On Shares
4 Shares	**4** On Post	**0** On Shares

138 Post Clicks

31 Photo views	**0** Link clicks	**107** Other Clicks

NEGATIVE FEEDBACK

1 Hide Post	**0** Hide All Posts
0 Report as Spam	**0** Unlike Page

Reported stats may be delayed from what appears on posts

Refereed scientific publications

Abrahams P, Strategic Review of the Australian Vegetable Industry's Extension and Training Program (May 2018)

Coutts, J, Mid-Term Review, National Vegetable Extension Network – VegNET (April 2018)

National Vegetable Extension Network – VegNet Victoria Gippsland – Project Overview
https://www.youtube.com/watch?v=1LaIp0OaFfY

References

Abrahams P, Strategic Review of the Australian Vegetable Industry's Extension and Training Program (May 2018)

Coutts, J, Mid-Term Review, National Vegetable Extension Network – VegNET (April 2018)

East Gippsland Food Cluster, and, Deliberate Practice, East Gippsland Sustainable Workforce Solutions Feasibility Study (October 2015)

Hort Innovation, Australian Horticulture Statistics Handbook: Vegetables 2017/18 (March 2019)

KPMG, and, Food and Fibre Gippsland, Accelerating Growth for the Gippsland Food and Fibre Industry (March 2019)

Intellectual property, commercialisation and confidentiality

In February 2019, the East Gippsland Food Cluster amalgamated with Agribusiness Gippsland to form on single organisation representing the interests of food and fibre in Gippsland. The new entity is registered in the State of Victoria as Food and Fibre Gippsland. The new domain name is www.foodandfibregippsland.com.au

Acknowledgements

The author wishes to thank Gippsland's vegetable growers for their support and encouragement, and for having the foresight to open the project up to the levy payers of tomorrow. We are all in this together.

In addition, the contributions of the following are worthy of special mention:

East Gippsland Food Cluster's former Board Directors – for the trust and focus on "the big picture"

EGFC (now Food & Fibre Gippsland) operations team – loyal, helpful and always looking for ways to "join the dots"

Mr Peter Bouzaid – database administration

And Mr Gavin Molden

Thank you to these organisations for the willingness to collaborate and share:

EGVID Pty Ltd

CSIRO

West Gippsland Catchment Management Authority

Bass Coast Landcare Network

Agriculture Victoria's Irrigation Team at Maffra

AUSVEG

Finally, to the National Vegetable Extension Network / VegNet (2016-2019) much appreciation for the peer support and idea generation.

Shayne Hyman, Report Author

Appendices

Appendix 1 - Case Study & Fact Sheets


Pests, Diseases & Disorders Field Identification Guides

Amongst the most popular resources for vegetable growers in Gippsland, Victoria are a series of Pests, Diseases and Disorders Field identification Guides. Levy-paying growers and non-levying paying growers, conventional and organic growers have found these useful tools to be informative and helpful in their operations, large and small.

THE GUIDES

There are five guides in the series published during 2014 and 2015. They are:

Ekman J, Tesoriero L and Grigg S, Pests, Diseases and Disorders of Babyleaf Vegetables: A field identification guide, 2014, ISBN 978-0-9925251-0-1

Ekman J, Tesoriero L and Grigg S, Pests, Diseases and Disorders of Brassica Vegetables: A field identification guide, 2014, ISBN 978-0-9925251-1-8

Ekman J and Lovatt J, Pests, Diseases and Disorders of Sweetpotato: A field identification guide, 2015, ISBN 978-0-9925251-2-5

Ekman J, Pests, Diseases and Disorders of Sweet Corn: A field identification guide, 2015, ISBN 978-0-9925251-3-2

Ekman J and Tesoriero L, Pests, Diseases and Disorders of Carrots, Celery and Parsley: A field identification guide, 2015, ISBN 978-0-9925251-4-9

Each guide is produced as a strong, water-resistant paperback, bound by spiral wire and appear as booklets. The contents are divided into three sections – insects (and Beneficials), Diseases, and, Disorders – and the sections are colour-coded and there are many photographs to assist with accurate identification and to a lesser extent, language barriers. A metric ruler features inside the back covers of the 2015 publications, along with a brief 'problem solver'.

Funding for the research and development of the series is as follows:

- 2014 publications, Horticulture Australia Ltd using the national vegetable levy and matched funds from the Australian Government
- 2015 publications, Horticulture Innovation Australia Ltd using the national vegetable levy and matched funds from the Australian Government

The copyright belongs with the respective aforementioned R&D Councils.

DISTRIBUTION

The popularity of the guides quickly exceeded supply in Gippsland through a variety of extension activities. To ensure ongoing access a copy of the series was donated to all the libraries across the six local government areas that comprise the Gippsland region. In this way they are available for loan, a less-expensive and more sustainable method of distribution.

Also, the producers of the series, Applied Horticultural Research have developed smartphone applications enabling growers to refer to digital guides while in their fields.

FOR MORE INFORMATION

Full copies of the guides are available online at http://ahr.com.au/news/pest-and-disease-identification-guides-available/ and hard copies may be available from jenny.ekman@ahr.com.au


CLIMATE CHANGE LAND CAPACITY AND CAPABILITY PROJECT - PILOT

Case Study April 2019

The Concept

This pilot project came out of the Bass Coast Landcare Network, with a view to explore the utilisation of farm land within Bass Coast Shire and the capacity of the land to diversify away from traditional grazing systems. From this seed idea, a unique partnership was created with the National Vegetable Extension Network - Victoria Gippsland (NeVNET Gippsland) through the East Gippsland Food Cluster, West Gippsland Catchment Management Authority, Bass Coast Shire Council and Bass Coast Landcare Network.

This partnership designed the Land Capacity and Capability Pilot project which set about exploring the drivers for climate change in Bass Coast, how a changing climate was going to impact the region and the lands capacity to adapt into the future.

The pilot sought to answer some key questions when thinking about innovation and diversification including:

- Climate change and its impacts on Agriculture in Bass Coast Shire;
- The planning scheme and its impacts on Agriculture in Bass Coast;
- Examples of diversification activities in Gippsland;
- Land capability assessment - how to apply it to your own property;
- Development of options on Case Study property in Woodleigh;
- Diversification and Innovation 'how-to-start' checklist

The Funding

This pilot case study developed a key partnership with the National Vegetable Extension Network - Victoria Gippsland (NeVNET Gippsland) through the East Gippsland Food Cluster, the West Gippsland Catchment Management Authority, the Bass Coast Shire Council and the Bass Coast Landcare Network.

From this seed funding, an additional $256,000 was gained through a successful application to the Virtual Centre for Climate Innovations Grants Program to extend this pilot throughout Southern Gippsland and develop a web-based decision-making portal.

The Methodology

A property selection matrix was established and the Mulhern's property in Woodleigh was chosen for this Pilot Project. The property is 76 acres with 60% of the property under a Trust for Nature Covenant. The remaining acreage was under a dryland grazing system.

Declan McDonald from SEGL was engaged to undertake


Win-Win Employment Outcomes

Enthusiastic job-ready workers are often hard to find for horticultural businesses and vegetable operations are no exception. Job seekers wanting to make a career in horticulture exist but many, many more are needed to fill the gaps and give the industry the security it needs to plan for growth and diversity. The absence of talent in rural and regional areas is compounded by the tyranny of distance from the nearest metropolis.

GRAEP stands for the Gippsland Regional Agrifood Employment Programme. GRAEP is delivered by the East Gippsland Food Cluster and funded under the "Jobs Victoria Employment Network" program which consolidates all Victorian employment services into one system, making it easier for Victorian job seekers to access the help they need to gain employment. The aim is that possessors will benefit from a more coordinated and streamlined approach that not only increases work readiness but also results in sustainable employment outcomes.

The "winners"

Bonaccord is a major contributor to the Gippsland economy. The farm has grown from just 54 acres in 1960 to 3,000 acres today, producing 22,000 tonnes of produce annually including corn, beans, brassica, carrots, onions and lettuce. Bonaccord employs up to 260 people during peak production (November to May) to produce, harvest, process, package and transport their final products.

Liana is an unassuming, bright and friendly young woman who has found herself a future in the agrifood industry in Gippsland. Liana, 26, works on the processing and packing line at Bonaccord, one of Gippsland's most successful vegetable growing enterprises. Unable to find steady work, Liana registered for the Gippsland Regional Agrifood Employment Programme (GRAEP), which aims to secure sustained employment for job seekers through a combination of training, mentoring support, and industry experiences and placements.

Through GRAEP, Liana undertook pre-employment training, which included participating in a new programme known as 'New Horizons – Growing Futures in Food', as well as receiving a two-day 'Introduction to Good Manufacturing Practice'. She was then introduced to employers in the horticultural sector. Liana personally handed her resume over at Bonaccord during an industry tour and made sure her positive attitude and genuine interest stood out. After only a week, she found herself in an interview and then had a new job.

Liana is one of many new entrants to the horticulture industry who has benefited from a unique opportunity provided by two projects both delivered by the East Gippsland Food Cluster: GRAEP and VegNET Gippsland. These projects have worked together for more than two years to respond to the pre-farmgate needs of growers for


Maddie's

East Gippsland Vegetable Innovation Days

More than 660 vegetable growers, researchers, industry service providers, government representatives, and other stakeholders attended the East Gippsland Vegetable Innovation Days on 3 and 4 May 2017 in Lindenow, Gippsland, Victoria. Opened by The Honourable Darren Chester MP and Mr Louis Gazzola, vegetable industry stalwart, an iceberg lettuce was ceremonially cut to signify the start of two days of field demonstrations in glorious Autumn weather. While most attendees came from all States of Australia, New Zealand and The Netherlands were also represented.

The East Gippsland Vegetable Innovation Days were held for the following purposes:

- To enable Australia's top ten seed companies to showcase their new, favourite and innovative varieties for growers and the industry at large.
- To provide a learning opportunity for growers and industry representatives to view exhibits from a broad range of industry service providers and research initiatives.
- To network, do business and celebrate being a vital part of the food chain in Australia and abroad.

Background

The State of Victoria hosted the National Vegetable Expo at Werribee every two years from 1963. After fifty years the Vegetable Growers' Association of Victoria (VGA) took a decision to wind the event up with the final Expo taking place in 2013. Andrew Bulmer, Managing Director of Bulmer Farms, had been taking a busload of East Gippsland growers to the event for several years. Stuart Grigg, Agronomist at Stuart Grigg AgHort Consulting, was a guest speaker at the final Expo. Together they decided to ensure Victoria still staged an exposition every two years and agreed a plan for the East Gippsland Leafy Vegetable Demonstration Day the following year, 2014.

About 400 vegetable growers and other members of the industry made their way to Lubs's Lane, Lindenow on Friday 9 May 2014 to visit the East Gippsland Leafy Vegetable Demonstration Day. A similar format to the Werribee events plus some additions gleaned from the Lockie Valley Growers Horticultural Exposition held in Queensland proved a winning combination and the feedback was resoundingly positive with calls for a follow up event.

Organising Committee

The East Gippsland Vegetable Innovation Days or EGVID, as they became known, took an organising committee of ten members ten months to design, develop and deliver. Andrew Bulmer and Stuart Grigg took the lead again and invited the East Gippsland Food Cluster to play a larger role than the one it had played in 2014. EGVID was to be a major event for the East Gippsland Food Cluster as part of the National Vegetable Extension Network, a program funded by Hort Innovation using the research and development National Vegetable Levy and funds from the Australian Government. The Industry Development Officer for Gippsland would be the event's project manager.


Checklist for Events

A useful tool for planning and delivering capacity building activities through events, is a checklist. Event management is a discreet skill set not unlike project management and is taught in pre-accredited to Diploma level courses throughout Australia. Many businesses offer cradle-to-grave event management services at costs ranging from several thousand to hundreds of thousands of dollars per event.

The benefits of staging events include:

- An event can offer the flexibility of focussing on one topic or several.
- Networking before, during and after the prescribed part of the event can help to embed the learnings and ground-truth them with peers.
- Seeking sponsorship for the event or part thereof may reduce the associated costs.

A checklist is best utilised as a list of possibilities rather than a step-by-step plan, although the latter may be appropriate in some circumstances. The following template is segmented into tasks that are:

- Pre-event tasks
- On the day activities, and
- Post-event tasks

PRE-EVENT

WHAT	DETAIL	COMPLETED
Purpose	In one sentence or three dot points outline the purpose or purposes of the event	
	Ensure that other stakeholders are mindful of the purpose/s and agree them	
Local Government	Inform, gain approval (if required), and check dates for conflicts/issues	

WHAT	DETAIL	COMPLETED
Tourism Authority	Check date & venue for conflicts/issues	
Budget	Program an event budget	
	Consider the need for additional funds and possible sources like grants, sponsorship, donations, entrance fees	
	Monitor spending	
Location/Venue	Select & secure	
	Consider promoting the venue for a reduction in cost or additional services	
	Arrange parking, and draft a map if there are more than thirty attendees	
	Consider audio-visual equipment required, source and check functionality and operation	
Transportation	Ensure key participants can make their way to the event on time	
	Check the requirements of presenters/speakers	
Agenda	Revisit the purpose of the event and define goals?	
	Translate goals into key messages	
	Develop event timeline	
	Book entertainment/MC (if required)	
	Collect written confirmation of entertainment/MC	
	Pay deposits	
	Consider names tags, table tents	
	Prepare Attendance Record	
Sponsorship	Create sponsorship proposal	
	Identify possible sponsors	
	Secure sponsors logos & permissions	
	Deliver sponsorship proposals & follow up within one week	


Clustering

A regional framework for improving vegetable industry outcomes

The 'East Gippsland Food Cluster' incorporated (now amalgamated with 'Agribusiness Gippsland' incorporated to form 'Food & Fibre Gippsland' incorporated) is one of Australia's oldest clusters. Operating since 2011, this cluster has been used as a model for other agrifood clusters, nationally. Its membership includes many vegetable production and processing businesses throughout Gippsland, Victoria.

What is a "cluster"?

A cluster is a group of businesses, government agencies, research and associated organisations, supported by a community, in a defined geographic area that are interconnected and share a common purpose or interest. Each contributes to enhance the innovation, growth and competitiveness of one another and in particular, the region and the businesses.

The group is characterised by comprising members from a 'quadruple helix' – Industry, Education, Government, Community.

Over the last decade cluster development has become a mainstream framework for innovation and regional development, especially in Europe.

In East Gippsland, the fertile Mitchell River valley outside Bairnsdale is a well-known vegetable growing area supplying wholesale domestic markets along the Eastern seaboard, national processors, retail supermarkets, and direct sales. Some lines make their way to export markets. Several vegetable businesses were instrumental in establishing the East Gippsland Food cluster.

Though clusters are a natural occurrence, they can be conceived and developed as place-based eco-systems focussed on smart specialisations. The nexus is often formed around answering the question – What do we do better in this region than any other region?

What benefits does clustering afford?

There are many examples around the World to show how innovative clusters rapidly progress:

- New knowledge and capabilities
- Productivity improvements
- New product development
- New business start-ups
- Public and private investment
- Increased competitiveness
- Export growth
- Regional development

Being clear on the purpose/s of a cluster contributes to its success and the sustainable development of the member organisations.

The East Gippsland Food Cluster has always been intent on:

- Sustainably growing the Gippsland Food Sector
- Exploring opportunities to improve productivity through innovation and supply chain synergies amongst members and other regional enterprises
- Developing workforce capability to support the sector and promote industry excellence

Operating on a project basis, this cluster has delivered the following benefits to members:

- Knowledge sharing
- Networking
- Joint procurement opportunities
- Professional development
- New business opportunities

Appendix 2

VG15047

Regional capacity building to grow vegetable business – Victoria, Gippsland

Monitoring & Evaluation Plan

Document Purpose

The purpose of this document is to provide a Monitoring and Evaluation Framework and Evaluation Operational Plan for this project. This will guide the data collected for review and reporting purposes of the project.

Project Purpose

The objective of the project is to provide regional capacity building services for the vegetable industry in Victoria, Gippsland. Gippsland is defined as the local government areas of East Gippsland, Wellington, Latrobe Valley, Baw Baw, South Gippsland and Bass Coast. The project will work collaboratively with the capacity building project delivering capacity building services for other vegetable growing regions of Victoria (South-East, West and Northern regions).

This project contributes to the following Objectives:

- To deliver regional capacity building services to the vegetable industry in Gippsland.
- To increase knowledge of vegetable R&D and facilitate the adoption of R&D by vegetable businesses in Gippsland.
- To increase the reach of the vegetable R&D program by engaging stakeholders in the vegetable value chain and developing trusted networks at a regional level.
- To provide linkages to the national industry communications services (delivered by AUSVEG through VG15027, 'Vegetable industry communications').
- To provide linkages to the National vegetable training initiative VG15028.

Vegetable Industry– Strategic Investment Plan 2012-2017

This project contributes to the achievement of the Vegetable Industry Strategic Investment Plan (SIP) 2012 – 2017 Objective:

- Increasing industry knowledge of R&D investments and providing a supporting environment to regional capacity building projects which aim to increase knowledge, engagement and adoption of the vegetable R&D program

Project Approach

The key activities/outputs of this project are:

1. Development of annual work plans
2. Design of extension activities targeting information needs of the target audience
3. Identifying gaps in adoption of knowledge and practices resulting from the vegetable R&D program
4. Delivery of extension events
5. Communication and engagement with growers and industry stakeholders
6. Project evaluation and reporting.

Context

The region produces a range of crops; mainly salad vegetables, brassica, potatoes, onions (Noting that potatoes and onions will not be a part of this project as they do not pay the vegetable levy) and carrots.

The region is seeing increased conversion to vegetable production from other primary production land uses, particularly dairy. There is also an increasing presence of interstate growers producing from the region as part of business growth, year-round seasonal supply and risk management strategies.

It is estimated that Gippsland represents about 26% of Victorian vegetable growing area, has about 140 grower and other stakeholder businesses, generates about $180 million per annum and has a production area of around 7000 Ha. The area has a well-established vertically integrated industry (integration additional components of sorting, washing, mixing, packaging and distribution, and then supplying products to a new customer or group of customers) with high levels of in-field production, state of the art processing plants and cool chain to Melbourne, SE Australian seaboard and international markets.

General feedback from growers suggests that there is a lack of availability of extension support across the region for the vegetable industry.

Project Log Frame and Monitoring and Evaluation Framework **Start Date: 16/05/2016** **Finish: 30/04/2019**

Project Name: Regional capacity building to grow vegetable business – Victoria, Gippsland **Project Number: VG15047**

Evaluation Level	Project Details	Performance Measures	Evaluation Methods
Broader Goals Potential impacts on industry productivity, profitability, environmental and/or social benefits.	**Potential Long-term Impact** • Increased size, efficiency, sustainability and profitability in the vegetable industry. • Australian community recognises and is supportive of the contribution of the vegetable industry.	• Extent to which the vegetable industry is growing, has increased efficiency and profitability. • Extent to which community are aware and supportive of the vegetable industry	**[Not the responsibility of the funded project]** • National and regional economic production statistics for vegetable production. • Community surveys and media analysis.
End of Program Goals [which this project is contributing towards] • Horticulture Innovation Australia	**Hort Innovation Objectives** • Vegetable Industry Strategic Investment Plan 2012-2017 objective: Increasing industry knowledge of R&D investments and providing a supporting environment to regional capacity building projects which aim to increase knowledge, engagement and adoption of the vegetable R&D program. [To be updated post 2017]	• Extent to which vegetable growers are aware and supportive of R&D investments and the trend over time. • Extent to which vegetable growers are engaged in capacity building activities and who accesses information and outputs.	• National and regional industry surveys. • Cumulative data from regional capacity building projects. • Feedback from industry representatives.
Immediate Outcomes [expected to be achieved in the life of the project] This project will contribute to the overall Australian vegetable regional capacity building program outcomes by delivering in Victoria, Gippsland. The intended outcomes of the program are: • Increased levels of engagement of Victoria, Gippsland vegetable	**Industry Strengthening** • Strengthened networks and appreciation for significance of region's vegetable industry. **Knowledge and Capacity Gains** • Increased levels of engagement (% and number to be determined) of Victoria, Gippsland vegetable growers and	• Extent to which networks have been strengthened in terms of stakeholder groups, roles and numbers. • Number of vegetable growers or % by size of vegetable growers and advisors who have participated in capacity	• Radar chart or matrix showing extent of regional network/s at project commencement and conclusion. • Annual vegetable grower and advisor surveys to capture data on

growers in the vegetable R&D program.	advisors participating in project activities.	building activities & indicate a gain in their knowledge and potential gaps.	engagement through project activity participation.
• Increased awareness of Victoria, Gippsland vegetable growers of vegetable R&D knowledge.	• Increased knowledge of vegetable R&D, innovation and technology with 80% of vegetable growers in Victoria, Gippsland to be aware of the program, events, and key messages promoted in the regional context. • Linkages established to the National vegetable training initiative to support knowledge acquisition and practice change in the region.	• Extent to which vegetable growers in Victoria, Gippsland are aware of current and recent relevant vegetable R&D, innovation, new technology and key messages compared to target. • Participation in National vegetable training initiative to support knowledge acquisition and practice change in the region.	• Annual grower survey to capture data on knowledge of current and recent relevant vegetable R&D, innovation, new technology and key messages. • Anecdotal evidence from advisors within Victoria, Gippsland region. • Application/sponsorship/funding/completion data from training service providers by region.
• Increased application by Victoria, Gippsland vegetable growers of vegetable R&D.	**Practice Change** • Victoria, Gippsland vegetable grower groups realising their own goals and learning needs and taking action to remediate. • Increased collaboration between vegetable growers and all stakeholders in the vegetable value chain.	• Number of applications for/investments in targeted R&D to meet specific learning needs at regional and sub-regional levels. • Extent to which collaborative projects and activities are initiated and supported by a range of stakeholders. • Number of co-innovation opportunities developed, underway or completed across the vegetable value chain.	• Case studies from within the region using Program Logic, of practice changes on farms with economic analysis. • Advice from Hort Innovation by region. • Narratives/action plans from major events. • Requests from vegetable growers to project steering committee for advice. • Annual grower and advisor surveys to capture data on collaborative projects and co-innovation opportunities.
• Increased advocacy by Victoria, Gippsland vegetable growers for the application of vegetable R&D.	• Emergence of more grower groups in Victoria, Gippsland and increased participation in industry bodies at State and National levels.	• Number of new grower groups or % increase of participation in existing industry bodies at State and National levels.	• Project records on activities, participation and feedback sheets using the Adoption Continuum Tool (ACT). • IDO participation in grower group establishment.

			• Industry body advice/publication of membership, representation, office bearers by region.
Influencing Activities [expected to be undertaken during the project] • Communication activities	**Communication** • Face-to-face meetings with vegetable growers. • Bi-monthly eNewsletter • Quarterly articles in local newspaper/s in Victoria, Gippsland. • Facebook page for Victoria, Gippsland.	• Number of face-to-face meetings with vegetable growers. • Extent of distribution of newsletter and articles. • Awareness and perceived value of content by vegetable growers and their consultants. • Number of 'likes', 'followers', 'comments', 'shares' 'posts to page' and other interactions.	• Narrative and survey data collected. • Subsequent requests from growers. • Project and software statistics on distribution and engagement with newsletter. • Number of clippings and location within newspaper. • Facebook page statistics and analysis.
• Extension Activities – field days, farm walks, etc	**Industry Engagement** • Two meetings per year with influencers, service providers.	• Number, type and content of meetings, and perceived value by influencers, service providers. • Use made of information disseminated/aggregated.	• Feedback data from meetings using the ACT with respect to consultants and other influencers. • Number of qualified referrals to other consultants and influencers.
	Extension • Delivery of four major extension conferences over the life of the project.	• Participation of vegetable growers by type, size and role. • Perceived value by vegetable growers. • Decisions taken and/or actions planned. • Perceived value of information disseminated/aggregated.	• Feedback sheets using the ACT. • Record of decisions taken and/or actions planned.
	• Series of minor events, group meetings, regional/sub-regional briefings/workshops, farm walks, farm trials to be determined by the target group at the rate of eight per year.	• Number, frequency, type and content of minor events. • Participation of vegetable growers and industry engagement.	• Attendance records. • Feedback sheets using the ACT.

	• Assistance/participation in vegetable industry events: ➢ National Horticulture Convention ➢ Trade Show/s • Targeted one-on-one visits with vegetable growers to assist with specific R&D adoption & case study development. • Participation in relevant industry/regional networking meetings/events.	• Type of assistance and participation in vegetable industry events. • Extent of added value, networking opportunity and use made of information. • Number and content of one-on-one visits. • Extent to which practice change occurred. • Number, type and perceived value of participation.	• IDO report on assistance and participation at industry events. • Narrative data collected. • Case studies developed. • Requests for specific R&D advice and/or expert opinion. • IDO report on participation at meeting or event.
Outputs **[expected to be developed from the project]** • New information products and/or packages. • New understanding and/or knowledge.	**Extension Materials** • Vegetable grower-friendly R&D information and project results including technical notes, simplified R&D reports on specific vegetables • Strategic Events calendar – in conjunction with other industry providers. **Project Reports** • Annual operating plans. • MER Plan. • Updates to Hort Innovation. • Six-monthly milestone status reports. • Mid-term project review report. • Final report.	• Number and content of extension materials, their accuracy, details of distribution/requests, perceived user-friendliness and usefulness to vegetable growers and consultants. • Extent to which calendar is completed and is comprehensive, useful and used by growers and other stakeholders. • Extent to which planned reports are completed in relation to needs and timing and are at required detail and quality.	• Project records on outputs, feedback from Hort Innovation, peer review of outputs. • Questions in annual grower's survey about extension materials. • Project details of calendar. • Feedback from growers and consultants about usefulness and value. • Acceptance and feedback from Hort Innovation.
Foundational Activities [planned to be used to undertake and advise the project] • Project Leader.	**Development** • Provide feedback to Hort Innovation on R&D gaps and needs. • Subcontract/co-create the development of grower-friendly	• Extent and usefulness of feedback to Hort Innovation and extent of action taken.	• Feedback from Hort Innovation on R&D gaps. • Project records of sub-contracting and completion.

• Industry development Officer. • Project Steering Committee including producer members. • Funds and in-kind.	materials and reports from R&D outputs. • Working relationship with RMCG, the organisation undertaking similar project for Victoria, South-East, West and North and [potential alignment of activities. **Governance** • Link with Coordinating project (NVEN) • East Gippsland Food Cluster Inc Board • Staffing: Project Leader and Industry Development Officer • Project Steering Committee	• Number and type of materials and report re-writing subcontracted and quality of subcontractors and their approach. • Type and extent of collaboration with RMCG and usefulness of relationship. • Type and extent of linking with the coordinating project. • Engagement, role and time input from staff. • Composition of Steering Committee, number of meetings, satisfaction of members with role, extent of input and their influence on the project.	• Statement of Intent developed and agreed. • Record of interactions with RMCG. • Project records on linkages, staffing. • Feedback from Coordinating project (NVEN). • Feedback sheets from Project Steering Committee. • Interviews with project staff. • Interviews with Hort Innovation staff.

M&E Action Plan

M&E Method [from Evaluation Methods column]	**Purpose/Focus**	**Details**	**Responsibility and Timing**
Network matrix or radar chart	To show numbers, type and linkages between key stakeholders of regional vegetable industry.	This lists key stakeholders in a table and the strength of linkages and the change over time. This could be done using social network analysis software	Project leader & IDO to undertake/manage - beginning and end of project.
Annual vegetable grower telephone survey	To capture extent of awareness, satisfaction, knowledge gains, changes made, influence of project activities, barriers and gaps.	This is a randomised short phone survey of approx 30 vegetable growers, asking questions needed for reporting and planning.	Project leader to initiate with support of project evaluation project in design. IDO to administer or use sub-contractor. Annually in June.
Narratives	To capture observed/ known change in practice resulting from project activities in a structured way.	Narratives are short, structured observations detailing how growers/others participated in activities and then took action. They follow a set framework.	Project staff to capture these as they observe or learn about them over time and put them on the on-line M&E platform.
Case studies	To provide a more in-depth analysis of changes made and their costs and benefits.	Case studies follow a similar framework to narratives but require a farm visit and gaining quantitative details for analysis.	Project leader to ensure that these are undertaken in the second and third year of the project – by IDO or subcontractor.
Feedback sheets – workshops, field days, consultant and team meetings	To capture reactions, perceived value, gains in understanding, intentions to act and issues needing addressing.	Feedback sheets follow a set structure to allow the key information to be captured. Examples are provided in this document which can be modified for specific events.	Event/meeting organiser to be responsible for modifying feedback sheet for the purpose and having these filled in an entered on the on-line M&E platform.
Interviews with staff, Project Team members, Hort Innovation staff, coordinating project leader	To gain feedback on what is working well, what needs attention, how well input is being given and acted on.	These will follow similar lines of questioning using a semi-structured format and summarised against main headings.	Project leader to organise – preferably using a non-team member to undertake the interviews.

Adoption Continuum Tool (ACT)

AWARENESS	Have you heard of the 'practice' before now?	No ☐ Stop (0)	Yes ☐ Continue	Where or how did you hear about this 'practice'?
INTEREST	Have you actively sought out more information on this 'practice'?	No ☐ Stop (1)	Yes ☐ Continue	Who have you sought more information from? What information were you seeking?
EVALUATION	Have you come to a decision yet on whether or not to adopt this 'practice on your property?	No ☐ Stop (2)	Yes ☐ Continue	
	What have you decided to do? Have you decided to adopt or reject this 'practice' for your property?	Not Adopt ☐ Stop (3)	Adopt ☐ Continue	Why and how did you make this decision?
TRIAL	Have you trailed/experimented with this 'practice' on your property?	No ☐ Stop (3)	Yes ☐ Continue	What have you learnt from your trials so far? Is there anything more you need to adopt this 'practice' fully?
ADOPTION	Have you fully adopted this 'practice' and integrated it into ongoing management of your property?	No ☐ Stop (4)	Yes ☐ Continue	Has adoption of this 'practice' delivered what you expected it to? What aspects are you happy with and why? What aspects are you unhappy with and why?
ADVOCATE	Are you actively advocating and promoting this 'practice' to others?	No ☐ Stop (4)	Yes ☐ Stop (5)	In what ways have you helped promote the 'practice' to others?

ACT integrated into all feedback and evaluation tools.

National Vegetable
Extension Network

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NT FARMERS

Hort Innovation

National Vegetable Extension Network

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Strategic levy investment
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National Vegetable **Extension Network**

NORTHERN TERRITORY

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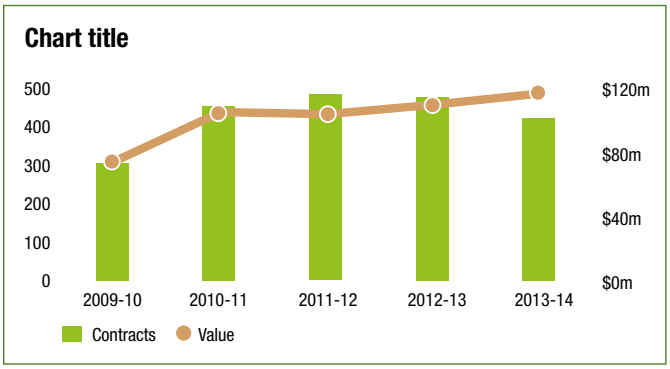

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Vegetable R&D Review 2006-2018

Hort Innovation

National Vegetable **Extension Network**

Introduction

The intention of this review is to make all regional extension staff aware of current and recent vegetable research and development projects, and, especially, to identify projects which have extension materials or components that can feed into regional extension activities.

Each project covered by the review will contain a short summary of the project and it will include links to the project final report and any extension materials currently available. These projects are also summarised in the attached spreadsheet, which also contains the links to project resources that can also be searched and prioritised in a way that makes the material more relevant to your local needs.

As projects are completed, final reports are added to this review. Alternatively, final reports can be ordered from Hort Innovation using the following link: horticulture.com.au/resources/final-report-order-form/

To request an electronic version of this review contact: adam.goldwater@ahr.com.au

Last updated 12/12/2018.

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ahr applied horticultural research

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This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Agronomy / production / postharvest

Vision systems, sensing and sensor networks to manage risks and increase productivity in vegetable production systems

This project led by QDAF also involves CSIRO and QUT as key project collaborators. It is about the development of vision-system sensing and sensor networks in relation to vegetable crops, and is part of a suite of projects relating to precision agriculture for vegetables. Also refer to project VG15003.
See the project update link below.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/11/2018
Project code:	VG15024		
Contact person:		**Email:**	
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Project update		

Using autonomous systems to guide vegetable decision making on-farm

This project by the Australian Centre for Fields Robotics based at Sydney University. It is about the development of vision-system sensing and sensor networks in relation to vegetable crops, and is part of a suite of projects relating to precision agriculture for vegetables. Refer to project VG15024.

Discipline:	Agronomy/production/postharvest	**Ends:**	
Project code:	VG15003		
Contact person:	Salah Sukkarieh	**Email:**	salah.sukkarieh@sydney.edu.au
Service provider:	University of Sydney		
Extension materials:	Website		

Evaluation of automation and robotics innovations: Developing next generation vegetable production systems

This is one of a group of projects that is being conducted in the area of automation and robotics. At this stage these projects are strongly research-focused and unlikely to have extension materials available.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/11/2016
Project code:	VG13113		
Contact person:	Sue Heisswolf	**Email:**	
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report		

Review of current irrigation technologies

The project reviewed a range of innovations in relation to irrigation of vegetable crops. A factsheet and series of workshops were produced. The main areas covered were soil moisture monitoring, variable rate irrigation, drip irrigation, system automation, energy costs and the need for technical support. Non-drain sprinklers, solar pumping, automating surface irrigation systems, tracking nutrient movement to save money, the importance of an irrigation design and minimum tillage were also seen as viable options to improve water productivity in some areas.

Discipline:	Agronomy/production/postharvest	**Ends:**	29/07/2016
Project code:	VG14048		
Contact person:	Mathew Plunkett	**Email:**	matthew.plunkett@lls.nsw.gov.au
Service provider:	Irrigation Australia Ltd		
Extension materials:	Factsheet, Vegenotes and final report		

Scoping Study of a disorder that reduces shelf-life and consumption of green beans

The cause of a bacterial disease in a crop in Victoria was identified as *Pseudomonas syringae*. There is no doubt that a significant infection of bean pods will, in its own right, reduce the quality of bean pods, a problem experienced by a number of growers. In this instance, however, the bacterium was isolated only from leaves, not from pods. There is detailed quality information available on chilling injury and on bacterial diseases. Growers would benefit from a summary of this material. The diagnosis of chilling injury was based mostly on anecdotal evidence.

Discipline:	Agronomy/production/postharvest	**Ends:**	10/07/2015
Project code:	VG14040		
Contact person:	Dr Brendan Rodoni	**Email:**	brendan.rodoni@dpi.vic.gov.au
Service provider:	Agriculture Victoria Services Pty Ltd		
Extension materials:	Final report		

Pre-harvest practices that will increase the shelf-life and freshness of vegetables

This project involved a review of pre-harvest effects on post-harvest quality of vegetables. The project produced a detailed review document which is available for download by following the link below. The project also produced three factsheets and three articles, also available by following the link below.

Factsheets: Pre-harvest effects on babyleaf spinach quality; Pre-harvest effects on lettuce quality; Health benefits of eating brassicas.

Articles: The benefits of silicon and vegetable crops; Greenhouse cucumber quality; Health benefits of eating vegetables.

Discipline: Agronomy / production / postharvest **Completion Date**: 31/05/2016
Project code: VG14025
Contact person: Drs Roberto Marques and Gordon Rogers **Email**: gordon@ahr.com.au
Service provider: NSW Dept of Primary Industries and AHR
Extensions materials: Vegenote, Factsheets on lettuce, babyleaf and brassica health. Articles on cucumber quality, silicon and heal effects of vegetables, Final report

Evaluation of commercially available farm management software programs for the vegetable industry

The project provides a list of farm management software programs compiled for vegetable growers to identify the most appropriate tool they can buy to meet their farm-management needs – from crop management through to social media. A spreadsheet (link below) lists all the apps and farm management software available to growers.

Discipline: Agronomy / production / postharvest **Completion Date**: 31/05/2015
Project code: VG13106
Contact person: Belinda Hazell **Email**: Belinda.hazell@tqaaustralia.com.au
Service provider: TQA Australia Inc
Extensions materials: Final report and list of farm management software and programs available

Identify process improvements for preserving peak freshness of broccoli

This study investigated the freshness of broccoli at retail and found that freshness at retail is highly variable, and that the quality does not correlate well to display method or price. The project recommended further studies on the cost of the effectiveness of cooling practices, production of training materials targeted at retailers, further evaluation of supply chains, particularly in relation to icing versus non-icing systems, and to test the effectiveness of 1– MCP (SmartFresh) as an alternative to top icing.

Discipline: Agronomy / production / postharvest **Completion Date**: Mid 2017
Project code: VG13086/VG14062
Contact person: Jenny Ekman **Email**: jenny.ekman@ahr.com.au
Service provider: Applied Horticultural Research
Extensions materials: Final report 13086 Final report 14062

Identifying and sharing postharvest best practice on-farm and online

This project has carried out postharvest research on new vegetable crops for which there was no data available. It has produced the ***Postharvest management of vegetables*** handbook and a series of product orientated fact sheets. The project has also conducted a series of workshops around the country, which will continue through VegPRO training. All of the content of the *Postharvest management of vegetables* handbook, fact sheets and new reference data for vegetable crops is available on the vegetable postharvest website at www.postharvest.net.au and by following the links below.

Discipline:	Agronomy/production/postharvest	**Ends:**	7/07/2017
Project code:	VG13083		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Postharvest manual Final report		Website and product factsheets

Prioritisation of vegetable crop commodities and activities for mechanisation

The objective of this project is to monitor and demonstrate the use of controlled traffic farming in vegetable production within the constraints of existing farm operations, with a focus on the north-west coast of Tasmania.

The take home messages from the project are:

- Tracking stability on compacted wheel tracks and side slopes remains an issue to be addressed for the implementation of controlled traffic farming (CTF)
- Undulating topography creates challenges for tillage operations and drainage under CTF
- Harvest traffic can cause soil compaction, even for summer harvested crops like poppies

For more information on this project view the brief factsheet by following the link below or, follow the link to the website below.

Discipline:	Agronomy/production/postharvest	**Ends:**	9/11/2015
Project code:	VG13081		
Contact person:	John McPhee	**Email:**	john.McPhee@utas.edu.au
Service provider:	Tasmanian Institute of Agriculture (TIA) - University of Tasmania		
Extension materials:	Final report		

Global scan for vegetable innovation – Fresh and minimally processed

The Australian vegetable industry aims to increase its vegetables' attractiveness and competitiveness as exports to Asian markets. To achieve this, research into the various types of innovation used within the vegetable industry was conducted to identify new, relevant and commercially viable solutions to assist Australian growers. Seven innovations that presented the best opportunities were developed and are ready to be distributed to growers and relevant stakeholders. Each innovation has a brochure developed. The innovations are listed below. The brochures and the final report are available via the link below:

1. Micro-perforations
2. Compostable packaging
3. PCR-PET packaging
4. Peal and reseal lidding
5. Ethylene scavengers
6. QR codes on vegetable packaging
7. Vegetable snack packs

Discipline:	Agronomy/production/postharvest	**Ends:**	1/07/2015
Project code:	VG13080		
Contact person:	Ben Dunsheath	**Email:**	Ben.Dunsheath@euromonitor.com
Service provider:	Euromonitor International Ltd		
Extension:	Final report and 7 innovation brochures		

Soil Wealth – Soil condition management – Extension and capacity building

The Soil Wealth project led jointly by AHR and Dr Doris Blaesing from RMCG have created a new national framework for the delivery of soil and crop-protection information to Australian vegetable growers.

They have resulted in new resources and approaches to communicate information and skills to the vegetable industry, including:

- Best-practice demonstration sites with leading growers in 10 Australian regions
- Website and Facebook sites
- A soil-borne disease masterclass run in September, 2015
- Field days, regional workshops and interest groups
- Videos, factsheets and social media deliver information and training to vegetable growers and agronomists
- A network of 1500 growers, agronomists, resellers and chemical companies interested in soil-borne disease management.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/05/2017
Project code:	VG13076		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	RMCG + Applied Horticultural Research		
Extension materials:	Website, factsheets, webinars and events		

An investigation of low-cost protective cropping

A range of low-cost predictive cropping measures were evaluated to help reduce the impact of adverse weather events on vegetable crop yields and quality. A range of measures was evaluated including: permanent shade structures, windbreaks, low-cost retractable roof structures and floating row covers.

The most promising structures were retractable rooms and floating row covers. Capsicum plants grown in the retractable roof Cravo® house were significantly larger and healthier than similar plants grown outside, and would be expected to have greatly increased yield over an extended cropping period.

Under cold conditions, however, fleece floating-row covers can provide major benefits. These materials can significantly improve germination and growth and protect crops from light frosts. Harvest of lettuce was brought forward 1–2 weeks using fleece materials. The lightest fabrics, which are also the cheapest, were sufficiently durable and gave results as good or better than more heavyweight fleeces. The floating-row covers were very promising in alleviating the effects of extreme heat and cold in babyleaf spinach crops.

The project produced a factsheet called “Blankets for vegetables”, which explains the use of floating recovers for frost protection. This is available via the link below and also from the ICP’s/Soil Wealth website. There are also two veg notes, a scientific paper and the final report available via the link below.

Discipline:	Agronomy/production/postharvest	**Ends:**	15/05/2016
Project code:	VG13075		
Contact person:	Adam Goldwater	**Email:**	adam.goldwater@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report, factsheet, conference paper and Vegenotes		

Guest worker scheme desktop study

The challenges faced by Australian growers are shared by others across the international community. The study, conducted by project leader Richard O'Brien, considered guest worker programs in countries with broadly similar market characteristics and employment needs to those in Australia. Specific examples were drawn from North America, Europe and Oceania. The study also considered guest worker schemes currently available within Australia and recommended some adjustment to those that apply to the horticultural sector.

WHM programs and SWPs are essential to maintaining and promoting a vibrant and profitable rural economy and must be constantly refined and reviewed to ensure that they incorporate best practice across all aspects of their implementation for the benefit of both, horticultural growers and seasonal workers. Refer to the link below for more information.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/05/2014
Project code:	VG13063		
Contact person:	Richard A. O'Brien	**Email:**	richardaobrien@gmail.com
Service provider:	Richard O'Brien		
Extension materials:	Final report and vegenote		

Building codes and greenhouse construction

The aim of this project was to reduce the cost of compliance for the construction of Greenhouse and Growing Structures (G/GS) and to provide guidelines for a consistent building approval approach across Australia. The investigations and documentation determine where cost-reduction measures can be implemented to economically assist the protective cropping industry and provide a defined approval process throughout Australia.

The project found that with ever-increasing global and local populations, increased variability of the environment and consumer demand for high-quality produce, it is vital that growers are encouraged to develop greenhouse and growing structures. This project encourages development by creating an interstate code of practice providing guidelines for safe and economically responsible G/GS design, regulation and operation with regard to building classification and fire and egress. Project VG13055 was led by Marcel Olivetto and Project Administrator Eric Peter Osborn, both from Osborn Lane Consulting Engineers, QLD. Click on a link below for a copy of the veg note, or contact the project leader for more information and a copy of the final report.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/09/2014
Project code:	VG13055		
Contact person:	Marcel Olivetto	**Email:**	brisbane@osbornconsulting.com.au
Service provider:	Osborn Lane Consulting Engineers		
Extension materials:	Vegenote		

Confirmation of ultra filtration as a viable low-cost water disinfection and nutrient solution recycling options

This project is about micro-filtration of water as a low-cost means of disinfestation of the nutrient solution, and of water supplied for protected cropping. There is a benefit-cost analysis tool available via the link below. Contact the project leader for more information about this project, and for any extension materials that may be available.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/06/2016
Project code:	VG13052		
Contact person:	Jeremy Badgery-Parker	**Email:**	info@primaryprinciples.com.au
Service provider:	Primary Principles		
Extension materials:	Cost-benefit analysis Final report		

Production of fish food for aquaculture from vegetable waste feasibility study

Currently, a major factor limiting aquaculture is the continued reliance on wild caught fish to produce fishmeal. Much research has focused on replacing fishmeal with animal and/or plant-based products, however, with only partial success. Project VG13050 examined the potential use of vegetable wastes to grow insect larvae, which can be used in animal or aquaculture feeds. Feeding trials with larvae showed that pumpkin, carrot, eggplant, capsicum and even processed vegetable sludge were all readily consumed.

Around 25g of fresh pumpkin or 30g of fresh carrot would be needed to produce 1g of dried larval meal, or feed conversion ratios of 4.9:1 to 2.0:1 – the average being 3.3:1 (dry weights). Although investment in BSF would currently be a risky venture for an individual vegetable farmer, this industry has considerable potential and may well develop in the future as fishmeal prices continue to rise.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/05/2014
Project code:	VG13050		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report and vegenote		

Integrating sustainable soil health practices into a commercial vegetable farming operation

The trials at Mulyan Farms have provided commercial scale validation that "softer" soil management practices can be integrated into large-scale vegetable production. For example, all cover crops produced a more profitable spinach crop, compared to a traditional fallowed system. Increases in profitability of 36% and 48% were obtained following the legume cover crops of Morgan Field peas or Balansa clover, respectively.

The project has successfully demonstrated and communicated that combining cover cropping with controlled traffic and reduced tillage will allow for sustainable improvement to the soil condition, which can maintain or improve yields, and reduce input costs.

The project delivered five factsheets which are all available on the Soil Wealth website, or by following the link below. The final report is also available by following the link.

- Biofumigation
- Carbon storage in vegetable
- Nitrous oxide emissions in vegetables
- Reduced till in vegetable production
- Winter cover crops.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/05/2016
Project code:	VG12115		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Factsheets and final report		Soil Wealth website

Enhancing best practice in vegetable production and business management in the Northern Territory

This project was an engagement project to identify vegetable growers in the NT and build relationships with the all commercial vegetable growers of the Top End who are predominantly Vietnamese or Cambodian in heritage. The project endeavoured to engage these growers by providing a dedicated engagement officer to be a stable and trusted point of contact on best-practice farming and farm business practices. The project produced a farm biosecurity planning document for managing CGMMV.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/07/2016
Project code:	VG12113		
Contact person:	Greg Owens	**Email:**	greg@ntfarmers.org.au
Service provider:	Northern Territory Farmers Association Inc		
Extension materials:	CGMMV biosecurity template, Vegenote and final report		

Increasing productivity and extending seasonality in soil-grown vegetables using capsicum as a candidate

The project evaluated rootstocks, varieties, ratooning and shading to increase the productivity of capsicums and chilli. A formal literature review was undertaken first, followed by field trials in Queensland. The project report is complicated and difficult to read, however, it appears an increase in yield of up to 30% is possible by grafting capsicums or chillies onto commercially available rootstocks. The use of shade has potential to also increase yield in capsicums and chillies. Suggest reading the report for more detail, and refer to project VG13075 for more information on shading.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/05/2016
Project code:	VG12103		
Contact person:	David Carey	**Email:**	david.carey@deedi.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report and Vegenote		

Identifying new products, uses and markets for Australian vegetables: A desktop study

Total waste from these crops was estimated at 278,000 tonnes, representing 25% of production and costing growers $155 million annually. This figure includes crops that were grown to maturity and either not harvested or harvested and not marketed. The calculations take account of the value growers receive from alternative lower value uses for the crop such as processing using a stock food. The project produced six factsheets. Five of the fact sheets describe in detail potential alternative uses for vegetable waste. There is one factsheet detailing vegetable waste by crop. The six factsheets are listed here and can be downloaded by following the link below.

1. Summary of waste categories and amounts x crop
2. Biogas feasibility (***refer follow up project***)
3. Fish feed feasibility (***refer follow up project***)
4. Promoting health eating – more vegetables
5. Extraction of volatiles and flavour compounds
6. Extraction of antioxidants

Discipline:	Agronomy/production/postharvest	**Ends:**	30/04/2013
Project code:	VG12046		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report and factsheets		

Controlling multiple heading and transplant shock in lettuce

This project investigated the cause(s) of blindness in lettuce and produced a factsheet on how to minimise the issue in seeding production. The project also evaluated the use of additives at planting to reduce the impact of transplant shock in seedlings.

The key findings from both aspects of the project are presented in two separate factsheets. The first factsheet outlines the causes of blindness in the seedlings and describes how seedling growers can minimise blindness in lettuce seedling production. The second factsheet explains how transplant shock can be minimised by the drench of potassium in nitrate is transplanting. Both factsheets can be downloaded via the link below.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/01/2016
Project code:	VG12017		
Contact person:	Adam Goldwater	**Email:**	adam.goldwater@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report, factsheets and Vegenotes		

Benchmarking uptake of soil health practices

This project reviewed the soil health program for the vegetable industry in Australia and includes recommendations for future research and extension required by growers in relation to managing the soils in a sustainable and profitable way. The project also directly surveyed 72 growers and collected their views on the major soil health issues, preferred communication styles and prioritised soil health issues for further study. The project also contains a list of relevant soil health publications and research outputs, and an analysis of vegetable cropping areas and production timeslots by region.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/09/2012
Project code:	VG11034		
Contact person:	Dr Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report		

On-farm demonstration of controlled traffic farming for vegetables

This project outlines the use of controlled traffic cropping systems for vegetable production. The focus of the project in in Tasmania, especially on processing vegetables. It links to a larger DAFF funded project showcasing controlled traffic and deep organic matter use in vegetable crops. The project produced a factsheet and there are links to other relevant information below.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/06/2013
Project code:	VG10080		
Contact person:	John McPhee	**Email:**	john.McPhee@utas.edu.au
Service provider:	Tasmanian Institute of Agriculture (TIA) - University of Tas		
Extension materials:	Factsheet		Link to other controlled traffic resources

Issues facing vegetable production in peri-urban areas – review and scoping study

This project reviewed issues facing peri-urban vegetable production, and this will have relevance to groups operating in production areas close to large urban centres. The report is well written, and contains useful information.

Discipline:	Agronomy/production/postharvest	**Ends:**	15/07/2011
Project code:	VG10059		
Contact person:	Charles Drew	**Email:**	srhs@srhs.com.au
Service provider:	Scholefield Robinson Horticultural Services Pty Ltd		
Extension materials:	Final report		

The production of baby-leaf lettuce under floating crop covers

This project investigated the use of floating row covers in the production of baby leaf lettuce, with a focus on south-east Queensland for the fresh-cut sector. Refer also to project ***VG12108*** which investigated the use of floating and on floating covers to exclude insects from leafy vegetables and produced a factsheet on managing insect contaminants. Refer to project ***VG13075*** which evaluated the use of floating row covers on leaf vegetables for frost protection and insect exclusion, and produced a factsheet called "Blankets for vegetables" on using floating row covers to minimise frost damage. These factsheets can also be downloaded from the link below.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/05/2013
Project code:	VG09188		
Contact person:	Robert Munton	**Email:**	robmunton2@optusnet.com.au
Service provider:	Britton Produce		
Extension materials:	Final report VegeNote and Factsheets		

Increasing energy efficiency and assessing an alternate energy option for Australian Protected Cropping

This project is focused on energy-efficiency in greenhouse production. The resource materials include a website with some information about saving energy and includes a link to an energy assessment tool for greenhouses.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/05/2014
Project code:	VG09124		
Contact person:	Joshua Jarvis	**Email:**	joshua.jarvis@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report and vegenote		Website with factsheets

Evaluation of vegetable washing chemicals

This project is about an evaluation of sanitisers for washing vegetable crops with a focus on processing. There is a report and a PowerPoint presentation available. Growers who produce leafy vegetables that are sold as pre-washed and ready-to-eat should consider using peroxyacetic acid-based sanitisers. However, these sanitisers are considerably more expensive and may contribute to a lower shelf-life of the product. The trials showed that electrified oxidised water to have superior efficacy to any of the other products tested, and extended product shelf-life.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/05/2012
Project code:	VG09086		
Contact person:	Robert Premier	**Email:**	robert.premier@consultant.com
Service provider:	Global F.S.		
Extension materials:	Final report and presentation		

Managing a greenhouse capsicum crop – interactive DVD demonstration and resource package

This project has produced resource information in relation to capsicum greenhouse production. The resources include fact sheets on essential knowledge, preparing and planting, managing the crop and an economic benefit cost analysis. There are also seven factsheets covering major technical areas including: nutrition, greenhouse design, pests and diseases (2), soil health management, irrigation and salinity. Follow the links below for more information.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/03/2013
Project code:	VG09070		
Contact person:	Trevor Linke	**Email:**	
Service provider:	Trevor Linke		
Extension materials:	Final report and list of resources		Factsheets and videos

Evaluating sweet potato varieties to meet market needs

The project assessed a range of sweet potato varieties in Qld to replace current standards. The most promising varieties were: *Evangeline* (gold sweet potato), *Southern Star* (white-fleshed sweet potato) and two new purple-fleshed cultivars *Eclipse* and *Philipino White*. For more details follow the links below.

Discipline:	Agronomy/production/postharvest	**Ends:**	31/01/2014
Project code:	VG09009		
Contact person:	Rodney Wolfenden	**Email:**	Sandra.dennien@daff.qld.gov.au
Service provider:	Australian Sweetpotato Growers Inc		
Extension materials:	Final report		

Developing a sustainable soil management model to increase farmgate returns in Tasmania

A large number of soil properties and management practices were analysed against carrot and potato crop performance over a three-year period in Tasmania. Soil organic carbon, aggregate stability and soil type were found to have an influence on potato quality. On average, potatoes performed better when produced in red Ferrosol soils compared with other soil types.

Soils other than Ferrosols produced higher quality potatoes with higher organic carbon and aggregate stability levels. Sampling of paddocks using PCR testing revealed a good correlation between disease expression on washed tubers and the levels of soil DNA for black dot (*Colletotrichum coccodes*) and powdery scab (*Spongospora subterranea*). Relationships between carrot quality, sap nitrate and soil compaction were found in the first two seasons but not in year 3, probably due to extreme weather events in that year.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/09/2011
Project code:	VG08106		
Contact person:	Kevin Clayton-Greene	**Email:**	kevin@harvestmoon.com.au
Service provider:	Harvest Moon		
Extension materials:	Final report		

Design and demonstration of precision agriculture irrigation applied to different vegetable crops

The project found that using a pressure control retro-fitted system to a travelling gun irrigator showed an energy saving of 17–21.8% and water savings of 5–10%. With the proven savings in water expenditure and energy consumption displayed in the project, it is reasonable to estimate that the cost of the modified irrigation system could be recovered in 2–3 years. Variable rate irrigation (VRI) using a network of soil sensors and a modified linear move irrigator also led to water savings.

Discipline:	Agronomy/production/postharvest	**Ends:**	2/07/2012
Project code:	VG08029		
Contact person:	Dr Susan Lambert	**Email:**	Susan.Lambert@utas.edu.au
Service provider:	University of Tasmania		
Extension materials:	Final report and vegenote		

Improving greenhouse systems and production practices (greenhouse production practices component) (Parent - VG07096)

A best-practice manual for conversion to simple hydroponics from soil-based production systems was developed in project VGO7144 and was released in August/September of 2012.
Demonstration sites exhibiting conversion to hydroponic systems were set up to compare yields and productivity with soil-based systems and facilitate communication with other growers – in some cases, yields were three to four times higher in simple hydroponic systems. Water use efficiency was also significantly higher when compared with soil-based crops. Hydroponic systems are often favoured for their high levels of efficiency in their utilisation of inputs including water, fertilisers, labour, land and energy.

Discipline:	Agronomy/production/postharvest	**Ends:**	29/02/2012
Project code:	VG07144		
Contact person:	Barbara Hall	**Email:**	barbara.hall@sa.gov.au
Service provider:	South Australian Research and Development Institute (SARDI)		
Extension materials:	Final report and Vegenote		

Beetroot Stand Management

This project was aimed at evaluating new processing beetroot varieties with a view to increasing yield. Essentially, the project found new varieties were not significantly better than the current standard. Most of the varieties were globe-shaped, but a cylinder-shaped variety trialled yielded as well as the industry standard, and could be suitable for the industry except for the need to re-engineer the method of slicing. The details of the New South Wales-based trials are included in the project final report. See link below.

Discipline:	Agronomy/production/postharvest	**Ends:**	1/05/2012
Project code:	VG06117		
Contact person:	Dr Donald Irving	**Email:**	donald.irving@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries, an office of Dept of Industry		
Extension materials:	Final report and VegeBites		

Data Analytics and App Technology to Guide On-Farm Irrigation

This project was contracted during 2016/17 to develop and improve a mobile phone application to help guide irrigations decisions on-farm. Growers can download the current version of the free app by searching it by name – 'The Yield'– in the Google Play or Apple App Store on mobile devices. It allows users to see evapotranspiration, rainfall and water balance data for the day, for the past week, and an estimate for the week ahead.
It is expected that, ultimately, an iteration of the app will allow growers to enter a location, crop type and crop growth stage to get a quick and easy estimate of vegetable crop water use and soil water balance to help take away some of the uncertainty when it comes to knowing when and how much to irrigate.

Discipline:	Production	**Ends:**	31/07/2018
Project code:	VG15054		
Contact person:	Ros Harvey		
Service provider:	The Yield Technology Solutions Pty Ltd		
Extension materials:	App download for Android App download for Apple		Project info

Investigating novel glass technologies and photovoltaics in protected cropping

This project aims to improve energy-efficient design and energy use in greenhouses, with a focus on the use of smart glass and semi-transparent photovoltaic glass (STPVG). The project will begin with a review of existing and in-development smart glass and STPVG technologies, prior to trials to assess their use and value under Australian conditions.

Discipline:	Production	**Ends:**	1/04/2017
Project code:	VG15038		
Contact person:	Baohua Jia	**Email:**	bjia@swin.edu.au
Service provider:	Swinburne University of Technology		
Extension materials:	Project details		Review summary

Optimising the benefits of vermiculture in commercial-scale vegetable farms
This three-year project will identify practical and cost-effective ways vegetable growers can use earthworms and vermiculture products in their growing systems. Vegetable growers at sites across Australia will be involved in field research over the next three years, and the project managers would like to hear from interested growers.

Discipline:	Production	**Ends:**	1/04/2018
Project code:	VG15037		
Contact person:	Bill Grant	**Email:**	bill.grant@blueenvironment.com.au
Service provider:	Blue Environment Pty Ltd and SESL		
Extension materials:	Project details	Website	Factsheet

Advanced greenhouse horticulture research facility designed for research, education and training.
With a bold vision to enhance national and international food security for an energy and water constrained future, this new facility will help Australian growers tap into the latest research and practices within greenhouse crop production to make their operations more efficient, and meet the increased demand for fresh food that can be delivered quickly to markets. The facility has a strong education and training focus, working in partnership with industry and TAFE to produce career-ready graduates through engaged learning, projects and research in their studies. Learnings will also be shared with industry.

Discipline:	Agronomy/production/postharvest	**Ends:**	30/12/2016
Project code:	MT13041		
Contact person:	Prof Deborah Sweeney	**Email:**	D.Sweeney@westernsydney.edu.au
Service provider:	University of Western Sydney		
Extension materials:		Website	

Precision Seeding Benefits for Processing Pea Production
This project commenced in late 2016 and will help improve the productivity and profitability of processing peas in Tasmania specifically, to underpin an industry average yield of eight tonnes/hectare. It will evaluate stand density and plant spatial arrangements, and explore ways to modify plant structure from single to multiple stems at establishment to increase overall number of pods on the first and seconds nodes that flower (these are the nodes which contribute to over 90 per cent of overall yield). The project will also evaluate commercial seeders and establishment practices.

Discipline:	Production	**Ends:**	31/03/2018
Project code:	VG15039		
Contact person:	Alistair Gracie	**Email:**	Alistair.Gracie@utas.edu.au
Service provider:	University of Tasmania		
Extension materials:	Article	Factsheet	

The Effects of Using Anhydrous Ammonia to Supply Nitrogen to Vegetable Crops

This project reviews the use of anhydrous ammonia in vegetable crops in Australia, and provides an observational trial comparing anhydrous ammonia with calcium nitrate.
Anhydrous ammonia is supplied in Australia by Incitec- Pivot Fertilisers, predominantly to the cotton and grain industries, and supply locations are focused around the areas these crops are produced.
Anhydrous ammonia can have beneficial effects on soil microbes, nitrifying bacteria and worms. It can also increase N retention in the soil, reducing nitrate leaching, resulting in yield and nitrogen-use-efficiency benefits.

Discipline:	Production	**Ends:**	31/11/2016
Project code:	VG15062		
Contact person:	Adam Harber	**Email:**	adam.harber@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Factsheet and final report	Website	

Evaluating and testing autonomous systems developed in VG15003 in Australian vegetable production systems

A key facet of this project is to help translate the research done to date into tangible commercial outcomes for end users. This will involve undertaking economic, market and IP evaluations of these technologies in order to define potential commercial pathways, along with identifying potential commercial partners.
This project will also involve designing, building, demonstrating and evaluating robotic platforms and utilising them across varied growing regions to prove operational effectiveness.

Discipline:	Production	**Ends:**	21/06/2021
Project code:	VG15059		
Contact person:	Salah Sukkarieh	**Email:**	salah.sukkarieh@sydney.edu.au
Service provider:	The University of Sydney		
Extension materials:	Project details and event updates	YouTube video	

Adoption of precision systems technology

This is a new project to support the vegetable industry in adopting precision agriculture technologies. Industry investment in machine guidance and controlled traffic systems means it is primed to develop and optimise precision approaches. The project will develop case-study farms in each state for research and extension, including training events and field days, and will develop video and fact-sheet resources to showcase potential applications of relevant precisions technologies.

Discipline:	Production	**Ends:**	31/12/2019
Project code:	VG16009		
Contact person:	Rod Edmonds	**Email:**	rod.edmonds@daf.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Webinar recording	Articles	

New Breeding Technologies and opportunities for Australian vegetable industry

Plant breeding technologies available for the improvement of vegetable and other crop plants are advancing rapidly. This study considered the current status of the Australian vegetable industry in relation to New Breeding Technologies (NBTs) is outlined, and a wide range of industry and researcher consultations were undertaken.

Leading Australian researchers working on NBTs for plant improvement are, in general, strongly positive regarding the potential of NBTs to contribute to Australian vegetable production. Vegetable seed merchants and breeders held a more conservative but open stance toward NBTs. Breeders believed that growers were much more focused on the performance of a variety in the field than on the technology used to develop it. Leading growers were less positive on the potential for NBTs to contribute to the Australian vegetable industry. The major concern was consumer acceptance, followed by the cost of applying NBTs to the relatively small vegetable market in Australia.

The final report outlines these perceptions from vegetable industry stakeholders, as well as current regulatory systems covering NBTs.

Discipline:	Production	**Ends:**	30/06/2017
Project code:	VG16010		
Contact person:	Michael Jones	**Email:**	m.jones@murdoch.edu.au
Service provider:	Murdoch University		
Extension materials:	Final report	Factsheet	

Developing technical guidelines and a best practice extension toolbox for greenhouse construction and safe operation

This project has developed a suite of information in relation to building and operating greenhouses and other grow structures for growers and the vegetable protected cropping industry. The resources are housed at www.greenhousetoolbox.com and include fact sheets on:

- Safe management practices, including fire prevention and working at heights
- Local government approval processes
- Design requirements and considerations
- Access and egress requirements
- Other issues and common grower concerns.

The project also developed a national greenhouse standard for inclusion in Australia's National Construction Code (NCC).

Discipline:	Production	**Ends:**	22/05/2017
Project code:	VG16004		
Contact person:	Marcel Olivotto	**Email:**	marcel.o@osbornconsulting.com.au
Service provider:	Osborn Consulting Engineers Pty Ltd		
Extension materials:	Website		VegeNotes

Improving processing vegetable yields through improved production practices

This project aims to improve production practices for Australia's vegetable processing industry. The first part of the project involves reviewing current production practices and identifying new innovations that could be implemented to increase productivity or reduce input costs. The second phase of the project involves field trials of key innovations.

Five factsheets have been produced, and include research findings and recommendations on:

- Maximising uniformity at harvest maturity in processing broccoli
- Optimising crop establishment in processing carrots
- Sclerotinia rot of green beans
- Irrigation management in sweet corn
- Winter crane fly

Discipline:	Production	**Ends:**	10/09/2017
Project code:	VG16011		
Contact person:	Sue Hinton	**Email:**	sue.hinton@utas.edu.au
Service provider:	University of Tasmania		
Extension materials:	Factsheets and VegeNotes		

Optimising cover cropping for the Australian Vegetable Industry

This project delivers research and extension on cover crops and practical agronomy to maximise their benefit for Australian vegetable growers. There are 7 cover crop trial sites, which include NSW, Tas, Vic, SA, WA and Qld. Trials will consider practices to better integrate cover crops into production systems, the potential to build disease suppressive soils, biofumigation and the impact on weeds. There will be a number of regional guides produced in years 2-3, as well as webinars, farm walks and videos. There will also be a series of practical cover crop coaching clinics to help growers integrate cover crops in to their farms.

The project is looking for growers to host short-term cover crop demonstration sites.

Discipline:	Production	**Ends:**	15/07/2020
Project code:	VG16068		
Contact person:	Kelvin Montagu	**Email:**	kelvin.montagu@gmail.com
Service provider:	AHR, QDAF, TIA, UNE		
Extension materials:	Factsheets, videos, and casestudies		

On farm evaluation of vegetable seed viability using non-destructive techniques

This project commenced in early 2017 and will conduct a comprehensive review of the range of available technologies that may assist the Australian vegetable industry screen seed viability on farm. It will provide recommendations identifying fit-for-purpose situations where certain technologies would be best applied to the Australian vegetable industry.

Additionally, it will provide recommendations for the development of novel technologies via new R&D investment/s with the potential for real time grading of seed for viability pre planting.

Extension and communication materials will be produced and presented to industry.

Discipline:	Production	**Ends:**	28/07/2017
Project code:	VG16028		
Contact person:	Jitka Kochanek	**Email:**	j.kochanek@uq.edu.au
Service provider:	The University of Queensland		
Extension materials:	Final report summary	VegeNotes	

Gap Analysis and Economic Assessment for Protected Cropping Vegetables in Tropical Australia

While there has been significant expansion of protected cropping production systems in Australia, much of this growth has been in the country's temperate regions. Beginning in March this year, this six-month project will increase awareness of, and information about, protected cropping opportunities and technology options specifically for the vegetable industry in Australia's tropics. It will identify gaps in current information, and assess the practical and economic viabilities of protected cropping options in these regions.

As well as providing decision-making information to growers and other industry stakeholders, it is expected the project will help in the prioritisation of future R&D efforts for the industry.

Discipline:	Production	**Ends:**	1/09/2017
Project code:	VG16024		
Contact person:	Elio Jovicich	**Email:**	elio.jovicich@daf.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report and VegeNotes		

Protected Cropping - Literature Review and Gap Analysis for Levied Vegetables

This project set out to better understand the R&D needs of the levy-paying component of the protected cropping sector. It involved an extensive literature review and gap analysis of protected cropping research needs. Light levels and condition, root zone management, biostimulates, pollination and the real-time monitoring of plant conditions were just some of the research gaps identified as part of the project, and are set to inform future investments in the protected cropping space.

Discipline:	Production	**Ends:**	1/08/2017
Project code:	VG16083		
Contact person:	Kelvin Montagu	**Email:**	kelvin.montagu@gmail.com
Service provider:	EcoXchange Pty Ltd trading as Colo Consulting		
Extension materials:	VegeNotes	0	

Research and Operations to Trial Innovation Glass and Photovoltaic Technologies in Protected Cropping

This project follows on from the results of the review conducted in VG15038. The project involves the real-world assessment of smart glass, STPVG and STC on plant growth, physiology, crop yield and quality, using the state-of-the-art glasshouse research facility at Western Sydney University.

Discipline:	Production	**Ends:**	11/05/2020
Project code:	VG16070		
Contact person:	David Tissue	**Email:**	d.tissue@westernsydney.edu.au
Service provider:	University of Western Sydney		
Extension materials:	0	0	

Stingless Bees as Effective Managed Pollinators for Australia Horticulture

This project will develop the use of stingless bees as alternate pollinators to honeybees for horticultural crops. Existing research on stingless bees will be reviewed, and studies will be undertaken with stingless bees on a range of fruit and vegetable crops to test their effectiveness. Vegetable crops will include glasshouse solanaceous and cucurbit crops.

Discipline:	Production	**Ends:**	30/8/2022
Project code:	PH16000		
Contact person:	James Cook	**Email:**	james.cook@westernsydney.edu.au
Service provider:	University of Western Sydney		
Extension materials:			

National Vegetable Protected Cropping Centre

With a bold vision to enhance national and international food security for an energy and water constrained future, this new facility will help Australian growers tap into the latest research and practices within greenhouse crop production to make their operations more efficient, and meet the increased demand for fresh food that can be delivered quickly to markets. The facility has a strong education and training focus, working in partnership with industry and TAFE to produce career-ready graduates through engaged learning, projects and research in their studies. Learnings will also be shared with industry.

Discipline:	Production	**Ends:**	30/06/2022
Project code:	VG17003		
Contact person:	Ian Anderson	**Email:**	i.anderson@westernsydney.edu.au
Service provider:	University of Western Sydney		
Extension materials:	Vegetables Australia article	Website	

Soil Wealth and Integrated Crop Protection - Phase 2

The new combined project delivering the next phase of both the Soil Wealth and ICP programs will respond to increasing economic, consumer, environmental and technological demands on vegetable producers. It will deliver integrated, independent, research-based information to growers and advisers to support business decisions on soil management and plant health.

The project will be guided by four themes:

- proactively scanning and reviewing new technological developments and presenting this information to growers;
- taking a production systems approach reflecting the increase in challenges and sophistication of vegetable farming;
- innovations in soil and crop health management which can increase productivity and/or reduce costs; and
- improving sustainability and robustness of vegetable farming systems, especially under adverse conditions (including the impacts of increased climate variability).

Discipline:	Agronomy and Pest/disease	**Ends:**	1/12/2020
Project code:	VG16078		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Summary of program	Website	

Pest and Disease Management

Facilitating adoption of IPM through a participatory approach with local advisors and industry

This project aims to demonstrate IPM in commercial vegetable crops in order to give advisors (chemical resellers as well as independent pest management advisors) more confidence in IPM. Angelica Cameron and Paul Horne from IPM Technologies are running initial theory training sessions and then in-field demonstrations on the farms of collaborating growers. These activities are backed up by regular phone and email support as required for each advisor or farmer, to help them with the IPM decision-making process week-by-week

This project has four components there is an IPM training component led by IPM Technologies Pty Ltd (Dr Paul Horne), a coordination component led by AUSVEG SA, an evaluation component led by clear horizon consulting and with a parent project led by Horticulture Innovation Australia. For more information about this project contact Hort Innovation or Paul Horne of IPM Technologies Pty Ltd.

Discipline:	Pest and disease	**Ends:**	28/02/2019
Project code:	VG15033-VG15036		
Contact person:	Paul Horne	**Email:**	paul@ipmtechnologies.com.au
Service providers:	AUSVEG SA, IPM Technologies, Clear Horizon Consulting Pty Ltd and Hort Innovation Australia.		
Extension materials:	Case study videos: https://vimeo.com/302539603/33f95975ef https://vimeo.com/302169280/0d7b57b45f https://vimeo.com/302016877/e747a877aa		

Improved management options for cucumber green mottle mosaic virus

This project is being run by the Northern Territory Department of Primary Industries and is researching control and management of cucumber green model mosaic virus. For more information about this project contact the NT Department Primary Industry & Fisheries or Greg Owens from NT Farmers.

Discipline:	Pest and disease	**Ends:**	18/01/19
Project code:	VG15013		
Contact person:	Greg Owens (info only)	**Email:**	idm@ntfarmers.com.au
Service provider:	Department of Primary Industry & Fisheries, NT		
Extension materials:	Factsheet	Website	

A multi-faceted approach to soil-borne disease management

This three-year project aims to provide Australian vegetable growers with the tools, information and skills they need to manage the risk of crop losses due to soil-borne disease in the major vegetable growing regions in Australia. There are five soil-borne disease groups that continue to be a major problem for Australian vegetable growers: *Sclerotinia spp*. (*S. sclerotiorum* and *S. minor*); *Fusarium spp.;* (*F. oxysporum* and *F. solani*), water moulds (primarily *Pythium spp.*), nematodes and *Rhizoctonia spp*. The project, being run jointly between RMCG and AHR are delivering an effective soil-borne disease management service to Australian growers, utilising the successful extension and delivery framework already developed under the Soil Wealth and Integrated Crop Protection projects. A best practice guide is being developed.

Five videos have been produced, including:

- Summer root rot
- Club root
- Bottom rot
- Black rot
- Big Vein

Discipline:	Pest and disease	**Ends:**	1/11/2018
Project code:	VG15010		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	RMCG + Applied Horticultural Research		
Extension materials:	Vegenote Videos		Factsheets, videos, webinars, training, demo sites on Soil Wealth website.

Improved soil-borne disease diagnostic capacity for the Australian Vegetable Industry

This project is being run by the SARDI who developed the PreDicta B molecular soil tests for the detection and quantification of soil-borne disease organisms for cereals. The project will focus on the development of molecular diagnostic probes for the identification of soil-borne disease for vegetables. The focus will be on developing new diagnostic techniques for club root in brassicas and cavity spot disease in carrots. In addition there will be calibration studies undertaken on a wider range of soil-borne disease organisms that affect vegetable crops, including Sclerotinia, Fusarium, Pythium, Rhizoctonia and nematodes. The project is coordinating with VG15010.

Discipline:	Pest and disease	**Ends:**	6/12/2018
Project code:	VG15009		
Contact person:	Michael Rettke	**Email:**	Michael.Rettke@sa.gov.au
Service provider:	South Australian Research and Development Institute (SARDI)		
Extension materials:			

Viruses of national importance to the vegetable industry

This project is a desktop review, considering viruses of national importance in relevant leviable vegetable crops. It covers aspects of virus epidemiology such as host range, transmission rates and mechanisms, influencing factors (e.g. environmental factors), diagnostic capacity and potential management options. The review includes a prioritisation of future R&D in this area, considering potential for improvements in management practices of viruses of national importance and reduction of impacts of these viruses that would contribute to improvements in productivity and profitability of vegetable production in Australia.

Discipline:	Pest and disease	**Ends:**	25/01/2017
Project code:	VG15008		
Contact person:	Byron de Kock (HIA)	**Email:**	byron.dekock@horticulture.com.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Vegenotes	Final report	

Innovative solutions to management of tospoviruses of vegetable crops

This project aims to address gaps in DNA sequence information for Australian tospoviruses, which infect a broad range of horticulture crops. This information is critical for the development of diagnostics and for management. The project also aims to generate information on host-pathogen interactions that may lead to identification of novel genes for resistance and help deliver broad-spectrum resistance to tospoviruses.

Discipline:	Pest and disease	**Ends:**	28/05/2018
Project code:	VG14063		
Contact person:	Neena Mitter	**Email:**	n.mitter@uq.edu.au
Service provider:	The University of Queensland		
Extension materials:			

Management and detection of bacterial leaf spot in capsicum and chilli crops

This project aims to increase the capacity of the vegetable industry to implement integrated disease management programs for bacterial leaf spot of capsicum and chilli field crops. It identified causal agents of the disease, reviewed existing research, and aimed to fill knowledge gaps, and investigate control measures. Key findings included:

- The testing of Australian isolates revealed all of the pathogens were tolerant to highly tolerant of copper. The researchers report that "copper may still have some role in management of bacterial leaf spot, however, alternative methods are needed to address the ineffectiveness of using copper alone."
- Essential oils may be a suitable avenue of alternative treatments, with the researchers noting that preliminary testing indicated oils tested had a strong antibacterial effect against *X. vesicatoria* and *X. euvesicatoria*, both as volatile gases and through direct contact. Further work is needed to explore this area.
- Management of bacterial leaf spot – apart from the use of resistant lines where possible – includes heat treatment of seed to prevent primary introduction of pathogens into crops and to mitigate the risk of introduction of new bacterial races, which may circumvent existing plant host resistance genes.

Discipline:	Pest and disease	**Ends:**	31/05/2018
Project code:	VG14010		
Contact person:	Denis Persley	**Email:**	denis.persley@daff.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Vegetables Australia article and factsheet		

Field Guide to Tropical Pests and Diseases in print

This field guide covers pests and diseases of a wide range of vegetable crops with a focus on the Northern Territory. It is comprehensive, contains many photographs and has been produced in English and Vietnamese. The guide is available in hard copy and also print-quality PDF versions of this guide are available from the Northern Territory Department of Primary Industries and Fisheries or by following the link.

Discipline:	Pest and disease	**Ends:**	1/06/2015
Project code:	VG13114		
Contact person:	Greg Owens	**Email:**	greg@ntfarmers.org.au
Service provider:	Department of Primary Industry & Fisheries, NT		
Extension materials:	Field guide		

Effective management of parsley summer root rot

Parsley summer root rot (SRR) affects all parsley-growing regions of Australia, and can lead to crop losses of up to 100 per cent. Running from 2014 and now concluded, this study aimed to determine the causal pathogens of SRR and to understand the disease's epidemiology, particularly in relation to environmental conditions and practices. It also aimed to develop robust and integrated disease management strategies. Research from this project confirmed that Pythium sulcatum is the most important cause of parsley SRR. This knowledge means growers can now apply more appropriate and effective management strategies targeting the pathogen. It was also found that longer crop rotations are needed in soil-based parsley production systems, particularly on farms where other apiaceous crops are grown.

Discipline:	Pest and disease	**Ends:**	31/07/2017
Project code:	VG13101		
Contact person:	Len Tesoriero	**Email:**	len.tesoriero@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Presentation		

Summer root rot in parsley scoping study

Previous investigations into root rots in parsley crops have largely focused on winter root rots caused by Pythium and Phytophthora, and not summer root rots. The incidence of summer root rots is variable, growers do not know when they will lose a crop to summer root rot, and crop losses of up to 90% or greater can occur.

Summer roots generally occur after a period of increased irrigation applications or a significant rainfall event. Fusarium was identified as the only common root rot pathogen identified in all three plant and soil samples, which underwent plant pathology assessment. For more information see the final report below. There is a follow-on project (VG13101) investigating control methods (see next panel).

Discipline:	Pest and disease	**Ends:**	1/07/2013
Project code:	VG12102		
Contact person:	Stuart Grigg	**Email:**	stuart@sgaghortconsulting.com.au
Service provider:	Stuart Grigg Ag-Hort Consulting Pty Ltd		
Extension materials:	Final report and vegenote		

Weed management for the vegetable industry –scoping study

This project is a review of weed management for the vegetable industry. The final report from the project is available by following the link below. There is now a follow-on project that is being conducted by Paul Kristiansen which covers both research and extension in relation to weed management for Australian vegetable growers. At this stage people should contact Paul Kristiansen directly in relation to this project. There is a webinar and presentation by Paul available via the soil wealth website, and can be accessed by clicking on the link below.

Discipline:	Pest and disease	**Ends:**	4/08/2014
Project code:	VG13079		
Contact person:	Paul Kristiansen	**Email:**	paul.kristiansen@une.edu.au
Service provider:	University of New England		
Extension materials:	Final report		Weed management webinar and resources

Integrated crop protection: Extension of integrated crop protection information

This project is focused on communicating information about pest, disease and weed management to vegetable growers and their advisers. It is being run in collaboration with the soil wealth project jointly by applied horticultural research and RMCG. Topics covered include: weeds, pest management, disease management, soil-borne disease, pesticide application, integrated pest management (IPM). This is being achieved through a combination of training, webinars, factsheets, videos and field demonstration. All this information is available on the innovative crop protection website by following the link below. The resources on the *Integrated Crop Protection* website is a key input for the VegNET project.

Discipline:	Pest and disease	**Ends:**	31/05/2017
Project code:	VG13078		
Contact person:	Anne-Maree Boland	**Email:**	anne-mareeb@rmcg.com.au
Service provider:	RMCG + Applied Horticultural Research		
Extension materials:	Resources on SW/ICP website		

Double knock low dose fenthion treatment of zucchinis as a quarantine treatment against cucumber fly

A new method of applying fenthion to acquire quarantine security was devised by Hannay-Douglas Pty Ltd using a much lower concentration of fenthion (100mg/L) but applied twice (24h apart). This ensures residues that are well below the maximum residue limit stipulated by the APVMA. This report describes the results of efficacy tests of this prototype treatment carried out on the main quarantine fruit fly pest of zucchinis, the cucumber fly (*Bactrocera cucumis*, French). The data generated in this project would be used to support a local registration or permit from APVMA. Refer to the report for further details.

Discipline:	Pest and disease	**Ends:**	1/07/2014
Project code:	VG13066		
Contact person:	Andrew Jessup	**Email:**	andrew.jessup@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report		

Identification of potential alternatives to metham sodium

Metham sodium (MS) is a broad-spectrum fumigant used to control a variety of soil-borne pests and diseases including nematodes, fungi, insects and weeds. The project has produced a factsheet which outlines the alternatives to meet them sodium. The factsheet (link below) proposes an integrated crop protection approach involving: biofumigation; proven amendments or "soil/plant health enhancers"; rotation or break crops such as seed crops / pasture breaks, and biocides/biological control.

Discipline:	Pest and disease	**Ends:**	5/05/2014
Project code:	VG13045		
Contact person:	Doris Blaesing	**Email:**	dorisb@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Final report and factsheet		

Fruit Fly research: Gap analysis

This project reviewed current methods available for managing fruit flies in vegetable crops. The two highest priorities for in-field control research were the use of perimeter baiting and exclusion netting. Exclusion of flies from a production area by physical or chemical means is certainly the best strategy in fruit fly management. If successfully applied, they avoid any need to treat the products in-field or add damaging and costly postharvest treatments. As such measures effectively produce a pest-free place of production (PFPP) they are also likely to be accepted for domestic market access. The methods for managing fruit fly identified in this project are now being evaluated a subsequent project VG13042 (see below).

Discipline:	Pest and disease	**Ends:**	20/02/2015
Project code:	VG13040		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report		

New in-field treatment solutions to control Fruit Fly (1)

This project successfully demonstrated a combination of perimeter protein baiting and male annihilation technique, applied on a farm-wide scale, for control of fruit fly in a commercial chilli crop. When assessed on a small scale under high fruit fly pressure this system was less effective, but successful control was achieved during winter when pressure was low. The project also evaluated alternative chemical options to dimethoate and fenthion for Queensland fruit fly and cucumber fly, and has developed data on seasonal fruit fly activity.

Discipline:	Pest and disease	**Ends:**	18/05/2017
Project code:	VG13041		
Contact person:	Lara Senior	**Email:**	Lara.Senior@daf.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report		

New in-field treatment solutions to control Fruit Fly (2)

This project has evaluated the use of perimeter baiting and exclusion netting for the control of fruit fly in vegetable crops, particularly capsicum. The results of these trials are presented in the form of five short videos aimed at explaining these techniques to growers. There is also a printed best practice guide that is free on request from AHR. Videos are available from the link below or AHR YouTube Channel and are:

- Video 1 Life cycle
- Video 2 Monitoring
- Video 3 Food-based baits
- Video 4 Male annihilation and Mass trapping
- Video 5 Netting and repellent

Discipline:	Pest and disease	**Ends:**	31/01/2017
Project code:	VG13042		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Videos, best practice guide and final report		

Adaptive pest management for horticulture under climate change – pilot pest scoping

The two case studies were silverleaf whitefly (*Bemisia tabaci*) in Bundaberg and diamondback moth (*Plutella xylostella*). Both pests were modelled to explore how their climate suitability might change under climate change scenarios. We found that both pests could increase the number of lifecycles they can complete each year by approximately 50%. The report made three recommendations:

1. Determine if it is feasible to make periodic assessments of pest densities (e.g. every 5 years) to monitor how pest abundance changes over time
2. Investigate the reasons for poor adoption of existing pest management recommendations
3. Improve grower understanding of the nature of climate changes and no regrets options for adapting management practices to changing conditions.

Discipline:	Pest and disease	**Ends:**	31/07/2014
Project code:	VG13029		
Contact person:	Darren Kriticos	**Email:**	darren.Kriticos@csiro.au
Service provider:	CSIRO Climate Adaption Flagship		
Extension materials:	Final report		

Alternative options to Fenthion and Dimethoate education project

This was an education project aimed at informing Australian vegetable growers about alternatives to Dimethoate and Fenthion, which are used to control Queensland fruit fly in Australia. The link to the project report contains useful resource information and a PowerPoint presentation about current alternatives to these two insecticides.

Discipline:	Pest and disease	**Ends:**	1/09/2012
Project code:	VG11031		
Contact person:	Jessica Lye	**Email:**	jessica.lye@ausveg.com.au
Service provider:	AUSVEG Ltd		
Extension materials:	Final report		

Updating and republishing valuable vegetable industry resources

This project has resulted in the publication of five pest and disease identification unit guides covering:

- Pests, Diseases and Disorders of Carrots, Celery and Parsley
- Pests, Diseases and Disorders of Sweet Corn
- Pests, Diseases and Disorders of Sweetpotato
- Pests, Diseases and Disorders of Brassicas
- Pests, Diseases and Disorders of Babyleaf Crops

The project has also developed a pest and disease identification app called ***VegPestID*** which can be downloaded for Android or Apple phones and tablets from the Play Store or App Store, or using the link below.

Discipline:	Pest and disease	**Ends:**	30/04/2015
Project code:	VG12087		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Ute Guides		Veg Pest ID App

Innovating new virus diagnostics and planting bed management in the Australian sweet potato industry

This project has developed grower guides and five factsheets, which are outlined below and can be accessed by the following link on this page.

1. Sweet potato viruses and phytoplasmas in Australia, worldwide, and their current methods of detection
2. Managing sweet potato plant beds in Australia
3. Sweet potato sample collection and virus diagnostic protocol
4. Managing sweet potato viruses in Australia
5. Managing sweet potato plant beds in Australia
6. What is Sweet potato chlorotic stunt virus (SPCSV)?

Discipline:	Pest and disease	**Ends:**	31/03/2018
Project code:	VG13004		
Contact person:	Sandra Dennien	**Email:**	Sandra.dennien@daff.qld.gov.au
Service provider:	Australian Sweetpotato Growers Inc		
Extension materials:	Factsheets, grower guide and reviews and final report		

Low dose methyl bromide treatment of capsicum to control fruit fly

This project investigated the use of low-dose methyl bromide treatment of capsicums to control Queensland fruit fly. We were unable to find a final report or any extension materials produced, however this project appears to have direct relevance to the Australian capsicum growers. We suggest contacting Queensland Department of Agriculture and fisheries in if you are seeking more information about this project.

Discipline:	Pest and disease	**Ends:**	28/02/2014
Project code:	VG10126		
Contact person:	?	**Email:**	
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:			

Management of insecticide resistance in the green peach aphid

Green peach aphid is a widespread and damaging pest in a broad range of horticultural crops, and for effective management growers should:

- Have resistance management strategies in place for this pest. High levels of resistance to synthetic pyrethroids, carbamates and organophosphates are widespread across Australia
- Due to the way aphids reproduce, resistant individuals can soon dominate a landscape with widespread use of the same insecticide
- Incorporating non-chemical control methods is critical to GPA management.

More information is available from the VegeNote available below.

Discipline:	Pest and disease	**Ends:**	30/09/2016
Project code:	VG12109		
Contact person:	Paul Umina	**Email:**	pumina@unimelb.edu.au
Service provider:	Cesar Pty Ltd		
Extension materials:	Vegenote and final report		

Improving the management of insect contaminants in processed leafy vegetables

Insect contaminants in harvested leafy vegetable crops is a major source of rejection for Australian vegetable growers. This project, conducted in collaboration with one harvest, assessed the effectiveness of ways to remove insect contaminants from leafy vegetables, especially baby leaf spinach and lettuce. The findings are outlined in this practice guide which can be accessed via the link below.

The most effective practices were:

- Remove from the crop prior to harvest by using a combination of blowers, chains in the crop and shaking tables
- Removing moths from crops using the Vortex insect trapping system prior to harvest
- Floating row covers as a physical barrier to exclude insects
- Low toxicity, short withholding period insecticides can be also be beneficial
- Removing insects from leafy vegetables in the field is better that removing them on the processing line
- dead insects (moths) were easier to remove in the processing line then live moths.

Discipline:	Pest and disease	**Ends:**	30/11/2015
Project code:	VG12108		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Best practice guide, VegNote and Final Report		

Plant Health desktop study

Key study - resource lists all VG Plant Health Projects - key document to assist locate previous R&D recommend all NVEN staff read the review. Also available is the detailed database of all previous crop protection projects, and economic evaluation tool spreadsheet and instruction guide and a separate document which outlines the smart phone apps that are available to assist in managing vegetable crop protection. The implementation of this strategy has been achieved through the integrated crop protection project (VG 13070) and the soil wealth project (VG 13076). Refer to the Soil Wealth/ICP website link below for more information.

Discipline:	Pest and disease	**Ends:**	30/04/2013
Project code:	VG12048		
Contact person:	Doris Blaesing	**Email:**	dorisb@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Review report, database, SmartPhone Apps, EVA tool	ICP Website	

Review of Soil-borne Disease Management in Australian Vegetable Production

This is a key study in relation to managing soil-borne disease in vegetable crops in Australia. This study reviews all previous work in relation to soil-borne disease management and research as of 2012, in Australia. The report should be seen as a significant resource document, and should be downloaded and read by all NVEN staff. This study informed the new soil borne disease project (VG15010) which is currently involved in research and extension in vegetable soil borne disease in Australia. Highly recommended as a resource document.

Discipline:	Pest and disease	**Ends:**	30/09/2012
Project code:	VG11035		
Contact person:	Prue McMichael	**Email:**	srhs@srhs.com.au
Service provider:	Scholefield Robinson Horticultural Services Pty Ltd		
Extension materials:	Final report		

Developing a strategy to control Anthracnose in lettuce

The project reviewed current Australian and international best practice in relation to managing anthracnose in head lettuce, with a focus on iceberg and cause lettuce. The project included an industry consultation workshop with input from Australian plant pathologists, the vegetable seed industry, processors and major vegetable growers in Australia. The results of the review and industry consultation are presented in a fact sheet which is available via the link below, and also via the ICP website.

Discipline:	Pest and disease	**Ends:**	30/11/2011
Project code:	VG10123		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report and factsheet		

Management of virus diseases in vegetables

No final report or extension materials except for the VegeNote (link below) could be located for this project. We suggest contacting the project leader for more information.

This project reviewed control measures for viral diseases in capsicum and cucurbit crops in Australia. Diseases covered included cucumber mosaic virus (CMV), zucchini yellow mosaic virus in WA, Tomato spotted wilt virus (TSWV) in greenhouse grown capsicum in Adelaide. Tolerant zucchini varieties were identified for Gatton, Queensland, producing up to 90% marketable fruit compared to susceptible varieties (20% marketable). Biological control of thrips is reducing TSWV in Adelaide. Control should also include planting upwind from existing crops to reduce insect vector movement and destroying harvested, infected crops prior to planting new crops.

Discipline:	Pest and disease	**Ends:**	28/02/2014
Project code:	VG10104		
Contact person:	Denis Persley	**Email:**	denis.persley@daff.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Vegenote		

Breeding Capsicum for tospovirus resistance

No information or final report could be located for this project. We recommend contacting the Queensland Department of Agriculture and Fisheries for more information.

Discipline:	Pest and disease	**Ends:**	1/05/2016
Project code:	VG10081		
Contact person:	Des McGrath	**Email:**	
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report		

Scoping study for sustainable broadleaf weed control in cucurbit crops

This project reviewed the current research and information available in relation to weed control on cucurbit crops. The issues for weed management are a sprawling plant habit and the lack of this registered herbicides available for broadleaf weed control. The study identified recent innovative approaches including soil solarisation, biofumigation, cover crops, bio herbicides and biodegradable mulch films. There are also several herbicides registered overseas for use in cucurbit crops that are not currently registered in Australia. The detailed report and appendices covering in excess of 200 pages can be found by clicking on the link below. There is a currently (2016) research and extension project on weed management in vegetables (VG15070 – A strategic approach to weed management for the Australian Vegetable Industry).

Discipline:	Pest and disease	**Ends:**	15/11/2011
Project code:	VG10048		
Contact person:	Brian Sindel	**Email:**	bsindel@une.edu.au
Service provider:	University of New England		
Extension materials:	Final report		

Cold disinfestation of capsicum fruit from Queensland fruit fly

Until recently the most common method of ensuring fruit were fruit fly-free was postharvest treatment with dimethoate insecticide. However, this product has now been withdrawn from this use and growers must find an alternative method. This research demonstrated that 10 days at 3°C provides an extremely high level of quarantine security against Qfly in red and green capsicums, Cayenne chillies and Birdseye chillies. For more information contact the project leader.

Discipline:	Pest and disease	**Ends:**	31/12/2012
Project code:	VG10028		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	NSW Dept of Primary Industries, an office of Dept of Industry		
Extension materials:	Final report		

Integrated weed management in vegetable brassicas

The project has produced the factsheet "A guide to effective weed control in Australian brassicas", which can be downloaded by following the link below. There is also a final report and a VegeNote available for download for more information. Please note that your Eurofins Agrisearch have now changed their name and the email address for Les Mitchell may no longer be functional.

Discipline:	Pest and disease	**Ends:**	1/07/2011
Project code:	VG09137		
Contact person:	Les Mitchell	**Email:**	les.mitchell@agrisearch.com.au
Service provider:	Eurofins Agrisearch		
Extension materials:	Final report, grower guide and vegenote		

Brassica stem canker: Phase 2

This project investigated the use of fungicides and plant growth products in the management of Brassica stem canker. None of the products evaluated provided complete control of stem canker. The fungicides Impact-In-Furrow® (flutriafol) and Jockey (fluquinconazole) in combination with Amistar ® (axozystrobin) reduced stem canker in both greenhouse and field evaluations, and registration of these products for use on vegetable Brassica crops was recommended. The research showed the use of plant growth products and fungicides in low disease situations did not significantly reduce stem canker severity, but could improve plant growth.

Discipline:	Pest and disease	**Ends:**	30/11/2011
Project code:	VG09129		
Contact person:	Barbara Hall	**Email:**	barbara.hall@sa.gov.au
Service provider:	South Australian Research and Development Institute (SARDI)		
Extension materials:	Final report		

Integration of crop and soil insect management in sweet potatoes

This project summarises techniques for managing the crop and soil insects and sweet potatoes. The project was delivered by Australian Sweetpotato Growers Inc. The results from the project are presented in a final report and a 17-minute video documentary which shows the techniques in a practical and accessible way. The use of the video as an extension tool is recommended.

Discipline:	Pest and disease	**Ends:**	1/05/2014
Project code:	VG09052		
Contact person:	Russell McCrystal	**Email:**	rmccrystal@gmail.com
Service provider:	Australian Sweetpotato Growers Inc		
Extension materials:	Final report		Video documentary

Alternative fruit fly control for market access and IPM enhancement in eggplant

This project gathered information to support new ways of managing fruit fly in eggplant to enhance future market access. The research project gathered baseline data on fruit fly seasonal activity in Bundaberg, Bowen and Burdekin regions and examined the effectiveness of several alternate chemistry groups applied prior to fruit harvest. The project found that current (2013) production systems with preharvest cover sprays (bifenthrin, abamectin and spinosad), pack-house sorting procedures and low fruit fly prevalence on eggplant farms greatly reduces the risk of fruit fly infestation in eggplant. Refer also to project VG10028 (Cold disinfestation of capsicum fruit from Queensland fruit fly) described above.

Discipline:	Pest and disease	**Ends:**	31/05/2013
Project code:	VG09023		
Contact person:	Dr Siva Subramaniam	**Email:**	siva.subramaniam@daff.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final Report		

Investigations for mass rearing of Orius armatus for controlling western flower thrips in the Australian vegetable industry

The project report explains how to rear the biological control agent *Orius armatus* for the control of western flower thrips in the Australian vegetable industry. The report includes information on laboratory and greenhouse bioassays, how to breed and use the biological control agent, with a focus on greenhouse vegetable production. Refer to the final report for detail.

Discipline:	Pest and disease	**Ends:**	30/01/2012
Project code:	VG08186		
Contact person:	Lachlan Chilman	**Email:**	lachlanchilman@hotmail.com
Service provider:	Manchil IPM Services		
Extension materials:	Final report		

Mechanisms and management of insecticide resistance in Australian diamondback moth

Diamondback moth (DBM) (*Plutella xylostella* L.) is the main pest of Brassica vegetable crops in Australia, and has international notoriety for rapidly acquiring insecticide tolerance, which then leads to field control failures. DBM resistance to older insecticide classes is widespread in Australia; hence the choices for DBM control are increasingly limited to several newer synthetic pesticides and *Bacillus thuringiensis* products. This project investigated mechanisms and options for managing resistance to diamondback moth control measures. Refer to the project report for more detail.

Discipline:	Pest and disease	**Ends:**	30/03/2013
Project code:	VG08062		
Contact person:	Greg Baker	**Email:**	greg.baker@sa.gov.au
Service provider:	South Australian Research and Development Institute (SARDI)		
Extension materials:	Final report		

Getting the most out of Eretmocerus hayati, an effective natural enemy of silverleaf whitefly

The research focused on how to get more out of the parasitoid, and better silverleaf whitefly (SLW) control by investigating: What management practices and decisions influence the abundance and distribution of the parasitoid; what features of the landscape influence the capacity of the parasitoid to achieve early colonisation of at-risk crops; and why the introduced E. *hayati* provides better control than the native E. *mundus*. Results were used to provide guidelines to growers that help to integrate control options for SLW. These guidelines were summarised in a user guide which identified a set of practical approaches that growers could adopt and integrate into their farming practice. The guide was prepared in consultation with growers so that the content and layout made sense to them. The user guide and final report can be downloaded from the link below.

Discipline:	Pest and disease	**Ends:**	31/08/2012
Project code:	VG08051		
Contact person:	Paul de Barro	**Email:**	Paul.Debarro@csiro.au
Service provider:	CSIRO Ecosystem Sciences		
Extension materials:	Final report and factsheet		

Identification of immune-suppressors of diamond-back moth (DBM)

This research suggests that immune-suppression could be utilised as part of integrated pest and resistance management strategies, for Brassica caterpillar pests. In addition, as the immune-suppressive compounds are not inherently toxic per se, they would have less environmental impact and be seen as a greener option compared to traditional insecticides and/or could be used synergistically with traditional insecticides and other existing management options. We estimate that a further 1–2 years research would be needed to provide the level of understanding (of the compounds) required to investigate commercial development with relevant partners such as agrichemical companies. Final report available for download.

Discipline:	Pest and disease	**Ends:**	29/07/2011
Project code:	VG08048		
Contact person:	Richard Glatz	**Email:**	richard.glatz@sa.gov.au
Service provider:	South Australian Research and Development Institute (SARDI)		
Extension materials:	Final report		

Investigations and developing integrated management strategies for carrot powdery mildew

Powdery mildew has been found on a carrot crops in three states of Australia. The first finding of the disease was in the Murrumbidgee Irrigation Area (MIA) of NSW in 2007. It has subsequently been found in Tasmania and South Australia in 2008. A factsheet outlining the cultural and chemical control options can be downloaded by following the link below. Permits are now (2016) available for: AMISTAR 250 SC FUNGICIDE (Permit 14816) and FOLICUR 430 SC FUNGICIDE and HORNET 500 SC 430SC (Permit 13091). These permits can be downloaded from the link below. More information on the status of permits and registration is available at www.apvma.gov.au

Discipline:	Pest and disease	**Ends:**	31/05/2012
Project code:	VG08044		
Contact person:	Andrew Watson	**Email:**	andrew.watson@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report, vegenote, factsheet and permits		

Development of methods to monitor and control Aphanomyces root rot and black root rot of beans

Refer to the link below for a copy of the final report and a detailed FAQ sheet which outlines the biology of the disease, photographs of symptoms and current control practices.

Discipline:	Pest and disease	**Ends:**	16/07/2012
Project code:	VG08043		
Contact person:	Andrew Watson	**Email:**	andrew.watson@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report and factsheets		

Identification of IPM strategies for Pythium induced root rots in Apiacae vegetable crops

Identification of IPM strategies for Pythium induced root rots in Apiaceae vegetable crops. The project was aimed at determining the role of Pythium in causing root rot and canker, identifying predisposing factors to disease and disease control strategies. Chemical control options are briefly outlined in the fact sheet with more detail in the final report. both the final report and the factory can be downloaded from the link below.

Discipline:	Pest and disease	**Ends:**	31/07/2012
Project code:	VG08026		
Contact person:	Elizabeth Minchinton	**Email:**	liz.minchinton@dpi.vic.gov.au
Service provider:	The Dept of Economic Development Jobs, Transport & Resources		
Extension materials:	Final report and factsheet		

Identification and monitoring of resistance in vegetable crops in Australia

Findings from this study contributed to the development of guidelines for improved resistance management which were published through VG07110 (Best practice production models in lettuce, brassica) and VG07109 (Development of effective pesticide strategies compatible with IPM management used on farm). A key recommendation is that growers should continue to follow resistance strategies to minimise further development of resistant populations. It is critical that availability of alternative fungicides from different classes be available for these strategies to be sustained.

Please note: We were unable to find the final reports for VG07110 or VG07109. We suggest you contact the project leader information about these follow-on projects.

Discipline:	Pest and disease	**Ends:**	1/07/2011
Project code:	VG07119		
Contact person:	Len Tesoriero	**Email:**	len.tesoriero@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report		

The delivery of IPM for the lettuce industry – an extension to VG05044

This project set out to establish the resistance status of several important fungal and bacterial pathogens from Australian vegetable crops. Findings from this study contributed to the development of guidelines for improved resistance management which were published through VG07110 (Best practice production models in lettuce, brassica) and VG07109 (Development of effective pesticide strategies compatible with IPM management used on farm). A detailed factsheet on Lettuce Integrated Pest Management along with the final report can be accessed from the link below.

Discipline:	Pest and disease	**Ends:**	6/02/2012
Project code:	VG07076		
Contact person:	Sandra McDougall	**Email:**	sandra.mcdougall@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report and factsheet (factsheet includes links to further materials)		

Benchmarking predictive models, nutrients and irrigation for management of downy and powdery mildews and white blister

This project focused on white blister on brassicas, powdery mildew on cucurbits and downy mildew and anthracnose on lettuce. The project determined the efficacy and economics which could be achieved with weekly fungicide sprays, disease predictive models, irrigation timing and growing a resistant variety, but the latter was the most superior IPM tool. It evaluated the benefits of nutrient management; developed a disease predictive model for powdery mildew of cucurbits and a detection kit for airborne spores of white blister.

The outcomes of this project, methodology conclusions and recommendations are outlined in a **VegeNote** entitled "Benchmarking predictive models, nutrients and irrigation for management of downy and powdery mildews and white blister". There is also a separate **factsheet** entitled "Benchmarking Models, Aerial Spore Sampling, Irrigation and Nutrients for downy mildew of lettuce and white blister on brassicas".

Discipline:	Pest and disease	**Ends:**	30/11/2011
Project code:	VG07070		
Contact person:	Elizabeth Minchinton	**Email:**	liz.minchinton@dpi.vic.gov.au
Service provider:	The Dept of Economic Development Jobs, Transport & Resources		
Extension materials:	Final report, poster, summaries and vegenote		

Thrips management in the green beans industry

Thrips can attack green beans from the moment the seedlings emerge from the ground through to flowering, but it is the damage some do during flowering that has the greatest impact. This project investigated the management of thrips in green beans. The outcomes of the project are summarised in a fact sheet which can be downloaded from the link below. More detail is available in the final project report.

Discipline:	Pest and disease	**Ends:**	31/08/2011
Project code:	VG07017		
Contact person:	John Duff	**Email:**	john.duff@daff.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report and factsheet		

Increasing adoption of IPM by WA vegetable growers and development of an ongoing technical support service

Grower uptake of IPM in Western Australia was poor before this project commenced in 2007, with lettuce and capsicum growers spraying prophylactically for western flower thrips (WFT). Additional management tools were developed during the project, including the evaluation of a native WFT predator (*Orius armatus*) and a thrips predatory mite (*Neoseiulus cucumeris*) in greenhouse capsicum, and bioassays to determine which commonly used pesticides could be safely used with *O. armatus*. The potential of a non-chemical control method using thrips attractants was also evaluated. For more information download the final report.

Note: Refer to the related project VG08186 (Investigations for mass rearing of *Orius armatus* for controlling Western Flower Thrips in the Australian Vegetable Industry) which is listed above.

Discipline:	Pest and disease	**Ends:**	31/10/2011
Project code:	VG06037		
Contact person:	Sonya Broughton	**Email:**	sonya.broughton@agric.wa.gov.au
Service provider:	Western Australian Agriculture Authority (WAAA)		
Extension materials:	Final report		

Improved management of pumpkin brown etch

This project will first confirm the cause and the environmental conditions conducive to brown etch throughout pumpkin growing regions of Australia.

It will then quantify varietal resistance/susceptibility among current commercial varieties and examine some of the environmental factors affecting brown etch.

Once the precise cause of the disease in Australia has been identified, control measures will be developed, costed, and evaluated in the field with commercial pumpkin growers and confirmed under controlled conditions. Finally, the most promising and cost efficient methods will be communicated to growers and supply-chain partners in Australia.

Discipline:	Pest and disease	**Ends:**	1/07/2019
Project code:	VG15064		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	VA Articles		

Characterisation of a Carlavirus of French Bean

This project was established at the end of 2016 to characterise a new carlavirus found infecting Fabaceae crops in in South East Queensland, and identify potential distribution and incidence of the virus in other French bean production regions of Australia. Importantly, the project will develop and help growers adopt management strategies for the virus, resulting in improved pack-out, increased marketable yield and a reduction in the impact of the disease.

Discipline:	Pest and disease	**Ends:**	31/05/2019
Project code:	VG15073		
Contact person:	Rod Edmonds	**Email:**	rod.edmonds@daf.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:			

Improved knowledge of factors contributing to carrot rot

This two-year study was tasked with investigating the complex causes of carrot crown rot disorders, and the field and soil factors that are conducive to its development in Tasmanian production regions. Its work revealed five different types of carrot crown problems that can affect carrot marketability and reduce returns to growers:

- Ring crown rot
- Smooth crown rot
- Corky crown rot
- Soft watery crown rot
- Black ring.

All except black ring are classified as major defects, meaning that affected produce ends up in waste bins. Carrots that have black rings in the crowns downgraded to lower grade carrots and sold at less than half the premium-grade carrot values.

In looking at the contributing factors to these crown rot conditions, the researchers found that soil environment has a major influence in crown rot disease development. Ground prepared and crops sown under wet weather conditions had increased incidence of crown rots, as well as other major defects such as forked and misshapen carrots.

High levels of stones, cloddy soil, poor drainage and soil crusting also contributed to increased levels of ring crown rot and smooth crown rot. Meanwhile, corky crown rot appeared to be related to carrot crown exposure to fluctuating surface soil moisture and temperature.

In a study on irrigation, low soil moisture (12mm at weekly intervals) at the 6 to 9 leaf stages, followed by 30mm of irrigation at weekly intervals from 9 leaf to harvest, increased crown rot incidence.

Discipline:	Pest and disease	**Ends:**	15/08/2018
Project code:	VG15066		
Contact person:	Philip Frost	**Email:**	pfrost@peracto.com
Service provider:	Peracto Pty Ltd		
Extension materials:	Final report		

Impact of Pesticides on Beneficial Arthropods of Importance in Australian Vegetable Production

As its name suggests, this project will be developing information on the impact of pesticides on insects and mites that play a beneficial role in the Australian vegetable industry. This information is

essential for making decisions about the use of pesticides in vegetable crops that are grown using integrated pest management. To help improve pest management with minimal and appropriate use of insecticides, for growers and their advisor the project will develop a user-friendly management guide around this information, based on crop type.
Extension materials will be available later in the project.

Discipline:	Pest and disease	**Ends:**	19/04/2020
Project code:	VG16067		
Contact person:	Jessica Page	**Email:**	jpage.ipm@gmail.com
Service provider:	IPM Technologies Pty Ltd		
Extension materials:	Website		Project update

Generation of Residue, Efficacy & Crop Safety Data for Pesticide Applications in Horticulture Crops 2017

This project is responsible for generating data to support a range of permit applications for a range of industries. This supports project VG16020 'Vegetable industry minor use program' which is used to renew and apply for new minor use permits for the vegetable industry. New minor use permits are published in the weekly AUSVEG newsletter, and current permits can be found on the APVMA website (link below).

Discipline:	Pest and disease	**Ends:**	1/02/2020
Project code:	ST16006		
Contact person:	Damian Bougoure	**Email:**	damianbougoure@eurofins.com
Service provider:	Eurofins Agrisearch Services		
Extension materials:			Link to current minor use permits

Vegetable agrichemical pest management needs and priorities

This project aims to prioritise agrichemical efforts. With close consultation with growers, it will identify pest priorities for vegetable commodities. These outcomes will aid in updating industry Strategic Agrichemical Review Processes (SARPs), inform industry direction at the annual AgChem Collaborative Forum, and lead the progression of minor use permits and chemical registrations. Patrick is keen to engage with growers and agronomists throughout Australia, and would like to come and talk at VegNET workshops (contact Patrick to arrange).

Discipline:	Pest and disease	**Ends:**	3/04/2020
Project code:	VG16060		
Contact person:	Patrick Arratia	**Email:**	patrick.arratia@ausveg.com.au
Service provider:	AUSVEG Ltd		
Extension materials	Project update		

A strategic approach to weed management for the Australian Vegetable industry

This project is being run by the University of New England weed research team and involves research. A weed management webinar was conducted in 2016 and recording of this webinar is available on the Integrated Crop Protection (ICP) website and there is also a factsheet produced by

the ICP project. Both are available by following the link below. For more information contact the project leader.
A weed management guide for 'Fat Hen' is now available. Guides on stinging nettle, nutgrass, pigweed, and blackberry nightshade are to come.
A study of the economics of weed management has commenced.

Discipline:	Pest and disease	**Ends:**	
Project code:	VG15070		
Contact person:	Paul Kristiansen	**Email:**	paul.kristiansen@une.edu.au
Service provider:	University of New England		
Extension materials:	Webinar and factsheet	Weed management guide	Cover crop trial video

New end-point treatment solutions to control Fruit Fly (2)

This project is developing a new export protocol for the export of Australian capsicums to New Zealand, replacing the current methyl bromide (MB) fumigation with low-dose fumigation. Research against Queensland fruit fly has shown that a treatment of 18g/m^3 MB at 18°C for 5 hours was efficacious. This is less than half the current protocol which requires 40g/m^3 MB at 17°C for 2 hours. Physiology trials showed that the low-dose methyl bromide did not reduce the fruit quality. The data package was submitted to the Department of Agriculture and Water Resources (DAWR), who are currently negotiating the new protocol with Ministry of Primary Industries (MPI) New Zealand. Research is continuing to generate data packages on other fruit fly species of concern.

Discipline:	Pest and disease / Market access	**Ends:**	31/05/2018
Project code:	VG13044		
Contact person:	Pauline Wyatt	**Email:**	pauline.wyatt@daf.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Presentation		

Field and landscape management to support beneficial arthropods for IPM on vegetable farms

This new program is designed to support Australian vegetable growers in harnessing the power of beneficial arthropods in integrated pest management (IPM) approaches. Specifically, it brings together a range of researchers and professionals in the field, who will capture information, develop and test strategies, and produce crop-specific and region-specific guidelines for field and landscape management to support beneficials. To kick things off, the project is beginning with a review of habitat management within the industry and in relevant literature.

Discipline:	Pest and disease	**Ends:**	30/06/2020
Project code:	VG16062		
Contact person:	Geoff Gurr	**Email:**	ggurr@csu.edu.au

Service provider:	Charles Sturt University	
Extension materials:	Project information sheet	Vegetables Australia article

Area wide management for vegetable diseases: viruses and bacteria

This project will be responsible for developing an 'area wide management' (AWM) strategy to address high-priority viral and bacterial diseases affecting vegetable crops. This strategy will include viral diseases transmitted by thrips, aphid and whitefly pests, and phytoplasmas transmitted by leafhoppers, and will involve pest management approaches. The project will also be keeping track of surveillance of tomato potato psyllid (TPP), through linkages with other industry TPP work.

Discipline:	Pest and disease	**Ends:**	30/05/2022
Project code:	VG16086		
Contact person:	Cherie Gambley	**Email:**	cherie.gambley@daf.qld.au
Service provider:	The Department of Agriculture and Fisheries (DAF) and Research and Development for Primary Industries Pty Ltd		
Extension materials:	Factsheet		

Review of issues and options for preventing and removing red back spiders in broccoli

This review examined factors that may be contributing to red back spiders entering broccoli crops and / or contaminating broccoli after harvest. It provides growers with some tools to identify potential sources of contamination and reduce the risk that red back spiders will contaminate crops. The factsheet provides a useful summary.

Discipline:	Pest and disease	**Ends:**	24/07/18
Project code:	VG17014		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Factsheet	Final report	

Marketing/supply chain

Consumer and market program for the vegetable industry (Project Harvest) – Stage 2

Colmar Brunton has been tracking consumer perceptions and behaviour in relation to vegetables through Project Harvest. Twenty-eight vegetables were analysed on a quarterly rotational basis – monthly tracker reports are available on the AUSVEG website. This work provides feedback and insights for vegetable growers who can use it to better understand their customer.

Discipline:	Marketing/supply chain	**Ends:**	30/06/2016
Project code:	VG14060		
Contact person:	Denise Hamblin	**Email:**	denise.hamblin@colmarbrunt.com
Service provider:	Colmar Brunton		
Extension materials:	Final report	Monthly reports on AUSVEG website	

New product development information for the vegetable industry

The aim of the project was to help equip Australian vegetable growers and producers with the tools required to innovate and develop new products to maximise the value of their crops. Resources include a how-to guide for developing new, added-value vegetable products; a guide to find Australian companies that could help the grower; and videos from the workshop held during this project.

Discipline:	Marketing/supply chain	**Ends:**	4/04/2016
Project code:	VG14031		
Contact person:	Hazel MacTavish-West	**Email:**	hazel@mactavishwest.com
Service provider:	MacTavish West Pty Ltd ATF MacTavish West Family Trust No. 1		
Extension materials:		A great resource guide and videos on veg innovations website	

Market research around the opportunity to create more vegetable snacking options to quantify market size

The project aim was to determine the size of the opportunity for vegetables in the Australian snack food market by quantifying the total snack food market and to identify opportunities for vegetables within it.

Information could be summarised further for growers/processors, including new snack product opportunities and market size/buyer profile.

Discipline:	Marketing/supply chain	**Ends:**	31/07/2015
Project code:	VG14024		
Contact person:	Martin Kneebone	**Email:**	info@freshlogic.com.au.
Service provider:	Freshlogic Pty Ltd		
Extension materials:	Final report and vegenote		

Vegetable industry market access and development program

AUSVEG undertakes activities including reverse trade missions, tradeshows, seminars and symposiums to develop export markets and increase market availability for Australian produce. Market development resources including export market snapshots are available on the AUSVEG website link below.

Discipline:	Marketing/supply chain	**Ends:**	31/03/2017
Project code:	VG13097		
Contact person:		**Email:**	
Service provider:	AUSVEG Ltd		
Extension materials:	Website promotion		Final report

Baseline demographic research for the vegetable industry

The aim of the project was to supply growers and other key industry stakeholders with data and insights to support their already extensive knowledge; to enable them to have an informed discussion with their retail partners and with their end client – the consumer. The project provided the vegetable industry with a baseline demographic read of the vegetable industry, by which growers can measure performance of the 15 participating commodities. Monthly reports are available on the AUSVEG website. Also on the website are opportunity calculators, which identify retail opportunities for particular vegetables.

Discipline:	Marketing/supply chain	**Ends:**	31/08/2015
Project code:	VG13088		
Contact person:		**Email:**	
Service provider:	The Nielsen Company		
Extension materials:	Final report		Monthly reports on AUSVEG website

Benchmarking Australian vegetable industry points of difference

In order to gain a better understanding of what attributes are required to place Australian produce at an advantage in export markets, a benchmarking study was carried out across key export markets into local consumer behaviours and preferences. Australian imports attained a strong, positive brand image, and the country should leverage on the quality of specific produce while improving on price and freshness. Details from the market analysis are available in the final report and could be incorporated into an export workshop.

Discipline:	Marketing/supply chain	**Ends:**	21/07/2014
Project code:	VG13085		
Contact person:	Ben Dunsheath	**Email:**	Ben.Dunsheath@euromonitor.com
Service provider:	Euromonitor International Ltd		
Extension materials:	Final report and vegenote		

Evaluation of quality assurance software for the vegetable industry

This project provided information for the vegetable industry by identifying a range of QA tools that can assist vegetable growers, including packers, in deciding on the selection and purchase of tools to assist in managing their QA systems.

The final report contains summary tables of QA software and tools, with details of their potential uses and ease of use. It also provides a decision aid for use in the selection of QA software/tools.

QA is a time consuming process for growers and packers, so any software they can use to reduce time input is beneficial and can increase traceability.

Discipline:	Marketing/supply chain	**Ends:**	30/03/2015
Project code:	VG13082		
Contact person:	Belinda Hazell	**Email:**	belinda.hazell@tqaaustralia.com.au
Service provider:	TQA Australia Inc		
Extension materials:	Final report and vegenote		

Financial Performance of Australian Vegetable Farms 2013-14 to 2015-16

Reports are available from this project which detail financial performance of vegetable farms by state and size for 2013–2014. Updated data for 2015–16 is now available and would be a useful benchmarking tool for growers.

Discipline:	Marketing/supply chain	**Ends:**	31/12/2016
Project code:	VG13068		
Contact person:	Milly Lubulwa	**Email:**	
Service provider:	Aust Bureau of Agricultural & Resource Economics & Sciences		
Extension materials:	Final and interim reports		Results from surveys

Market analysis and strategy: Broccoli to Japan

This project undertook an in-depth market analysis to determine if potential existed for Australian broccoli exports to Japan. The research focused on the current market size and growth trends of the broccoli market (fresh and frozen); market access; market segments; competitors; supply chains; consumer research; and economic analysis. The project concluded that a combination of factors had placed Australia in a position to re-enter the Japanese fresh broccoli market. A desktop research booklet provides a useful summary of the market analysis undertaken.

Discipline:	Marketing/supply chain	**Ends:**	30/04/2015
Project code:	VG13048		
Contact person:	Bronwyn Warfield	**Email:**	Bronwyn.Warfield@tiq.qld.gov.au
Service provider:	Trade and Investment Queensland		
Extension materials:	Final Report and research summary booklet		

Optimum vegetable portion size to meet consumer needs

This project looked for potential to optimise portion sizes to drive increased purchase and consumption. The research focused on six vegetables including carrots, pumpkin, cabbage, cauliflower, celery and broccoli. Overall, findings support four recommendations to industry, all of which can lead to increased purchases and consumption:

1. Retailers will benefit from offering more fairly basic portion options
2. Removing excess parts of the vegetable will enhance perceived value
3. Smaller versions of vegetables should be considered
4. Industry should provide greater inspiration about how to prepare and store vegetables.

Summary factsheets on each vegetable are available at the end of the final report.

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Discipline:	Marketing/supply chain	**Ends:**	31/05/2014
Project code:	VG12094		
Contact person:	Georgina Woodley	**Email:**	georginawoodley@bdrc.com.au
Service provider:	BDRC Australia		
Extension materials:	Final report		

Evaluating the success of VG12045/069/070 – Barriers & drivers of vegetable consumption and purchase

This project evaluated and summarised findings from three projects completed by different providers on the barriers and drivers of vegetable consumption and purchase. The final report provides a useful summary of barriers and drivers of vegetable consumption and purchase of capsicum, Asian leafy greens, pumpkin, beans, cauliflower and broccoli. The summary can be found as part of the executive summary.

Discipline:	Marketing/supply chain	**Ends:**	30/04/2014
Project code:	VG12092		
Contact person:	Paul Costantoura	**Email:**	paulc@reviewpartners.com.au
Service provider:	Review Partners		
Extension materials:	Final report		

Conveying the positive social, economic, environmental and other benefits of Australian vegetables

This project provides a statistical overview of the Australian vegetable industry, value of vegetable trade, value of the vegetable industry by region, modelling the economic value of the vegetable industry, and summaries by vegetable (presented in factsheet style). Data from this project could be used as is, or incorporated into product or region-specific factsheets.

Discipline:	Marketing/supply chain	**Ends:**	31/10/2015
Project code:	VG12090		
Contact person:	Paul Costantoura	**Email:**	paulc@reviewpartners.com.au
Service provider:	Review Partners		
Extension materials:	Final report		

Enhancing market Attitudes Towards IPM and Sustainable Vegetable Production Practices

This project had two objectives. The first was to examine the attitude of consumers to insect contamination in vegetables. The second was to determine whether there is likely to be a specific, value added market for vegetables grown using integrated pest management under a sustainability or "ecolabel". The project involved a bench-top study of these issues and literature review, focus groups with consumers, a national survey and finally the production of a series of short, consumer focused videos which explain the use of beneficial insects in growing vegetable crops.

Discipline:	Marketing/supply chain	**Ends:**	5/05/2014
Project code:	VG12084		
Contact person:	Jenny Ekman	**Email:**	jenny.ekman@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report		Consumer videos on AHR website

Consumer and market program for the vegetable industry

This market research project tracks consumer attitudes and trends, as well as conducting customer market research on areas of interest to the industry. Colmar Brunton is the project service provider and copies of the monthly reports produced over a three-year period from June 2013-June 2016 are available on the links provided on the AUSVEG website (link below).

Discipline:	Marketing/supply chain	**Ends:**	23/06/2016
Project code:	VG12078		
Contact person:	Jenny Witham	**Email:**	
Service provider:	Colmar Brunton		
Extension materials:	Monthly reports on AUSVEG website		Final report

Consumer attitudes and usage in the green leaf category

This project provides important insights into consumer behaviour when purchasing green leaf salads. The final report contains plenty of results – some of which will still be relevant for grower-marketers.

Discipline:	Marketing/supply chain	**Ends:**	31/08/2013
Project code:	VG10094		
Contact person:	Treena Welch	**Email:**	treena.welch@oneharvest.com.au
Service provider:	Harvest FreshCuts Pty Ltd		
Extension materials:	Final report		

VegBIZ -Vegetable enterprise decision support systems

A simple computer program was developed to assist vegetable growers with making decisions about what to grow, based on an analysis of potential income and likely operating costs. A link to the tool is available on the AUSVEG website (follow link below). Factsheets are also available that explain how to use the tool. Check with Gerard Kelly if the tool has been updated since it was produced.

Discipline:	Marketing/supply chain	**Ends:**	1/06/2013
Project code:	VG08021		
Contact person:	Gerard Kelly	**Email:**	gerard.kelly@dpi.nsw.gov.au
Service provider:	NSW Dept of Primary Industries		
Extension materials:	Final report and factsheets		Summary and links on AUSVEG website

Horticulture for tomorrow review and update

The Guidelines for Environmental Assurance in Australian Horticulture provide a mechanism for all horticultural producers to assess their level of environmental credentials and to develop a pathway for continuing to improve their on-farm environmental performance. The guidelines contain useful grower resources and links to other resources that could be used directly or modified for future extension material.

Discipline:	Marketing/supply chain	**Ends:**	
Project code:	AH13014		
Contact person:		**Email:**	
Service provider:	HAL		
Extension materials:	Link to environmental assurance guidelines		

Vegetable snacking options market research - Stage 2

This project will build on the findings of VG14024, and will look at distribution channels, smaller vegetable product forms and overcoming issues and challenges related to using locally produced vegetables in processed snack form. The final report details a number of products available internationally, and may contain some good options for vegetable growers.

Discipline:	Market	**Ends:**	25/11/2016
Project code:	VG15060		
Contact person:	Martin Kneebone	**Email:**	info@freshlogic.com.au.
Service provider:	Freshlogic Pty Ltd		
Extension materials:	Final report		

Sensitivity Study - Impact of increasing exports on the domestic vegetable market

This report examined the impacts of increasing vegetable exports on the domestic vegetable market, so that the industry can prepare and plan for the forthcoming changes.

The project involved desktop research, industry consultations and economic modelling, supplemented by detailed case study research into individual segments of the Australian vegetable market.

Three scenarios of low, moderate or high vegetable export growth were modelled for short and long-term effects on the domestic industry.

Discipline:	Market	**Ends:**	21/12/2016
Project code:	VG15061		
Contact person:	Dr Daniel Terrill	**Email:**	
Service provider:	Deloitte Access Economics Pty Ltd		
Extension materials:	Final report		

VG15077 - Financial Performance of Australian Vegetable Farms 2016-2017 to 2018-2019

This project will complete three further economic surveys of Australian vegetable growers, in the financial years 2016-17 to 2018-19. The proposed three surveys will be an extension of the nine surveys already conducted by ABARES for Horticulture Innovation Australia (Hort Innovation) and its predecessor Horticulture Australia Limited (HAL).
The surveys are designed to collect comprehensive production and financial performance data, production intentions and issues of particular interest to industry stakeholders.
The surveys will be conducted in March to June of each financial year and results will be presented to Hort. Innovation in September.

Discipline:	Market	**Ends:**	30/10/2019
Project code:	VG15077		
Contact person:		**Email:**	
Service provider:	Aust Bureau of Agricultural & Resource Economics & Sciences		
Extension materials:	Report from 2014-15 and 2015-16	Website with reports	

Understanding consumer triggers & barriers to consumption of Australian indigenous vegetables & Asian vegetables
This project has been tasked with identifying commercially viable Australian indigenous vegetables and Asian vegetables; assessing their consumer appeal through a range of consumer interactions, including sensory testing; and providing recommendations for industry to ensure the greatest likelihood of success in the market. Product sheets are being developed and will be available soon.

Discipline:	Market	**Ends:**	19/05/2017
Project code:	VG15071		
Contact person:		**Email:**	
Service provider:	Colmar Brunton		
Extension materials:	Booklets		

Addressing Vegetable Consumption Through Food Service Organisations (Chefs, TAFEs and other training institutions)
This project was established to drive domestic sales and consumption of Australian vegetables through engagement with the foodservice industry. It will develop a program to help recruit, educate and impact on chefs, cooks and hospitality students in particular, to be led by a celebrity chef.

Discipline:	Market	**Ends:**	25/09/2017
Project code:	VG16026		
Contact person:	Jamie Kwong	**Email:**	jamiek@wshop.com.au
Service provider:	WORKSHOP AUSTRALIA PTY LIMITED		
Extension materials:	VegeNotes		

Boosting Vegetable Consumption through Diet

This ongoing investment has delivered an innovative tool to help consumers understand and increase their vegetable intake – an app called VegEze, which challenges people to eat more vegetables.

Released in mid-November, the VegEze app has a game-style approach, motivating participants to add extra vegetables to their daily diets and form long-term, healthier habits through a 21-day challenge to eat three different vegetables at each dinnertime. There are daily reminders and rewards throughout, and the app comes with educational resources such as a visual guide to serving sizes for specific vegetables, plus recipes and nutritional information.

The idea behind the app came from previous levy-funded research with the CSIRO, which demonstrated a positive relationship between the number of different types of vegetables Australian adults eat and their overall vegetable intake.

To help further understand vegetable consumption and how education initiatives can boost it, the project team will also be looking at how effective the VegEze app's game-like nature is at helping transform people's eating patterns.

Discipline:	Market	**Ends:**	1/05/2018
Project code:	VG16071		
Contact person:	Anna Crook	**Email:**	0
Service provider:	SP Health Co. Pty Ltd		
Extension materials:	VegeNotes	0	

Horticulture Trade Intelligence Reporting 2017-2019

This project provides easy-to-read and easy-to-act-upon trade performance information to Australia's horticulture industry. Quarterly reports will be made available for download through the Hort Innovation website.

Discipline:	Market	**Ends:**	1/03/2020
Project code:	MT16011		
Contact person:	Tim Foulds	**Email:**	tim.foulds@euromonitor.com
Service provider:	EUROMONITOR INTERNATIONAL (AUSTRALIA) PTY LTD		
Extension materials:	Vegetable trade intelligence report: Q1 2017 Q2 report		

Market Opportunity for Vegetable Juices

This project involves market research into the vegetable juice market of Australia and trends that might lead to increases in consumption. Opportunities to increase consumption will be investigated. There may be opportunities for the findings of the project to be presented to interested growers towards the end of the project.

Discipline:	Market	**Ends:**	18/09/2017
Project code:	VG16016		
Contact person:	Michael Feely	**Email:**	mfeely@market-research.com
Service provider:	Horizon Research Corporation Pty Ltd		
Extension materials:	VegeNotes		

Understanding the Nature, Origins, Volume and Values of Vegetable Imports

This project seeks to understand the nature, origin, volume and value of vegetable imports coming into Australia. It examines data from a range of sources and produces annual summaries.

Discipline:	Marketing/supply chain	**Ends:**	30/03/2018
Project code:	VG12083		
Contact person:	Luke Rolley	**Email:**	luker@rmcg.com.au
Service provider:	RM Consulting Group		
Extension materials:	Import factsheets	0	

Vegetable trend Forecasting and Analysis

The aim of this project is to provide insight on the topic of trends in diet, dining and health and forecasting future drivers, stakeholders and consumers based on these trends. In understanding this, we can provide both a competitive advantage for the Australian vegetable industry by extrapolating those trends as a basis for strategic growth initiatives. Using broccoli and eggplant, the project provides a practical example of how this may be actioned right now to benefit the growers/industry financially by leveraging proven health/nutritional benefits. Case studies are available.

Discipline:	Market	**Ends:**	17/03/2017
Project code:	VG16027		
Contact person:	Susan Coles	**Email:**	susanc@wshop.com.au
Service provider:	WORKSHOP AUSTRALIA PTY LIMITED		
Extension materials:	Casestudies and final report		

Educational opportunities around perceptions of, and aversions to, vegetables through digital media (part 1 - market research, part 2 - development)

This project is the first of three related projects to be established by Hort Innovation. Combined, the new industry initiative will first seek to understand school-aged children's perception of vegetables, and will then develop digital food education resources to boost consumption of and attitudes towards veggies. These resources will feature the involvement of a celebrity chef. The projects will also develop other supporting materials to encourage positive behaviours, attitudes and outcomes around vegetables with kids aged six to 14.

Discipline:	Market	**Ends:**	12/06/2017
Project code:	VG16018		
Contact person:	Alice Zaslavsky	**Email:**	squeak@aliceinframes.com
Service provider:	EDIBLE ADVENTURES PRODUCTIONS PTY LTD		

Vegetable Market Price Reporting pilot program - market data and reporting

This pilot program represents the trial of a new market price and insights reporting resource for Australian vegetable growers. It will deliver accurate and timely twice-weekly and monthly wholesale market price reports on 10 key vegetable categories from markets in Brisbane, Sydney, Melbourne and Adelaide.

The reports include summarised wholesale prices; price differentials between wholesale markets; analysis of pricing, including trends through the season and over time, as well as the impact of product form, grade, pack size and more. The project will focus on providing analysis and insights to support increased knowledge and use of market price reporting by growers to aid in business decision making.

Discipline:	Market	**Ends:**	19/5/2019
Project code:	VG16081/16084		
Contact person:	John Brewer & Martin Kneebone	**Email:**	ausinspect@outlook.com martin@freshlogic.com.au
Service provider:	AUSMARKET CONSULTANTS and Freshlogic		
Extension materials:	Bi-weekly and monthly reports		

Vegetable Business Benchmarking

This project will develop a targeted and applied benchmarking tool for vegetable growers. It will establish key benchmark performance metrics for the vegetable industry and drivers of best practice performance through a grower-orientated participatory tool.

Benchmarking is a simple and effective way to take stock of a business and identify where improvements can be made — it also gives a clear idea of how a business is performing compared to the industry average.

Discipline:	Market	**Ends:**	16/12/2019
Project code:	VG17000		
Contact person:	Bryn Edwards & Donna Lucas	**Email:**	donnal@rmcg.com.au bryn.edwards@vegetableswa.com.au
Service provider:	VegWA and RMCG		
Extension materials:	WA report		

Vegetable Cluster Consumer Insights Program (VG16069)

This new data initiative, which will be known as the **'Harvest to Home'** program, is responsible for bringing together retail and consumer data for the benefit of the vegetable industry. Growers will be able to access the program's insights through an easy-to-use and simple-to-access 'data dashboard', with its own dedicated website called 'Harvest to Home' (see link below).

Discipline:	Marketing	**Ends:**	22/9/2020
Project code:	VG16069		
Contact person:	Sarah McKee	**Email:**	sarah.mckee@nielsen.com
Service provider:	The Nielsen Company		
Extension materials:	Website		

Building the business case to grow domestic demand for vegetables in Australia

This short project investigated a potential opportunity for the Australian vegetable industry: investment in a well-executed marketing program. Specifically, the research looked at the potential to grow consumer demand for vegetables through marketing efforts, and to subsequently increase economic returns for growers. The work has provided information on the likely return on investment to industry from funding generic vegetable marketing activity, with the information intended to help industry stakeholders in assessing and discussing the future in this space with industry. The conclusion is that a carefully-planned, well-executed and appropriately funded marketing strategy, implemented over a number of years, will deliver a substantial and sustained increase in vegetable consumption.

Discipline:	Market	**Ends:**	31/08/2018
Project code:	VG17013		
Contact person:	Adam Briggs	**Email:**	Adam.Briggs@horticulture.com.au
Service provider:	MCKINNA ET AL - Insight Outlook Consulting Pty Ltd as Truste		
Extension materials:	Final report		

Food safety, health and nutrition

Fostering and enhancing food safety in the vegetable industry

This project sought to quantify the extent of food safety certification in the Australian vegetable industry as a primary measure of food safety commitment. It discusses food safety hazards and opportunities for effective food safety management to maintain the industry's good food-safety record. Data and recommendations from the project are available in the final report.

Discipline:	Food safety, health and nutrition	**Ends:**	1/12/2013
Project code:	VG13020		
Contact person:	Doris Blaesing	**Email:**	dorisb@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Final report		

Identifying and understanding the factors influencing bioactive levels in vegetables

This project collated information on the phytonutrients (bioactives) in levied vegetables. This project has developed a useful resource of information on phytonutrients in vegetables and as a result amendments were made and resources added to www.veggycation.com.au as text and downloads. Amendments include new information on postharvest factors that impact on phytonutrient levels, status of health claims of phytonutrients and typical amounts of phytonutrients present.

Discipline:	Food safety, health and nutrition	**Ends:**	31/01/2016
Project code:	VG14027		
Contact person:	Carolyn Lister	**Email:**	Carolyn.Lister@plantandfood.co.nz
Service provider:	The New Zealand Institute for Plant and Food Research Ltd		
Extension materials:	Final report and vegenote		veggycation website

Developing a nutrient and/or health claim label for packaged babyleaf spinach and rocket

Many factors can affect the levels of bioactives including weather, variety and handling. The main aim of this project was to measure the impact of these factors on the levels of bioactives. It was found that while location, season and storage all affected the levels of vitamin C, vitamin A and folate in rocket and spinach, claims could be made on vitamin C, folate, and beta-carotene. Models were developed to determine the estimated levels of vitamin C and folate in blends of salad mixes.

Discipline:	Food safety, health and nutrition	**Ends:**	28/02/2012
Project code:	VG08148		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report and VA feature		

Developing 'superyellow' enhanced pigment sweet corn for eye-health

This project developed sweet corn varieties with high levels of zeaxanthin to help improve eye-health. Ten new 'SuperGold' varieties were produced. The high-zeaxanthin corn has increased levels of zeaxanthin by more than seven times, which means people can eat a practical amount of corn each day to manage aged-related macular degeneration.

Discipline:	Food safety, health and nutrition	**Ends:**	31/03/2015
Project code:	VG07081		
Contact person:	Tim O'Hare	**Email:**	t.ohare@uq.edu.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	VA feature		

A revolutionary new sensor for in-field measurements of food safety in leafy vegetables

This project is run by Salah Sukkarieh from the University of Sydney field research robotic centre. The focus of the project is on the development of a sensor to detect salmonella on the surface of spinach and also, possibly, in processing factories. At this stage there is unlikely to be anything to communicate to growers, however it is worthwhile being aware of the existence of this project.

Discipline:	Food safety, health and nutrition	**Ends:**	30/05/2016
Project code:	VG13073		
Contact person:	Salah Sukkarieh	**Email:**	salah.sukkarieh@sydney.edu.au
Service provider:	The University of Sydney		
Extension materials:	None at this stage, see above		

ProbiSafe - Development of biocontrol agents to inhibit pathogen growth

This project focuses on keeping vegetables healthy and safe. It will develop, verify and make available new biological control agents (new strains/blends of beneficial bacteria) to inhibit the growth of harmful bacteria on vegetables. The result will be an additional level of safety in both fresh and processed produce.

Initial work has included lab-based trials of Probisafe and commercial probiotics, with Probisafe shown to inhibit the growth of *Salmonella typhimurium* on cut iceberg lettuce by up to 1000-fold over seven days of storage at 8˚C. The project team has also been reaching out to major vegetable growers and processors to present preliminary work and seek involvement with the project.

Discipline:	Health	**Ends:**	
Project code:	VG16005		
Contact person:	Cameron Turner	**Email:**	c.turner@uniquest.com.au
Service provider:	UniQuest Pty Limited		
Extension materials:			

Increase Consumption and Sales by Developing Community Awareness and Benefits of Vegetable (Scoping Study)

This is a preliminary study to increase understanding of a range of 'community interventions', such as the establishment of community gardens, and how these might increase vegetable consumption. By outlining the existing knowledge and impacts of such interventions, it is expected to help guide further research, evaluation and action.

Discipline:	Health	**Ends:**	27/07/2017
Project code:	VG16025		
Contact person:	Rebecca Patrick	**Email:**	rebecca.patrick@deakin.edu.au
Service provider:	Deakin University		

Improving safety of vegetable produce through on-farm sanitation, using Electrolysed Oxidising (EO) water

Electrolysed oxidising (EO) water is used during postharvest but has not been used to any extent for treating preharvest water. It has potential for minimising risk of contamination by food borne pathogens and the outcome from this project will be validation of its effectiveness and application relative to other sanitisers and protocols for its use on-farm.

Discipline:	Food safety	**Ends:**	31/05/2020
Project code:	VG15068		
Contact person:	Enzo Lombi	**Email:**	enzo.lombi@unisa.edu.au
Service provider:	University of South Australia		
Extension materials:	Update		

Pathogen Persistence from Paddock to Plate

The project will examine whether current pre-harvest water and untreated animal manure withholding periods are sufficient to minimise or eliminate the risk of microbial contamination of high risk vegetable crops.

The work aims to support the use of materials that add valuable organic matter to soil, while still managing food safety risks.

Free testing of soil amendments and irrigation water for *E. coli, Salmonella* and *Listeria* is available to vegetable growers.

Discipline:	Food safety	**Ends:**	1/12/2019
Project code:	VG16042		
Contact person:	Richard Bennett	**Email:**	r.bennett@pma-anz.com
Service provider:	Fresh Produce Safety Centre Limited		
Extension materials:	Project details	Vegetables Australia article	

Export focus

Improving the efficiency of the carrot export industry – A whole of chain approach scoping study

The objective of this project was to identify issues that affect the economic efficiency of the export carrot industry in Australia. These will be addressed by further research.

Discipline:	Export focus	**Ends:**	6/05/2016
Project code:	VG12063		
Contact person:	Rachel Lancaster	**Email:**	rachel@eatswa.com.au
Service provider:	Western Australian Agriculture Authority (WAAA)		
Extension materials:	Vegenote	0	

Malaysia and UAE market analysis and strategy: Carrots and sweet corn

The objective of this study was to complete an analysis of the fresh carrot and sweet corn markets in the United Arab Emirates (UAE) and Malaysia; identify and profile relevant supply chain participants that would assist growers to develop export trade networks; and prepare an R&D investment plan. Opportunity to grow the export market for carrots and sweet corn was identified in the UAE and additional commercial opportunity was also identified for carrots in Malaysia. A Three Year Market Development Investment Plan for Carrots UAE and Malaysia was developed.

Discipline:	Export focus	**Ends:**	30/05/2014
Project code:	VG13047		
Contact person:	Michael Clarke	**Email:**	Clarke@AgEconPlus.com.au
Service provider:	AgEconPlus Pty Ltd		
Extension materials:	Final report		

Malaysia and UAE market analysis and strategy: babyleaf and beans

This feasibility study was carried out by Euromonitor International. Throughout the course of the research, a comprehensive inquiry has been conducted on local consumers' preferences via extensive consumer surveys and in-store interviews, followed by trade interviews and product placement studies. Trade networks and supply-chain participants between Australia's growers and offshore distributors in Malaysia and UAE were identified and profiled. Recommendations on the two markets by product are available in the report.

Discipline:	Export focus	**Ends:**	28/03/2014
Project code:	VG13046		
Contact person:	Umesh Madhavan	**Email:**	umesh.madhavan@euromonitor.com.sg
Service provider:	Euromonitor International Ltd		
Extension materials:	Final report		

Japan export symposium

An export symposium was held in Cairns to deliver a forum specifically designed to explore the opportunities the Japanese market presents while increasing the understanding of what the consumer is seeking in this market. Presentations from the symposium are available in the final report.

Discipline:	Export focus	**Ends:**	30/09/2014
Project code:	VG13034		
Contact person:		**Email:**	
Service provider:	AUSVEG Ltd		
Extension materials:	Final report		

Identifying market opportunities for Australian vegetables in China

This project focused on exploring opportunities for Australian vegetables in China. Research was conducted among Chinese consumers, as well as local retailers, wholesalers, government and thought leaders. The target market for Australian vegetables in China is large and open to considering Australian produce. Modern channels such as hypermarkets and premium retail should be primary target channels.

Discipline:	Export focus	**Ends:**	30/04/2014
Project code:	VG12095		
Contact person:	Bill Morgan	**Email:**	
Service provider:	Cognition Research		
Extension materials:	Final report and vegenote		

Exporting to China – A symposium for vegetable growers

The aim of the symposium was to deliver a forum designed to increase the understanding of the Chinese market and consumer, increase understanding of how to tap into the Chinese market and successfully conduct business. Presentations from the symposium are available in the final report and are summarised in the factsheet.

Discipline:	Export focus	**Ends:**	30/08/2013
Project code:	VG12093		
Contact person:		**Email:**	
Service provider:	AUSVEG Ltd		
Extension materials:	Final report and summary factsheet		

Domestic and export market access and trade viability issues – Strategy to address

This project details a strategy to assist the Australian vegetable industry to open new domestic and export markets and make existing markets more viable. To deliver the strategy it was necessary to focus on three key issues: domestic and export impediments; relevant leviable products; and existing and potential markets. The final report includes case studies of export success, market analysis summaries, and an export viability checklist for growers.

Discipline:	Export focus	**Ends:**	30/04/2013
Project code:	VG12042		
Contact person:	Michael Clarke	**Email:**	clarke@ageconplus.com.au
Service provider:	AgEconPlus Pty Ltd		
Extension materials:	Final report - including export market summaries and success casestudies. Vegenote		

Removing barriers of food safety certification for vegetable exporters though GLOBALG.A.P. co-certification

This project supports the benchmarking of the Freshcare Food Safety and Quality Standard (FSQ4) against the internationally recognized GlobalG.A.P. standard. Successful completion of this benchmarking, and recognition of the Freshcare Standard by GlobalG.A.P., will help streamline compliance processes for Australian growers accessing export markets. The process is expected to be completed by mid-2017.

Discipline:	Export	**Ends:**	30/10/2017
Project code:	VG16019		
Contact person:	Clare Hamilton-Bate	**Email:**	info@freshcare.com.au
Service provider:	Freshcare Ltd		
Extension materials:	Project details		

Export Development of Australian Vegetables to Japan

This project is focused on developing vegetable exports to Japan. The project will involve consumer research, competitor analysis and development and implementation of a market development strategy for Australian vegetables in Japan. The Queensland Dept. of Agriculture and Fisheries is the project leader and is working in collaboration with Trade and Investment Queensland (Japan Office), and The Agri Business and Western Australia Department of Premier and Cabinet (Japan Office) to deliver this project.

Discipline:	Export	**Ends:**	30/06/2018
Project code:	VG15074		
Contact person:	Bronwyn Warfield	**Email:**	bronwyn.warfield@daf.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:			

Vegetable Industry Export Program

This project incorporates activities in the following areas: export readiness, training and education, market development, market access; and communications and industry engagement.
A number of export readiness checklists are available from the AUSVEG website (link below).

Discipline:	Export	**Ends:**	26/03/2021
Project code:	VG16061		
Contact person:	Michael Coote	**Email:**	michael.coote@ausveg.com.au
Service provider:	AUSVEG Ltd		
Extension materials:	See website	AUSVEG website	

China Insights Data for the Australian Vegetable Industry

Contact the project leader for details about this project.

Discipline:	Export	**Ends:**	17/07/2017
Project code:	VG16079		
Contact person:	Marc Soccio	**Email:**	marc.soccio@optusnet.com.au
Service provider:	AgInfinity		
Extension materials:	0	0	

Export facilitators

This project aims to help support vegetable growers to take advantage of commercial export opportunities. The project is being run in three parts, in Tasmania, Queensland, and in Western Australia, with WA as the overall facilitators. A network will be established between the regions to help coordinate growers' capacity to support foreign buyers.

Discipline:	Export	**Ends:**	31/12/2020
Project code:	VG16085		
Contact person:	Manus Stockdale	**Email:**	manus.stockdale@vegetableswa.com.au
Service provider:	West Aust Vegetable Growers Assoc Inc T/As Vegetables WA		
Extension materials:	Project summary		

Environment

Landscape diversity and field-margin management

This project reviewed Australian and international literature related to the role of field margins and landscapes surrounding crop fields in providing resources to beneficial organisms and reducing arthropod pest pressure in vegetable and other crops. This review was used to generate recommendations on how to manage off-production habitats at field margins and in surrounding landscapes for vegetable pest suppression, and what is needed for this to be implemented by farmers.

Discipline:	Environment	**Ends:**	16/06/2016
Project code:	VG14047		
Contact person:	Vesna Gagic	**Email:**	vgagic@gwdg.de
Service provider:	CSIRO Sustainable Agriculture Flagship		
Extension materials:	Final report		

Innovative ways to address waste management on vegetable farms

Vegetable production can result in the creation of large amounts of unwanted materials or waste products. The aim of the project was to enable the Australian vegetable industry to consider alternatives to plastic use and recycling, contributing to continuous improvement in farm management practices, efficiency and sustainability. Recommendations were made for the future of plastic management on vegetable farms.

Discipline:	Environment	**Ends:**	31/05/2015
Project code:	VG13109		
Contact person:	Anne-Maree Boland	**Email:**	anne-mareeb@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Final report and VA feature		

Environmental assessment of the vegetable industry

An environmental assessment was undertaken to measure the performance of the vegetable industry with regard to good environmental practices and also the impact it is having on the environment around it. This performance report provides the first environmental assessment for the vegetable industry. The report highlights the important environmental issues that were identified by different stakeholder groups and important issues that they say are emerging.

Discipline:	Environment	**Ends:**	2/02/2015
Project code:	VG13057		
Contact person:	Anne-Maree Boland	**Email:**	anne-mareeb@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Final report		

Economic evaluation of farm energy audits and benchmarking of energy use on vegetable farms

Infotech Research conducted 22 energy audits of vegetable growers around Australia. These audits best assisted medium-sized growers with farms and packing sheds in improving their business profitability through energy saving measures. The best returns on investment are achieved through prevention of energy losses (waste losses) followed by energy efficiency improvements.
Infotech Research produced a benchmarking report and options analysis to assist growers to evaluate their own energy consumption.

Discipline:	Environment	**Ends:**	15/12/2014
Project code:	VG13054		
Contact person:	John Cumming	**Email:**	john@infotechresearch.org
Service provider:	Infotech Research		
Extension materials:	Final report, vegenote, factsheet, casestudy, energy saving calculator		

On-farm power generation – Options for vegetable growers

Research into on farm power generation has produced details of the options, and explored feasibility of adoption of such systems. Growers can use this to help them make informed decisions about the economic, technical and operational costs and benefits of the various technologies, the challenges of installation and operation, and the suitability of systems to individual ventures.
A summary factsheet, as well as factsheets on gas, solar and wind power were produced.

Discipline:	Environment	**Ends:**	31/10/2014
Project code:	VG13051		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report (including detailed casestudies) and factsheets		

Biogas generation feasibility study

This study was commissioned to explore in more detail the feasibility of biogas on Australian vegetable farms. Extensive consultation with industry was undertaken, including a number of case studies.
Analysis highlighted the complexity of determining biogas feasibility for individual farms. The analysis also suggests that the biogas technology is likely to be feasible for a small segment of the industry (large farms which generation large waste volumes and have high energy needs). For this reason future activities should be focused specifically on this segment.

Discipline:	Environment	**Ends:**	30/05/2014
Project code:	VG13049		
Contact person:	Anne-Maree Boland	**Email:**	anne-mareeb@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Vegenote and final report		

Remediation of soil contaminated by Salmonella enterica to expedite plant or replant of vegetables

This project was the first research study undertaken on survival of *Salmonella enterica* in soil contaminated with chicken manure conducted under Australian conditions. The research indicated that *Salmonella enterica* counts decline over time under natural field conditions after a contamination event. Solarisation (black plastic covering the soil) may have potential to promote faster die-off of *Salmonella enterica*, providing soil temperatures under the plastic have several hours at 37°C or above.

Discipline:	Environment	**Ends:**	31/05/2016
Project code:	VG13039		
Contact person:	Robyn McConchie	**Email:**	robyn.mcconchie@sydney.edu.au
Service provider:	University of Sydney, Faculty of Agriculture & Environment		
Extension materials:	Factsheet		

Understanding and managing impacts of climate change in relation to government policy, regulation and energy efficiency

This review identifies the potential threats, as well as opportunities, that relate to the current Federal Government regulatory framework. Outcomes from the project have been summarised on the vegetableclimate.com website and in the factsheet.

Discipline:	Environment	**Ends:**	25/02/2016
Project code:	VG12049		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report and factsheet		More info on vegetable climate website

Understanding and managing impacts of climate change and variability on vegetable industry productivity and profits

This review was commissioned by the industry in 2013 to provide a comprehensive assessment of the threats and opportunities around climate variability and climate change, and to develop a plan for the future. The Australian vegetable industry is in a strong position to deal effectively with climate change and vegetable growers have a greater capacity to adapt to change more than most other rural industries. Project outputs and materials relevant to the vegetable industry is available on the vegetable climate website.

Discipline:	Environment	**Ends:**	21/04/2013
Project code:	VG12041		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research Pty Ltd		
Extension materials:	Final report and vegenote		Website

EnviroVeg Program for promoting environmental best practice in the Australian vegetable industry

EnviroVeg provides growers with guidelines and information on how to manage their business in an environmentally responsible manner. It provides a visible way of demonstrating a responsible attitude towards the environment. It also assists growers by showing the community that they are responsible environmental managers.
Growers can volunteer for free independent assessment of their environmental practices. The EnviroVeg manual is available on the website.

Discipline:	Environment	**Ends:**	20/12/2016
Project code:	VG12008		
Contact person:	Andrew Shaw	**Email:**	andrew.shaw@ausveg.com.au
Service provider:	AUSVEG Ltd		
Extension materials:	Final report		Website - including manual and other resources

Carbon and sustainability – A demonstration on vegetable properties across Australia

A two-year study was conducted to demonstrate reduced GHG emissions management techniques on vegetable farms in Australia. On-farm demonstration of activities leading to reduced GHG emissions were packaged into case studies and informational products to provide the industry with an understanding of the importance of carbon and GHG emissions in the vegetable supply chain. A vegetable carbon calculator and links to other resources is available on the website.

Discipline:	Environment	**Ends:**	19/06/2012
Project code:	VG09190		
Contact person:	Peter Melville		
Service provider:	Horticulture Australia Ltd		
Extension materials:	Final report		Carbon tool website

Environmental effects of vegetable production on sensitive waterways

This project aimed to develop processes that enable vegetable farmers to address environmental concerns with respect to sensitive waterways, at a farm and community level. This has been achieved by identifying nutrient [nitrogen (N)] losses, validating nutrient application practices and developing tools to better manage nutrient application in vegetables and processes to engage with communities on issues associated with waterways. The activities were focussed in several vegetable growing regions that impact on sensitive waterways including Watsons Creek (Victoria), Lockyer Valley (Queensland) and Bowen (Queensland).
The project developed a good agricultural practice guide, vegetable nutrient removal calculator, fertiliser use efficiency factsheets.

Discipline:	Environment	**Ends:**	21/03/2014
Project code:	VG09041		
Contact person:	Stephen Harper	**Email:**	stephen.harper@daff.qld.gov.au
Service provider:	The Department of Agriculture and Fisheries (DAF)		
Extension materials:	Final report, vegenote and growers guide		

Economic and carbon emissions model for controlled traffic farming in vegetables

This project developed farm economic and GHG models relevant to different enterprise types in the Tasmanian vegetable industry. The models allow variables to be altered to conduct sensitivity analyses, thereby identifying the factors that are most important in delivering the benefits of CTF. This helps identify areas of focus for the adoption of CTF, and for future research and development.

Modelling showed CTF could increase average gross margin across the rotation by 66%, while seasonal controlled traffic farming (SCTF) could lead to a 16% increase, compared to the conventional production system.

Discipline:	Environment	**Ends:**	30/12/2012
Project code:	VG09019		
Contact person:	John McPhee	**Email:**	john.McPhee@utas.edu.au
Service provider:	Tasmanian Institute of Agriculture (TIA) - University of Tas		
Extension materials:	Final report		

Revegetation by design, Queensland: Natural resource management and IPM

Experiments were conducted throughout the Lockyer Valley, QLD. These included: 1. The impact of early predation on pest populations, and how pest suppression was affected by land use, e.g. crops, grassland, bushland; and the sources of natural enemies at multiple spatial scales, e.g. farm, neighbouring farms, and landscape. 2. The contribution of an on-farm refuge for beneficial insects in landscapes with few and many beneficial insect sources. 3. The potential of two commonly observed predators to eat pests. Recommendations included trials of on-farm beneficial-refuge options for vegetable production systems in different regions, developing a decision-support tool to assist growers with plant selection, and investigation how the condition of native remnant vegetation affects the pest load and habitat for beneficial insects.

Discipline:	Environment	**Ends:**	30/03/2012
Project code:	VG07040		
Contact person:	Nancy Schellhorn	**Email:**	Nancy.Schellhorn@csiro.au
Service provider:	CSIRO Ecosystem Sciences		
Extension materials:	Final report		

Creating Value from Edible Vegetable Waste

Established at the end of 2016, this project aims to address the issue of vegetable wastage on-farm and post-farm-gate. The project will develop new knowledge and processes to improve recovery of edible material. Avenues of exploration will include the extraction of 'nutraceuticals' from vegetable waste; the processing of edible waste into new fibre-rich, healthy raw ingredients and food products; and the use of fermentation to develop next-generation fermented vegetables. The project will have a focus on brassica vegetables and carrots. The project team are keen to engage with broccoli and carrot growers for ideas and input.

Discipline:	Environment	**Ends:**	20/12/2018
Project code:	VG15076		
Contact person:	Mary Ann Augustin	**Email:**	maryann.augustin@csiro.au
Service provider:	CSIRO		
Extension materials:	Workshop presentation	VegeNotes	

The EnviroVeg Program 2017-2022

The EnviroVeg Program 2017 – 22 is jointly managed by AUSVEG, Growcom and Freshcare. This revamped EnviroVeg program will align components from EnviroVeg, Hort360 and Freshcare Environmental to deliver a clear pathway to environmental assurance for Australian vegetable growers.

The program is the vegetable industry's own environmental program and previous EnviroVeg projects have provided resources to growers to develop and quantify their environmental practices. This new version of the program will support and improve environmental management on-farm and develop recognition and a competitive advantage for growers.

Contact EnvioVeg Coordinator Andrew Shaw for further information.

Discipline:	Environment	**Ends:**	28/02/2022
Project code:	VG16063		
Contact person:	Andrew Shaw	**Email:**	andrew.shaw@ausveg.com.au
Service providers:	Growcom Australia, AUSVEG Ltd, Freshcare Ltd		
Extension materials:	0	EnviroVeg website	

Communications

Growing Leaders 2015

This National Vegetable Industry Leadership Program, develops skills of new and emerging leaders with a mix of theory, practical industry-based visits, and discussion panels with industry experts.

The program focuses on developing skills at three levels: personal, business, and industry. Therefore, all employees from all sectors of the industry, which includes growing, harvesting, processing, extension, exporters, importers, and marketing, are encouraged to participate.

Discipline:	Comms	**Ends:**	31/12/2018
Project code:	VG15030		
Contact person:		**Email:**	admin@ruraltraininginitiatives.com.au
Service provider:	Rural Training Initiatives		
Extension materials:	Link to program info		

Nuffield Scholarships

Nuffield Australia Farming Scholarships is a unique program that awards primary producers with a life-changing scholarship to travel overseas and study an agricultural topic of choice.
Owners or managers of vegetable businesses should be encouraged to apply for the scholarship.

Discipline:	Comms	**Ends:**	30/09/2017
Project code:	VG14065		
Contact person:			
Service provider:	Nuffield Australia Farming Scholars		
Extension materials:	Link to website		

Develop vegetable industry occupational health and safety resources

This project developed a suite of tools for growers to use to help them improve WHS practice on farm and in the packing shed. Approximately 1200 files of information have been provided on an easy-to-use carrot-shaped USB to 944 vegetable growers across Australia, called VegWHS. These USB drives are available from Adam Goldwater adam.goldwater@ahr.com.au.

Discipline:	Comms	**Ends:**	30/09/2015
Project code:	VG13053		
Contact person:	Luke Rolley	**Email:**	luker@rmcg.com.au
Service provider:	RMCG		
Extension materials:	Final report, vegenote and large suite of tools available for growers		

VegWHS Training Resources

This project will create 8 x short video clips that can be uploaded to YouTube or other social media applications. The video clips will show levy paying vegetable growers how to use the VegWHS (the carrot USB's) resource.

The video resources will enable growers to access training at their convenience in a simple format (video), provide a low cost training outcome to the industry and extract additional value from the funds previously spent on the VegWHS resource.

Discipline:	Comms	**Ends:**	2/06/2017
Project code:	VG16031		
Contact person:	Luke Rolley	**Email:**	luker@rmcg.com.au
Service provider:	RM CONSULTING GROUP PTY LTD		
Extension materials:	Final report	Videos	

PMA ANZ Produce Executive Program Scholarships

Established in March, this project will support three industry scholarships each year from 2017 to 2020, for levy-paying growers to take part in the PMA A-NZ Produce Executive Program. The Program is an intensive course for middle and high-level vegetable industry managers from across the supply chain to advance personal and professional development.

The 2018 scholarship opportunities will be advertised in Hort Innovation and AUSVEG newsletters, as well as on the PMA-ANZ website.

Discipline:	Communications	**Ends:**	3/04/2021
Project code:	VG16031		
Contact person:	Anita Pike	**Email:**	apike@streamwise.com.au
Service provider:	Streamwise Learning Pty Ltd (Formally EMFOR Corporation)		
	PMA-ANZ website		

Biosecurity

Strengthened biosecurity for the vegetable industry – Phase 1 and 2

Biosecurity is an important issue for the vegetable industry, both in terms of protecting Australian farms from pests and diseases we yet do not have, and maintaining our pest-free status for international trade. It is also important for minimising the spread of pests and diseases internally in Australia.
AUSVEG have a range of resources that are useful in managing biosecurity on their website (link below).

Discipline:	Biosecurity	**Ends:**	1/10/2018
Project code:	VG15020 and VG1103		
Contact person:	Jessica Lye	**Email**	jessica.lye@ausveg.com.au
Service provider:	AUSVEG Ltd		
Extension materials:	Biosecurity AUSVEG website		

Managing biting fly, a.k.a stable fly, in vegetable crop residues

This project evaluated methods of preventing stable fly (*Stomoxys calcitrans*) development from vegetable crop residues. Recommendations were generated for industry and growers, which were incorporated into Vegetables WA's (VWA) Good Practice Guide and reflected in the Stable Fly Management Plan (2013) within the Biosecurity and Agricultural Management (BAM) Act regulations to minimise stable flies.

Discipline:	Biosecurity	**Ends:**	15/08/2015
Project code:	VG12022		
Contact person:	Don Telfer	**Email:**	don.telfer@agric.wa.gov.au
Service provider:	Western Australian Agriculture Authority (WAAA)		
Extension materials:	Vegenote, VegWA guide and final report		

Advanced stable fly management for vegetable producers

This project is investigating strategies to reduce the development of stable flies in crop residues left after vegetable harvest. As well as assessing the ability of the flies to lay eggs on residues, it is looking at the use of new machinery for deep burial of crop residues; the use of biological agents including beneficial fungi and predatory insects; and non-chemical approaches to removing stable flies from carrier animals.

Discipline:	Biosecurity	**Ends:**	30/09/2018
Project code:	VG15002		
Contact person:	0	**Email:**	0
Service provider:	Western Australian Agriculture Authority (WAAA)		
Extension materials:			0

Investigating on farm HACCP programs for managing plant pests of biosecurity concern

This project will see an options paper developed for a Hazard Analysis and Critical Control Points based biosecurity system to manage plant pests in Australia that are of concern to industry, and government biosecurity agencies. Initially, the paper will concentrate on some key pests for the vegetable industry; however the ultimate intent is that such a system would have broader use for the horticulture sector, and perhaps all plant industries.

Discipline:	Biosecurity	**Ends:**	4/04/2017
Project code:	VG15051		
Contact person:	Grant Telford	**Email:**	
Service provider:	BIOSECURITY SOLUTIONS AUSTRALIA PTY LTD		
Extension materials:			Website

Review of the National Biosecurity Plan for the Vegetable Industry

This project is reviewing the industry's current biosecurity plan. The revised plan will identify the current highest-risk pests to the industry, the risk mitigation activities needed to reduce the biosecurity threat, and the surveillance and diagnostic activities and capabilities available.

Discipline:	Biosecurity	**Ends:**	1/06/2021
Project code:	VG15065		
Contact person:	0	**Email:**	0
Service provider:	Plant Health Australia Limited		
Extension materials:		0	

Surveillance of tomato potato psyllid in the Eastern States and South Australia

Its surveillance activities are designed to bolster psyllid surveillance already conducted under other industry work, for the early detection of tomato potato psyllid (TPP) should it cross from Western Australia into South Australia and the eastern states, including Tasmania. Surveillance involves potato crops as well as other solonaceous vegetables (including capsicum, eggplant and chilli), especially those grown in greenhouses.

The project continues to offer growers access to sticky traps for participation in the national TPP surveillance program, as well as training workshops on surveillance and identification.

Discipline:	Biosecurity	**Ends:**	1/05/2018
Project code:	MT16016		
Contact person:	Calum Wilson	**Email:**	calum.wilson@utas.edu.au
Service provider:	University of Tasmania		
Extension materials:	Recorded training session		Final report

Control, eradication and preparedness for Vegetable Leafminer

The VLM project will prepare for the potential spread of the pest by developing management and surveillance packages, modelling the spread, and developing response plans in the event of a regional eradication. Throughout the project AUSVEG will deliver an extension program to improve awareness of VLM, and educate growers about methods of control as developed by project partners.

Workshops will be held in late 2017 in QLD and can be extended to other growing regions around Australia as the project progresses. These awareness workshops will include a farm biosecurity planning component, as developed by the AUSVEG Vegetable and Potato Biosecurity program. Workshops in later years will include a VLM management component, which will be informed by project partner findings.

Discipline:	Biosecurity	**Ends:**	1/09/2020
Project code:	MT16004		
Contact person:	Jessica Lye	**Email:**	jessica.lye@ausveg.com.au
Service provider:	AUSVEG		
Extension materials:	Flyer	Website with video	

Training

National Innovation Coach/ Hort 360

This project is part of the EnviroVeg program, and provides training through the pilot program. Hort 360 also host the environmentally focused self-assessment platform for the EnviroVeg project.

Discipline:	Training	**Ends:**	30/09/2018
Project code:	VG16063		
Contact person:	Scott Wallace	**Email:**	swallace@growcom.com.au
Service provider:	Growcom Australia		
Extension materials:			

Veg Inductions

This project involves creating a digital induction resource for entry-level workers in the vegetable industry. The resource will be ready for use in April 2018.

Discipline:	Training	**Ends:**	31/1/2018
Project code:	VG16031		
Contact person:	Shane Ridley	**Email:**	shane@otrain.com.au
Service provider:	Pinkmonkey Pty Ltd		
Extension materials:			

Basic Irrigation Skills Workshops

The workshop will deliver hands on training to irrigation operators in the vegetable industry. The training will cover; water - soil –crop relationships, understanding and managing the irrigation system, determining an irrigation schedule that matches crop water needs, measuring and interpretation of soil moisture monitoring information, and strengths and weaknesses of soil, plant and weather based approaches for irrigation decisions.

The primary focus of the training will be the delivery of practical irrigation management tools and information to allow irrigation operators to improve crop yields and/or quality and profitability.

Discipline:	Training	**Ends:**	25/10/2018
Project code:	VG16031		
Contact person:	Gordon Rogers	**Email:**	gordon@ahr.com.au
Service provider:	Applied Horticultural Research		
Extension materials:	Training guide		

Horticulture Code of Conduct Workshops

This half-day session covers an overview of the code, types of trading arrangements covered and paperwork and records required.

Discipline:	Training	**Ends:**	23/06/2018
Project code:	VG16031		
Contact person:	Jill Briggs	**Email:**	jill@ruraltraininginitiatives.com.au
Service provider:	Rural Training Initiatives		
Extension materials:			

Negotiation and Influencing Workshop

This two-day workshop covers negotiation and influencing skills, including how to communicate, increase confidence and develop practical skills.

Discipline:	Training	**Ends:**	21/06/2018
Project code:	VG16031		
Contact person:	Edwina Swan	**Email:**	eswan.ens@negotiate.org
Service provider:	ENS International		
Extension materials:			

VegInnovations 2018 Regional Roadshow

This series of workshops follows on from VG14031 (New product development for the vegetable industry). The workshops aim to help equip Australian vegetable growers and producers with the tools required to innovate and develop new products to maximise the value of their crops.
Extension materials include a 'How-To Guide' and 'New Product Development Checklist', as well as videos with key messages from the workshops. There is also a resource guide of Australian companies that specialise in new food product development.

Discipline:	Training	**Ends:**	31/08/2018
Project code:	VG16031		
Contact person:	Hazel Mactavish-West	**Email:**	hazel@mactavishwest.com.au
Service provider:	MacTavish West Pty Ltd		
Extension materials:	How-to Guide	Website with videos, and guides	

AusChem Chemical Accreditation Level 3

A 2 day workshop covering safe chemical handling, storage and transport as well as safe application of chemicals using correct personal protective equipment and understanding chemical labels. This course includes ACCHM303 and ACCHM304.

Discipline:	Training	**Ends:**	31/05/2018
Project code:	VG16031		
Contact person:	James Gorrie	**Email:**	james.gorrie@trainsafe.net
Service provider:	Train Safe NT		
Extension materials:			

Chemical Handling for Vegetable Crops

This project is facilitating nationally-recognised Chemical Accreditation courses that are specific to the vegetable crops grown in the region where the training is taking place. There have been 15 two-day courses scheduled around the country.

Discipline:	Training	**Ends:**	20/10/2018
Project code:	VG16039		
Contact person:	Sophie Lapsley	**Email:**	sophiel@rmcg.com.au
Service provider:	Duff Consulting		
Extension materials:			

VegPRO Pest and Disease Training

Workshops delivered practical, hands on training for Pest & Disease ID in the vegetable industry.

Discipline:	Training	**Ends:**	30/11/18
Project code:	VG16031		
Contact person:	Stuart Grigg	**Email:**	stuart@sgaghortconsulting.com.au
Service provider:	Stuart Grigg Ag-Hort Consulting Pty Ltd		
Extension materials:			

VegNET end of project survey

National Vegetable Extension Network

Aim

To evaluate the current VegNET program at a national level, and identify if support for a continuation of the program exists; and if so, what improvements can be made.

Method

An end of project survey was developed based on previous surveys which had been carried out in some of the regions. The survey was reviewed by all Industry Development Officers (IDOs), the Coordination Project team, and Hort Innovation staff.

The complete list of survey questions is available in Appendix 1.

Surveys were loaded onto SurveyMonkey, and electronic links provided to IDOs. IDOs then sent the survey out to stakeholders through their email distribution lists.

Most responses were directly inputted by the respondent, although some were provided over the phone to the IDO who then inputted answers.

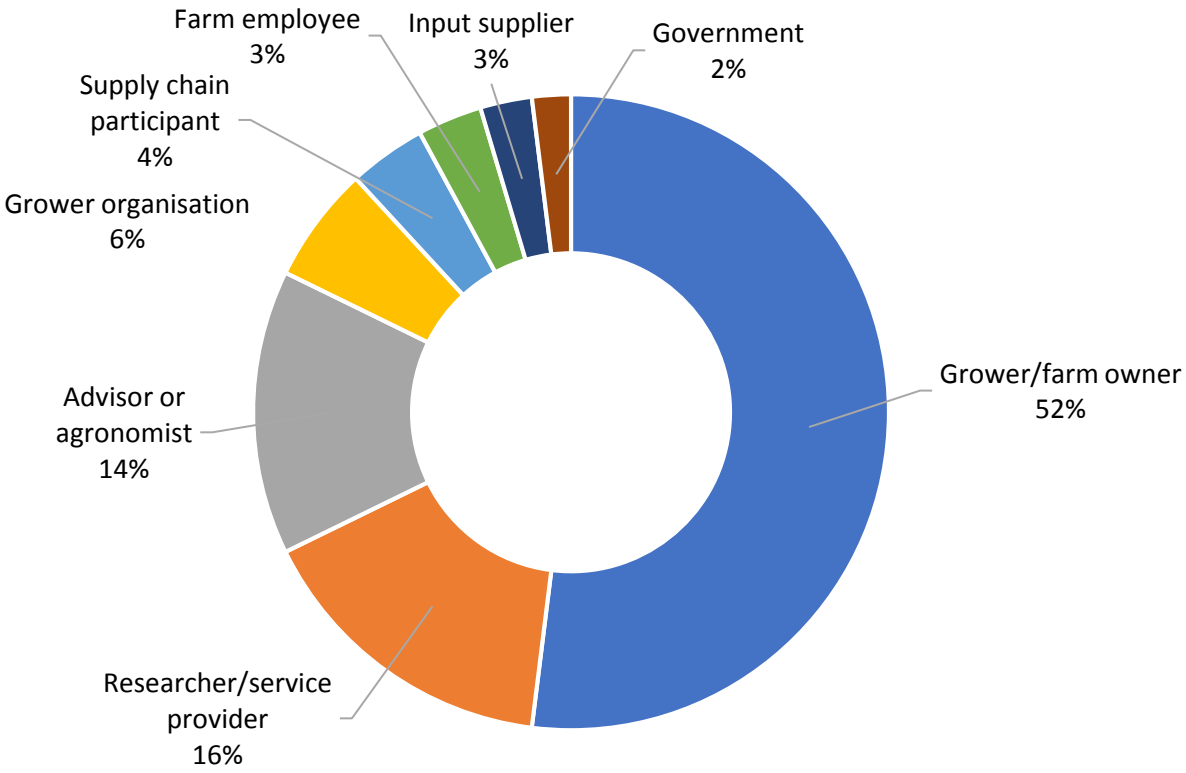
A minimum of 9 responses was received in each region, with a total of 153 across all regions.

Results

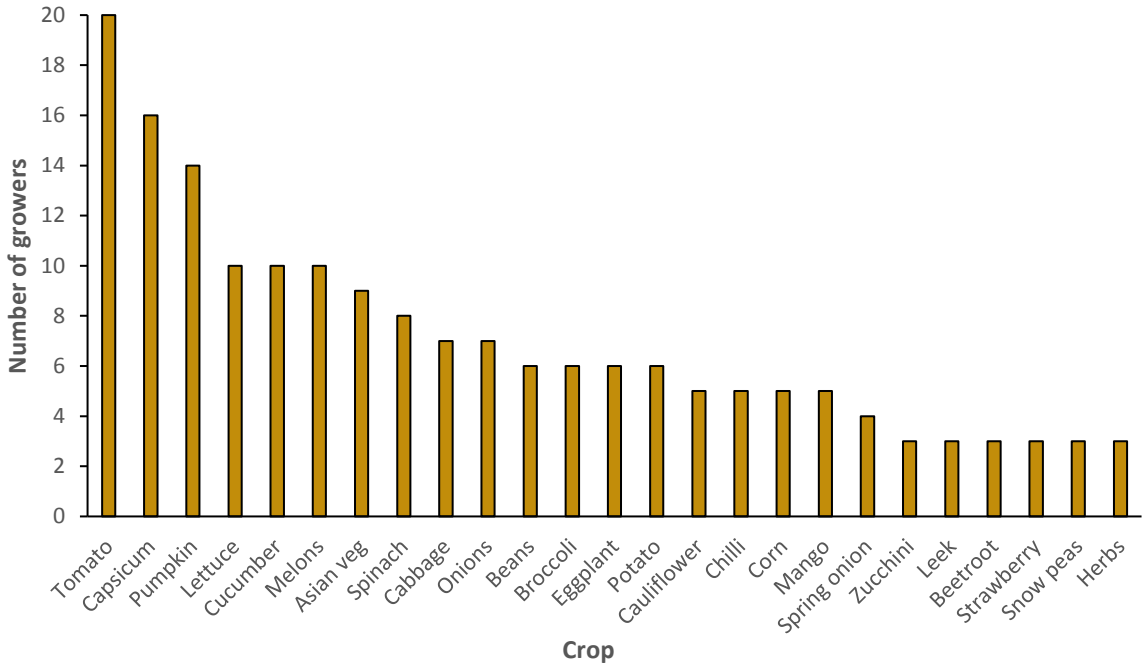
Q1. Your details

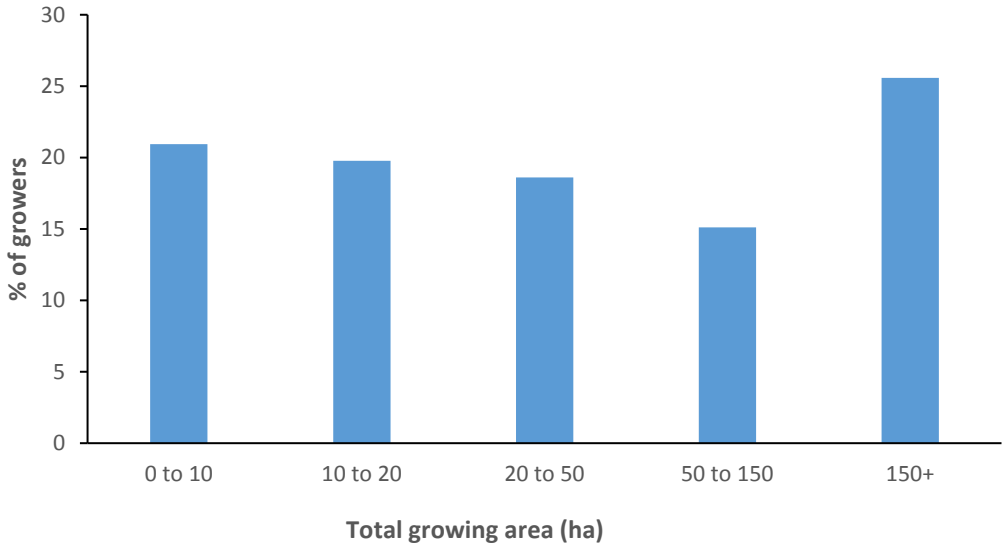
Personal details will be kept confidential.

Q2. Which group best describes your role at work?

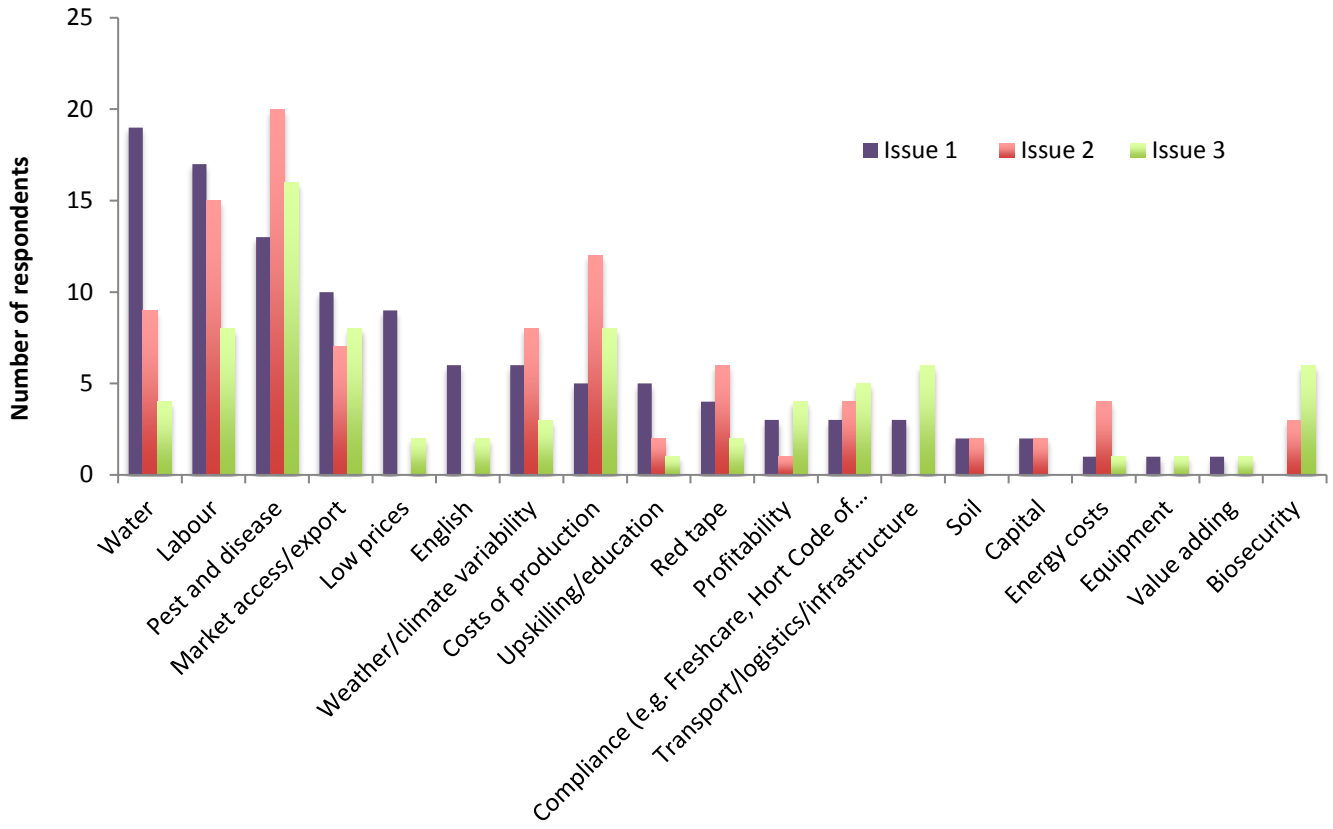


Q3. If you are a grower or farm employee, indicate the crops you grow and the approximate growing area:

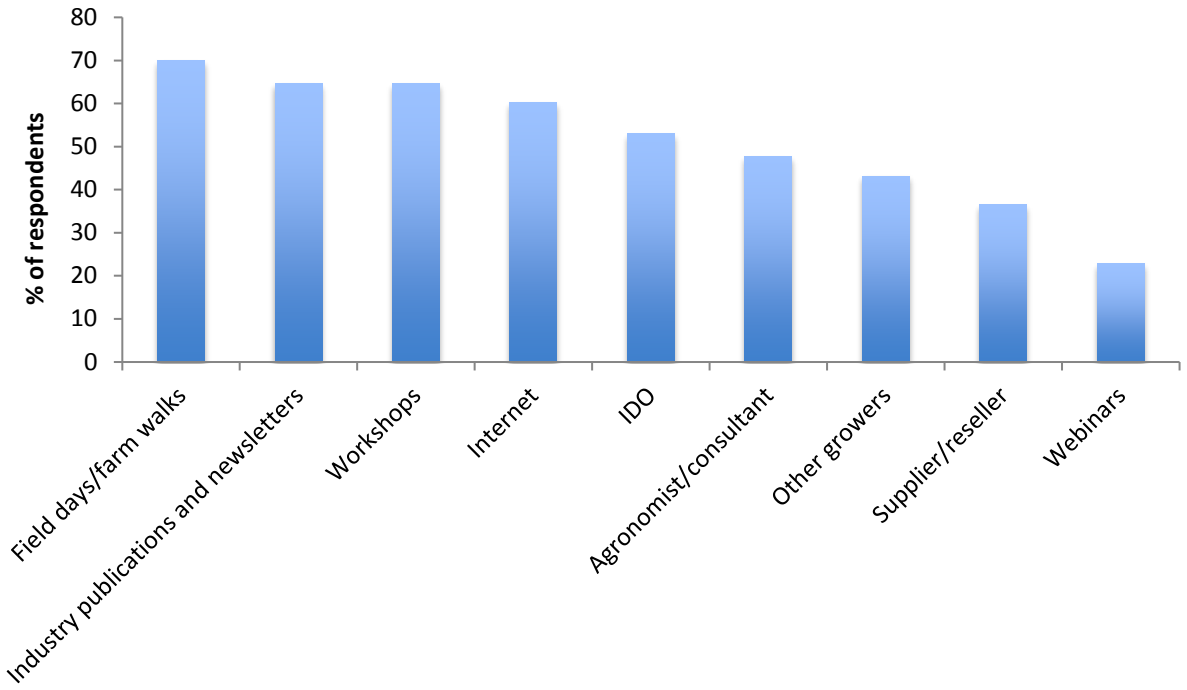




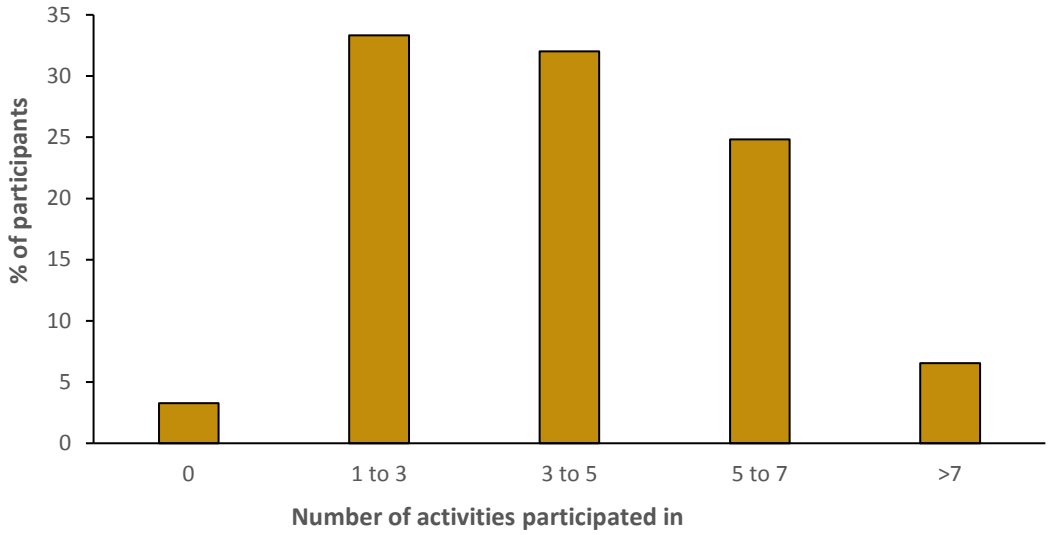
Q4. What are the top 3 issues limiting your business?

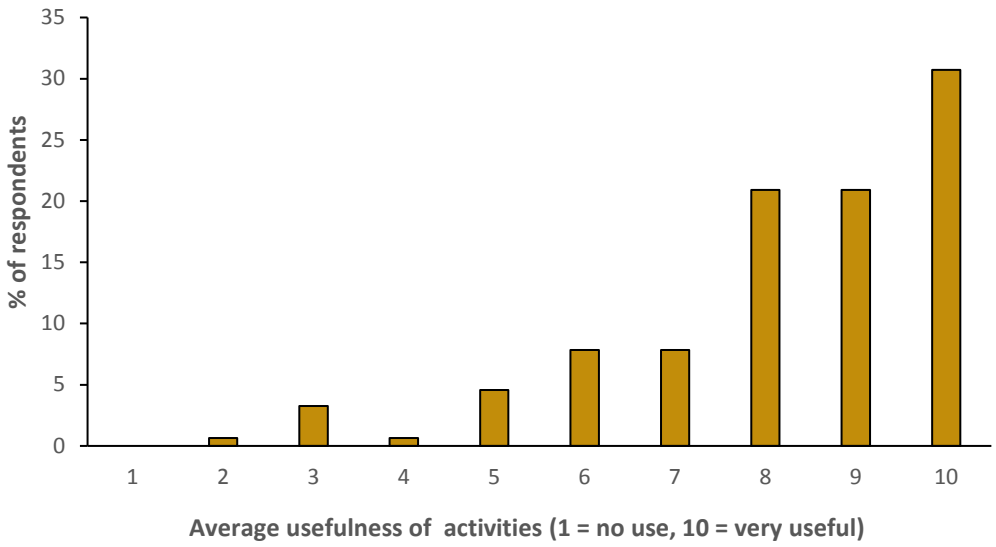


Q5. Where do you get your information about production and farm management issues?

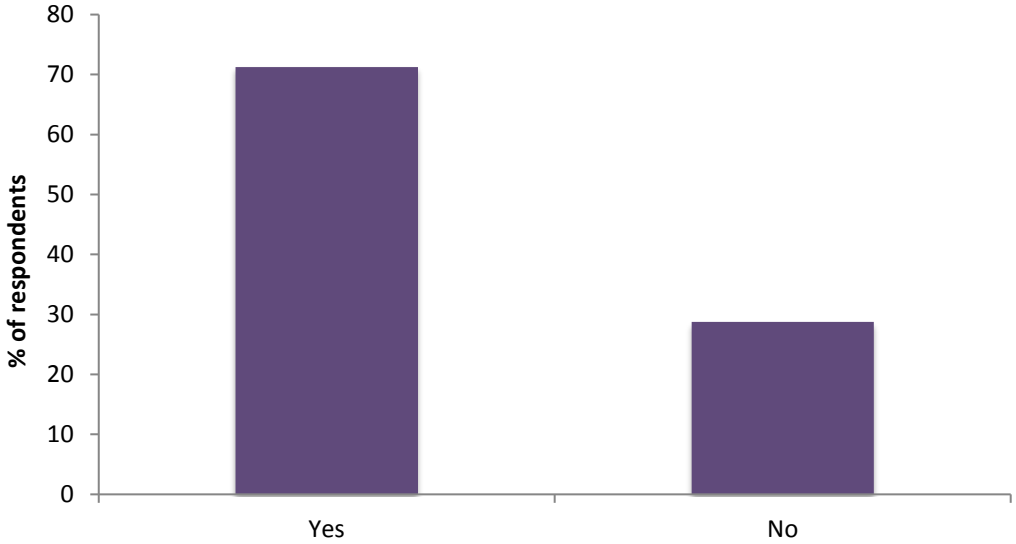


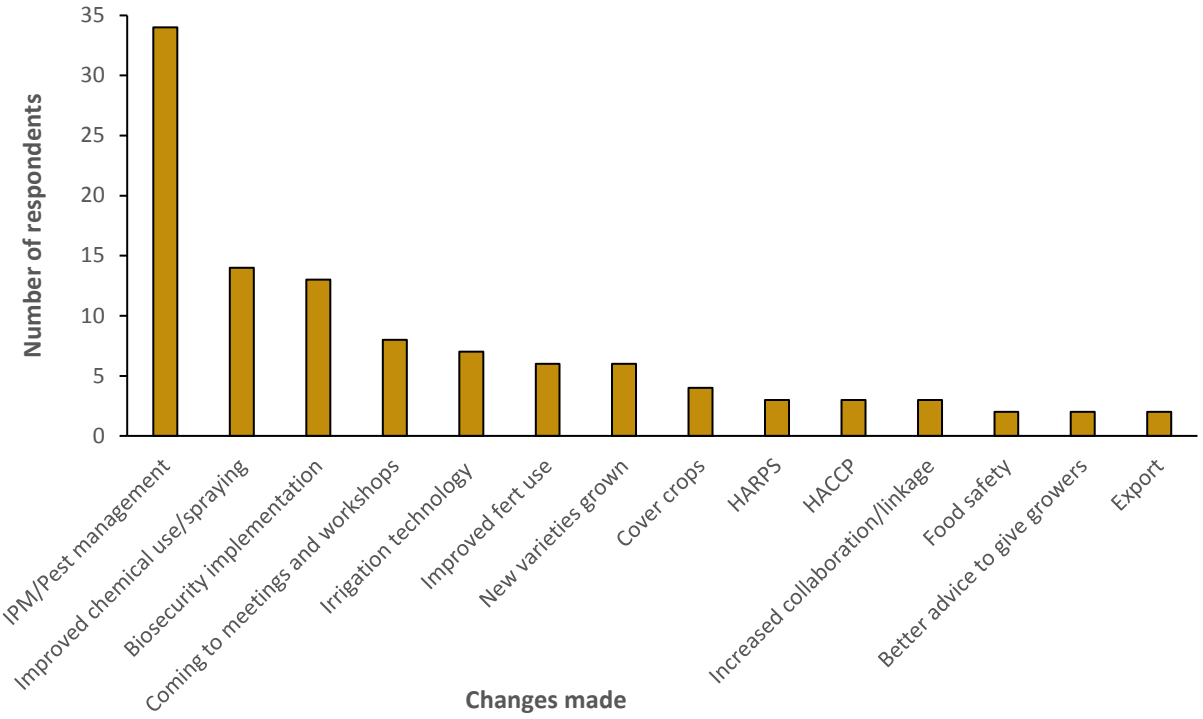
Q6. Over the last 3 years, VegNET has run several activities in your region. Please indicate which activities you participated in and how useful they were to you.



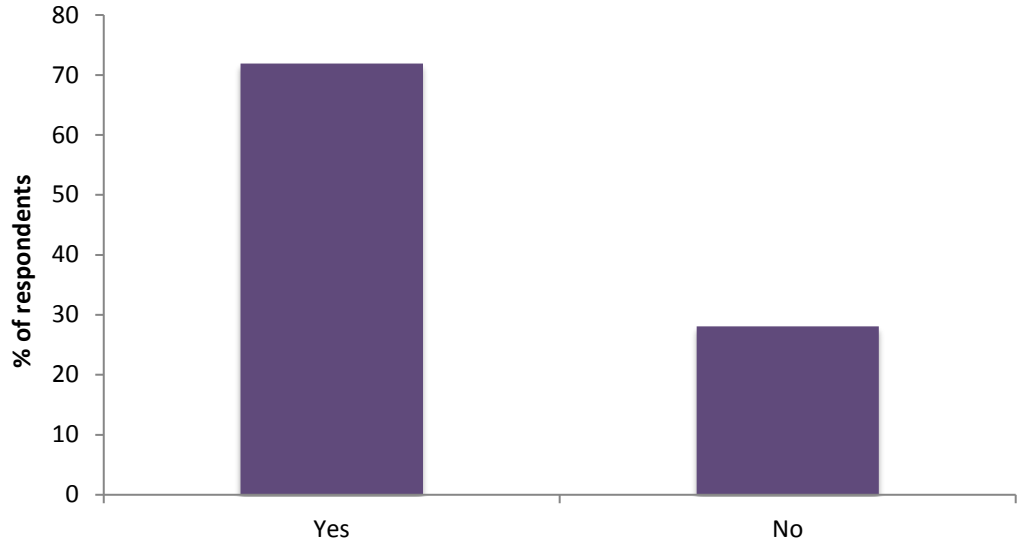


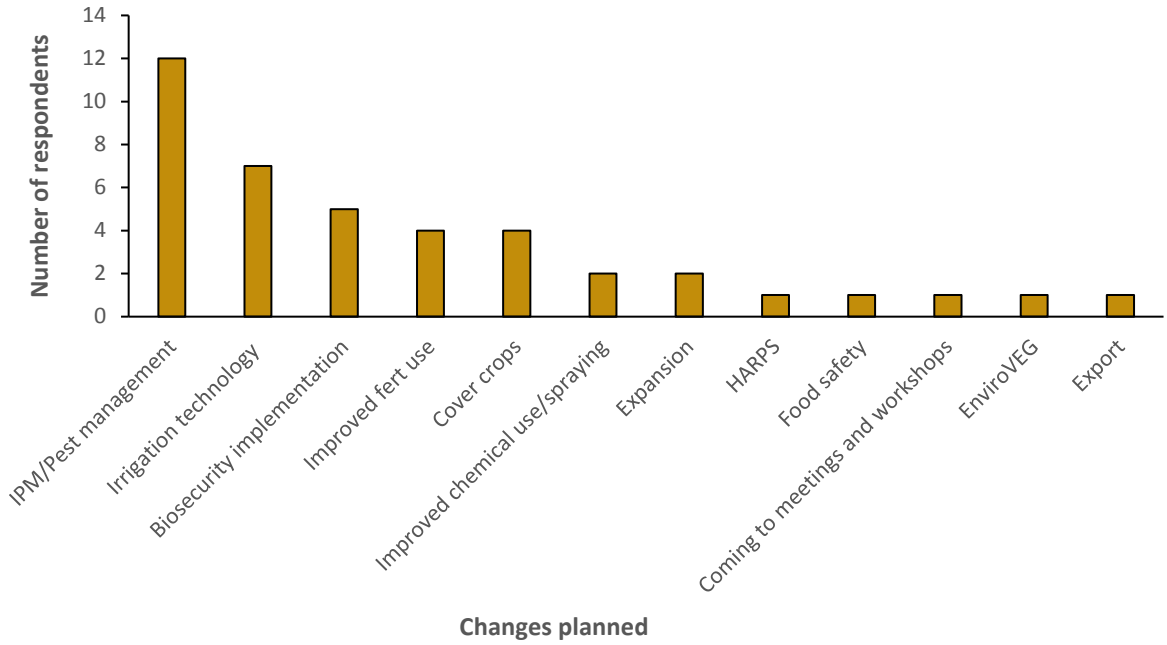
Q7. As a result of the above VegNET activities, have you made any changes to your work practices (or in the advice you provide) or adopted any new technologies in the last 3 years?





Q8. As a result of VegNET activities, are you planning further changes to your work practices (or in the advice you provide)?

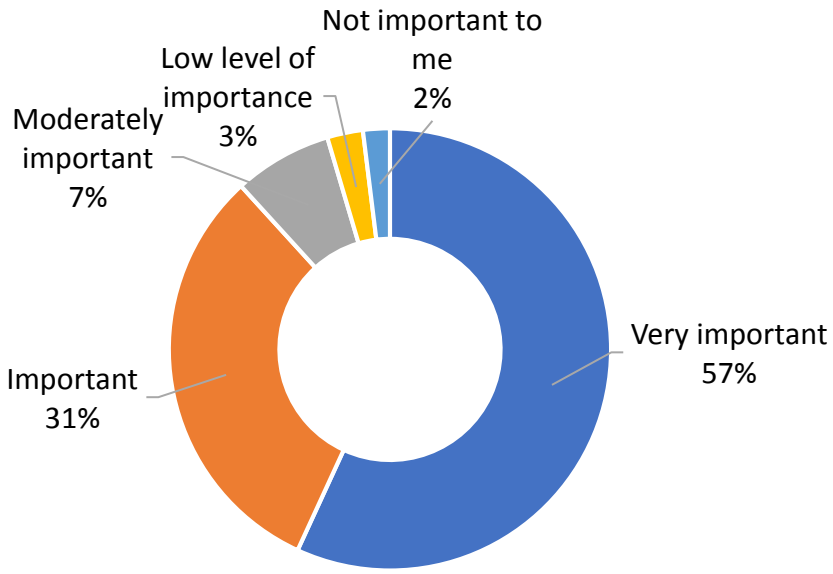




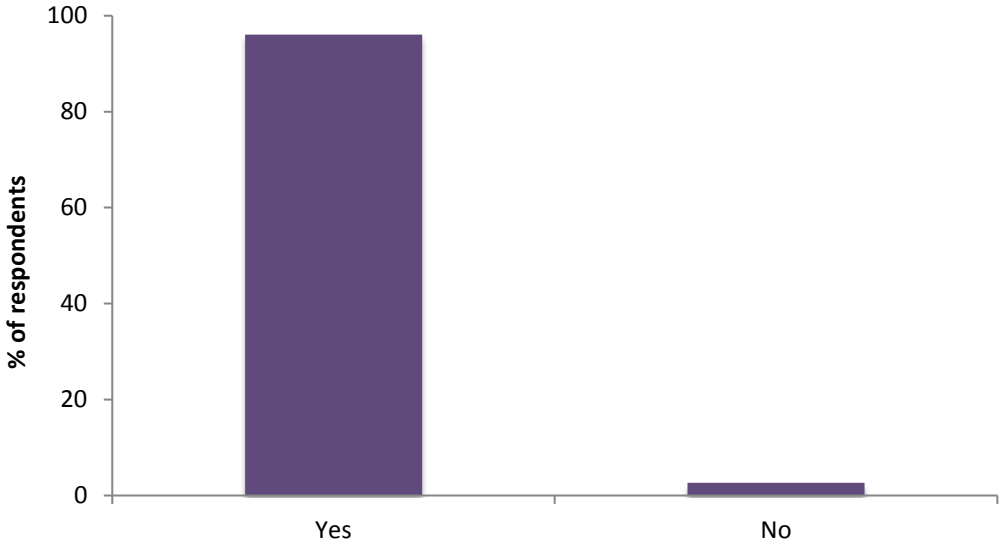
Q9. What further information or assistance from VegNET would help you in making improvements to your business?

- Online VegNET forum
- Economic assessment of new technology
- Fertigation
- Chemicals
- Business skills/mentoring
- IPM, pest and disease control
- Crop variety trials
- LEAN training
- Food safety training
- Hydroponics
- Water licensing
- Compliance - assistance with ongoing/new requirements
- Ongoing R&D updates
- Help with grants
- Continued IDO support
- Connection to markets
- Demo trials
- Plant nutrition
- Procuring labour
- Human resource management

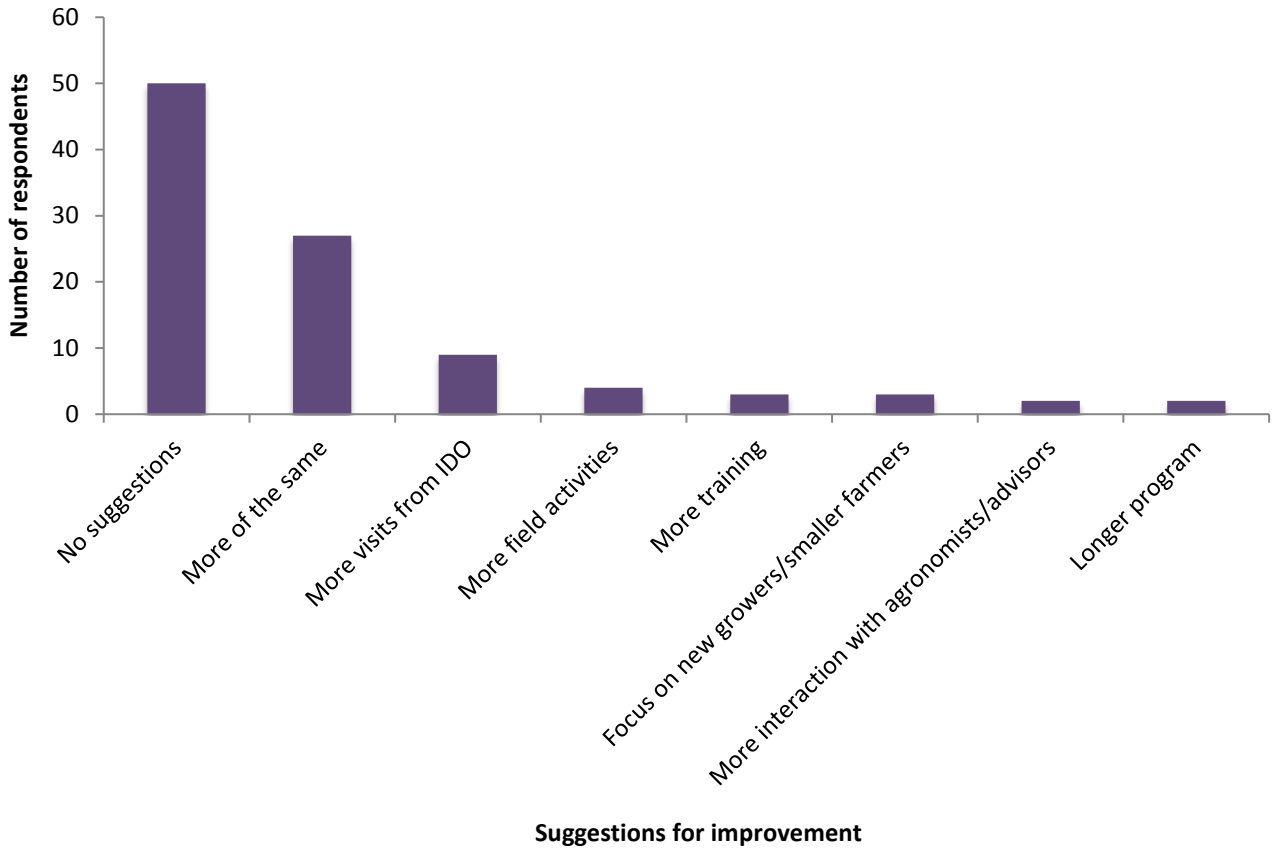
Q10. How important is VegNET in keeping you informed about the latest developments in vegetable R&D?



Q11. Do you see value in the VegNET project continuing beyond 2019?



Q12. If YES, do you have any suggestions for improvement? If NO, why not?



Q13. Please provide any other comments.

- VegNET provides an essential role in connecting growers, researchers, advisers and other groups
  VegNET has provided many networking opportunities
- The current VegNET model should be extended
- Want more on climate change effect on veg production
- Want more on pest management
- Thank you for all your hard work
- Look forward to the program continuing in the future

Appendix 1 – End of project survey form

End of project VegNET survey

National Vegetable Extension Network

This survey has been designed to help assess the VegNET program (https://bit.ly/2Or6yEY) which has been active in your region for the past 2.5 years.

Your input is important, and will be used to help improve future extension programs.

The survey will only take 5-10 minutes, and your answers will remain confidential by aggregating the results.

1. Your details:

Region: _____

Postcode: _____

Name (optional): _____

Mobile number (optional): _____

Business name (optional): _____

2. Which group best describes your role at work: *(select one)*

- ☐ Grower/farm owner
- ☐ Farm employee
- ☐ Grower organisation
- ☐ Advisor or agronomist
- ☐ Supply chain participant
- ☐ Researcher / service provider
- ☐ Other (Please describe) _____

3. If you are a grower or farm employee, indicate the crops you grow and the approximate total growing area:

Crops grown:

_____

_____

Growing area _____ ha _____ acres _____

4. What are the top 3 issues limiting your business?

_____

_____

_____

5. Where do you get your information about production and farm management issues? *(select all that apply)*

- ☐ Field days/farm walks
- ☐ Workshops
- ☐ Agronomist/consultant
- ☐ Internet
- ☐ Webinars
- ☐ Rural input supplier/reseller (e.g. Elders, Muirs, Landmark)
- ☐ Other growers
- ☐ Industry development officer
- ☐ Industry publications and newsletters (e.g. Vegetables Australia)
- ☐ Other: _____

6. Over the last 3 years, VegNET has run several activities in your region. Please indicate which activities you participated in and how useful they were to you.

Activity (list below)	**Participated** (Y/N)	**Usefulness for you** (1 = no use, 10 = very useful)
e.g. IPM workshop		1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10

7. As a result of the above VegNET activities, have you made any changes to your work practices (or in the advice you provide) or adopted any new technologies in the last 3 years?

☐ Yes

☐ No

If so, what changes have you made?

_____

_____

_____

8. As a result of VegNET activities, are you planning further changes to your work practices (or in the advice you provide)?

☐ Yes

☐ No

If so, please list these below:

_____

_____

_____

9. What further information or assistance from VegNET would help you in making improvements to your business?

_____

_____

_____

10. How important is VegNET in keeping you informed about the latest developments in vegetable R&D? *(select one)*

a. Very important

b. Important

c. Moderately important
d. Low level of importance
e. Not important to me

11. Do you see value in the VegNET project continuing beyond 2019?

☐ Yes

☐ No

12. If YES, do you have any suggestions for improvements?

If NO, why not?

_____

_____

_____

13. Please provide any other comments.

_____

_____

Thank you for participating in this survey.

Presenters at the launch of the National Vegetable Extension Network event at Schreurs & Sons farm in Clyde, Victoria.

R&D
Farm Productivity, Resource Use & Management

The National Vegetable Extension Network is up and running

National Vegetable Extension Network

HORTICULTURE INNOVATION AUSTRALIA HAS TEAMED UP WITH MEMBERS OF THE VEGETABLE INDUSTRY TO DEVELOP THE NATIONAL VEGETABLE EXTENSION NETWORK. THE AIM OF THE NETWORK IS TO EFFECTIVELY COMMUNICATE INFORMATION TO GROWERS THROUGH 10 REGIONALLY-BASED EXTENSION PROJECTS, WITH COORDINATION AND SUPPORT PROVIDED BY APPLIED HORTICULTURAL RESEARCH.

For too long, research funded by vegetable growers and Australian taxpayers has done only half the job.

Researchers have made great progress in developing and testing new methods for pest and disease control, post-harvest handling, soil health, biosecurity, crop agronomy, irrigation, health and nutrition, and more. While some of these projects have extended their findings back to the growers in a useful and practical way, sadly, most struggle.

A wealth of potentially useful information languishes in carefully written final reports or scientific papers that few growers or industry practitioners will ever read.

The good news is that this is all about to change.

Effective extension

The National Vegetable Extension Network has been set up by Horticulture Innovation Australia (Hort Innovation) and the vegetable industry to effectively extend vitally important research-based information to growers.

It may surprise you to know just how much information has been produced by current and already completed vegetable R&D projects:

- The Australian vegetable industry and Hort Innovation has funded 235 separate research or development projects over the past 10 years;
- There are more than 600 R&D outputs currently available on the AUSVEG InfoVeg website (ausveg.com.au/infoveg), as well as relevant outputs from other horticultural industries, R&D from the private sector and international scientific literature;
- A recent review of vegetable industry extension materials identified and reviewed nearly 300 extension resources including fact sheets, ute guides, books, CDs and DVDs, websites and posters.

How will it work?

Regional projects: The lifeblood of the National Vegetable Extension Network flows from 10 regionally-based extension projects. The regional extension projects and the leaders' contact details are listed on the next page.

Coordination and support: Overall extension program technical support and coordination is being provided by Applied Horticultural Research (AHR). In this important supporting role, AHR staff Adam Goldwater and Dr Gordon Rogers will assist the program.

- **Review of recent vegetable research:** All recent and current vegetable R&D projects will be reviewed and any available extension materials such as fact sheets, books and ute guides will be identified for regional projects to use. The review will also identify current projects that incorporate extension. This review is critically important for the regional projects so participants are aware of the research available for extension.
- **Coordination:** Assist regional projects to prioritise projects to suit local needs and coordinate with other regions. AHR will also help coordinate with national extension projects such as Soil Wealth, Integrated Crop Protection and Soil Borne Disease Management. Regular meetings will be organised to bolster collaboration between the regional project staff and deliver a united, cohesive program that works to benefit vegetable growers.
- **Branding:** The name and logo that you see in this article was developed as the first official activity of the coordination project.
- **Videos:** In the first year, five videos will be produced that regional projects will be able to use to help communicate the results of key research.

Communication: This is what it's all about, and AUSVEG will

Region	Project leader	Email address
Bowen Gumlu and FNQ	Anna McCowan	idm@bowengumlugrowers.com.au
Wide Bay Burnett	Bree Grima	bree.grima@bfvg.com.au
Southern Queensland	Anthony Staatz	anthonys@koalafarms.com.au
New South Wales	Bill Dixon	bill.dixon@lls.nsw.gov.au
Western Australia	John Shannon	office@vegetableswa.com.au
Northern Territory	Greg Owens	greg@ntfarmers.org.au
South Australia	Jordan Brooke-Barnett	jordan.brooke-barnett@ausveg.com.au
Tasmania	Donna Lucas	donnal@rmcg.com.au
Victoria – Gippsland	Nicola Watts	info@egfci.com.au
Victoria – Northern, Western and South Eastern	Anne-Maree Boland	anne-mareeb@rmcg.com.au

be playing a key role in this aspect of the National Vegetable Extension Network.

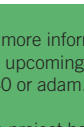
Each issue of *Vegetables Australia* will carry a special feature on upcoming extension events of national and regional importance.

Levy-funded research on show

The 2016 National Horticultural and Innovation Expo was a two-day event held in Gatton, Queensland. Organised by Lockyer Valley Growers, the expo showcased new seed varieties, machinery demonstrations and the latest research, innovation and technology.

The event was an overwhelming success and a great method of linking growers to all those involved in the horticultural supply chain. Hort Innovation had a booth over the two days where the National Vegetable Extension Network Banner was premiered and the conversation started.

RIPPA the robot was a big hit, and once growers learnt that the robot was a levy-funded research output, they were keen to hear more of what R&D has occurred with their levy dollars.



For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

This project has been funded by Horticulture Innovation Australia Limited using the National Vegetable Levy and funds from the Australian Government.

Project Number: VG15049

Horticulture Innovation Australia

Greater Sydney Local Land Services ag advisory experts Matt Plunkett (bottom right) and Peter Conasch (bottom left) with growers and industry at the launch of the project.

R&D Drive Train

National Vegetable Extension Network: Spotlight on Tasmania and New South Wales

IT'S ALL SYSTEMS GO WITH THE NATIONAL VEGETABLE EXTENSION NETWORK. THE FEATURE REGIONS FOR THIS ISSUE, TASMANIA AND NEW SOUTH WALES, HAVE BOTH HAD A BUSY START TO THE PROJECT.

In September, producers, packers and advisers converged on the Tasmanian cities of Devonport and Richmond to hear about postharvest management of vegetables from a Horticulture Innovation Australia levy-funded research project, *Identifying and sharing postharvest best practice on-farm and online* (VG13083).

The importance of cooling produce, monitoring product temperature and storage were key themes throughout the morning, with new technologies taking centre stage. At the time of writing, the team is working with the soil borne disease project, *A multi-faceted approach to soil borne disease management* (VG15010), to hold a workshop on irrigation management and damping off in leafy vegetable crops in southern Tasmania.

Additionally, there are plans to present a summary of recent consumer and market research at the Tasmanian Institute of Agriculture (TIA) Forthside Vegetable Research Facility Open Day in early November. The afternoon's presentation will focus on opportunities in the supply chain: what the consumer wants, what's available and what growers can do to take advantage of that.

What else is available?

The Tasmanian National Vegetable Extension Network (NVEN) team is available to work with producers, one-on-one or groups on issues that are important to you and the industry in Tasmania. If you have a grower group already, or are keen to get one up and running, the team can help. The NVEN team in Tasmania is offering BizCheck for growers wanting to evaluate their current business position, benchmarking and/or cost of production. Additionally, the team has a range of resources from events held so far.

How to keep in touch

- Like the team on Facebook: Search 'National Vegetable Extension Network – Tasmania'
- Follow NVEN Tasmania on Twitter: @TasFarmingFutures
- Visit the website: tasfarmingfutures.com.au
- Contact NVEN Tasmania Industry Development Officer Ashley Evans on 0447 776 909.

New South Wales

The launch of NVEN NSW attracted many growers and industry representatives to the Sydney demonstration farm. The event provided valuable information and was an opportunity to gather feedback on the NSW extension project into the future.

Greater Sydney Local Land Services Manager Bill Dixon said the event also attracted strong representations from the Khmer and Chinese communities.

"It was excellent to hear directly from these communities on the key issues and priorities they face as vegetable growers in the Sydney Basin," he said.

"They are happy to be involved in this project and we look forward to working

UPCOMING EVENT IN WA

vegetablesWA is presenting the annual Grower Leadership Summit on Friday 25 November, where international opportunities and competitors as well as the latest domestic market insights will be discussed. The information at the summit will be presented by Coriolis, Nielsen and Colmar Brunton.

Details are as follows:
9:30am-2:30pm: Grower group tour
3:00pm-6:00pm: Summit
6:00pm-7:30pm: Cocktail/Networking function
Please note: this is limited to 15 places.

The tour will visit Baldivis Farms' automated greenhouse operations and Ivankovich Farms' automatic carrot packing machine. If you are interested in participating, contact Rebecca Blackman at vegetablesWA at rebecca.blackman@vegetableswa.com.au or phone 08 9481 0834.

Greater Sydney Local Land Services Officer (mixed farming) Peter Conasch with Agnes Banks vegetable growers Val and Sam Micallef.

NVEN Tasmania Industry Development Officer Ashley Evans.

closely with them to reduce input costs and boost their returns at the farm gate."

Tackling the big issues

Following the launch, AUSVEG delivered the NVEN's inaugural workshop on biosecurity risks and responsibilities to growers and industry.

This was closely followed by a compost workshop for the Khmer community, aimed at promoting the benefits of using compost to improve soil health, detailing how to use compost on-farm and showcasing composted products.

A parsley and brassica disease identification workshop has also been held for Chinese growers.

"While it's early days, we are very encouraged by the response from growers to date and at this stage our focus will remain on engagement and getting the word out to as many stakeholders as possible," Mr Dixon said.

How to keep in touch

- Register to receive regular updates on workshops and events by email to admin.greatersydney@lls.nsw.gov.au.
- Contact Greater Sydney Local Land Services Manager Bill Dixon on 02 4724 2113.

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

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Horticulture Innovation Australia

22 young growers visited Ellement Produce in Western Australia in November 20

EXTENSION UPDATES FROM AROUND THE NATION

The National Vegetable Extension Network has experienced a busy end to 2016, which was highlighted by a gala dinner in Bundaberg, a Vegetable Industry Leaders Summit in Western Australia and the network's inaugural annual meeting.

WIDE BAY BURNETT, QLD

When guests entered what is traditionally known as a shed, they were immediately awash with a haze of blue and soft twinkling lights in representation of a 'night under the stars', which was the theme for the Bundaberg Fruit and Vegetable Growers (BFVG) 2016 Industry Gala Dinner.

More than 520 regional producers and representatives from Woolworths, Coles, local MPs, AUSVEG and agricultural supply chain businesses attended the successful event. Held on 8 October 2016, it offered plenty of networking opportunities for vegetable businesses in the region.

Wide Bay Burnett – National Vegetable Extension Network (NVEN) staff members took the opportunity to speak with Professor Fiona Coulson and Professor Phil Brown from Central Queensland University on how the two organisations could collaborate by potentially linking students and graduates to local producers for thesis projects and work experience. Vegetable growers were interested to hear about the Wide Bay Burnett NVEN project and are keen to participate in one-on-one consultations that will commence in 2017.

WORKING WITH VEGETABLE GROWERS

Industry Development Officers (IDOs) Kylie Jackson and Daryl Anastasi are fortunate to have direct relationships with a number of vegetable industry support businesses who are already working in the region and embarking on various research activities. Kylie and Daryl are working closely with these businesses to coordinate the distribution of research papers, host succinct workshops and pave the way to assisting vegetable growers in the region to build their business capacity.

Expressions of interest are invited for a March 2017 workshop in Bundaberg on the Vegetable Industry Strategic Investment Plan for 2017-22. Please register your interest on the website below.

How to keep in touch:

- Contact BFVG Project Officer Daryl Anastasi on 0428 716 218 c daryl.anastasi@bfvg.com.au.
- Keep up with upcoming events on the website: bfvg.com.au/events.

WESTERN AUSTRALIA

On 25 November 2016, vegetablesWA hosted a Grower Group Tour and the Industry Leaders Summit for the second year. The event was hailed a success, with 22 young grower attendees undertaking a tour of Ellement Produce and Baldivis Farms befor attending the Summit in the afternoon.

The Summit was opened by Tim Morris from Coriolis, who spoke about the exporting opportunities for WA vegetable growe Colmar Brunton and Nielsen representatives then provided the findings from recent consumer research to the growers, discussi

A full house at the Bundaberg Fruit and Vegetable Growers 2016 Industry Gala Dinner.

three product lines. The information was based on research projects funded by Horticulture Innovation Australia (Hort Innovation) which are currently being conducted.

Overall the event was successful, with growers having plenty of knowledge to take away and implement on-farm.

How to keep in touch:

- Contact Industry Development Officer Truyen Vo on 0457 457 559 or truyen.vo@vegetableswa.com.au.
- Keep up with upcoming events on the website: vegetableswa.com.au.

INAUGURAL ANNUAL MEETING

The National Vegetable Extension Network held its inaugural annual meeting at the Hort Innovation office in Sydney from 25-26 October. Sixteen vegetable IDOs representing 10 regions of Australia came together for two days of networking, planning and discussions.

Highlights included a session on the use of webinars from Dr John James and presentations from vegetable researchers on some of their recent work and areas for extension to vegetable growers. IDOs discussed their plans for the coming year and identified some opportunities for collaboration between regional groups.

An overview of vegetable levy funded research projects and extension resources from the last 10 years was presented. The IDOs now have the chance to transfer some of that research into valuable improvements for vegetable growers.

R&D Drive Train

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

This project has been funded by Horticulture Innovation Australia Limited using the National Vegetable Levy and funds from the Australian Government.

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National Vegetable Extension Network

Horticulture Innovation Australia

Growers inspecting the RIPPA robot on display at Schreurs & Sons celery farm in Victoria.

Bowen and Gumlu growers recently visited the South Australian Produce Markets.

VEGNET: PROGRAM UPDATES FROM AROUND THE NATION

The National Vegetable Extension Network has a new name: VegNET. The project is starting to deliver important benefits to vegetable growers through its 10 regionally-based extension projects. Here are some recent highlights from Victoria and North Queensland.

GROWING VICTORIAN VEG BUSINESSES

"Growing vegetable businesses" has been the key message for the VegNET rollout in Victoria's northern, western and south-eastern regions, with profitability and cost of production a priority for growers.

Robot for Intelligent Perception and Precision Application (RIPPA) trials in Clyde in the south-eastern region and Lindenow in East Gippsland have generated a lot of interest. As well as weeding, RIPPA provides crop-monitoring data including growth, yield estimation and soil moisture levels.

Cost of production remains a priority issue, and the project team will soon provide BizCheck assessments to growers to measure and understand the main inputs of their business and how they interact to determine farm profit.

Recent events included a farm walk in Werribee South on 8 March to talk about the yield results emerging from the compost and reduced-tillage demonstration site (part of the Soil Wealth and Integrated Crop Protection projects). A workshop for the Vegetable Strategic Investment Plan was also held on the same day.

Meanwhile, a Port of Melbourne export facilities tour on 5 April will enable a behind-the-scenes look at the facilities and their role in the vegetable supply chain.

Project events, news, resources and shared lessons from other growers across the region are included in a monthly e-newsletter distributed to Victorian growers. To sign up, please contact one of the field officers:

- Northern region – Ken Orr, 0428 502 936 or ken.orr54@bigpond.com
- Western region – Clinton Muller, 0498 192 596 or clintonm@rmcg.com.au
- South-eastern region – Carl Larsen, 0419 622 393 or carll@rmcg.com.au
- Online: growingvicveg.com, Twitter: @GrowingVegBizs

NORTH QUEENSLAND GROWERS TOUR INNOVATIVE SA FARMS

Eight Bowen and nearby Gumlu (North Queensland) vegetable growers learnt about marketing, irrigation technology and precision agriculture during a three-day study tour of innovative South Australian farming systems and technology.

There is value for growers of field vegetables to learn from other industries and production systems such as viticulture and glasshouse horticulture. The tour began at the South Australian Produce Markets, facilitated by its CEO Angelo Demasi. Growers gained a better understanding of the market system and the role it plays in the state's produce supply. Grower Dale Williams of Euri Gold Farms, Bowen, found learning about improvements in packing and product standards particularly useful.

After visiting several covered production growers, Jonathan Land from Gumlu said that covered production tactics have helped him to find potential ways to streamline his own operation.

Carl Walker (Phantom Produce, Bowen) visited Dominic Skinner of Machine Engineering Australia in the Barossa and now believes soil moisture probe technology would be very useful, particularly in learning to manage water usage.

The study tour was arranged jointly by Bowen Gumlu Growers Association and Queensland Department of Agriculture and Fisheries (QDAF), and was supported by VegNET.

The tour followed the *Adoption of variable rate technology in Queensland's intensive vegetable production systems* project, led by QDAF, where 12 farms trialled and adopted a suite of precision approaches. This project was jointly funded by QDAF and the Federal Government's National Landcare Program.

How to keep in touch:

- Industry development officer: Cherry Emerick, 0427 701 225 or idm@bowengumlugrowers.com.au
- Facebook: facebook.com/bowen.growers
- Online: bowengumlugrowers.com.au/home

R&D Drive Train

INFO

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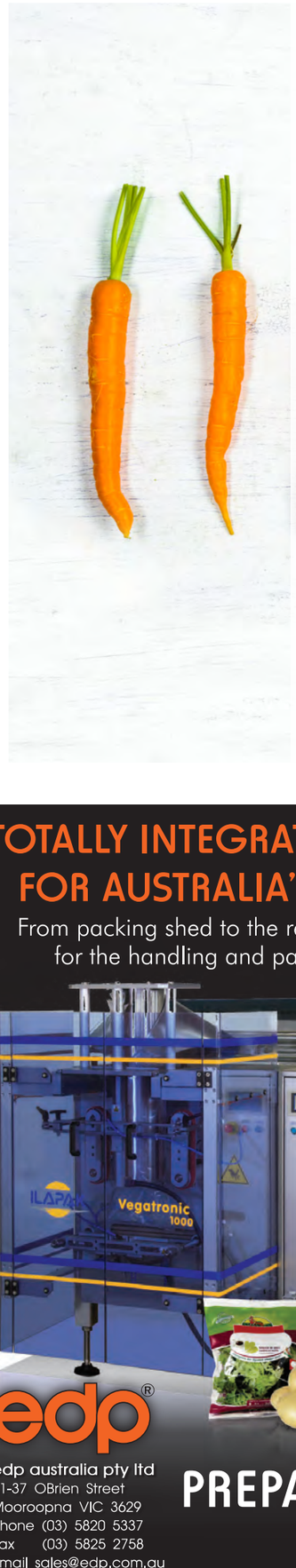
National Vegetable Extension Network

Horticulture Innovation Australia



VEGGIE STATS: CARROT

To enable deeper insights into the production and trade performance of key Australian vegetable products, we have developed a series of crop-specific Veggie Stats profiles. The next instalment of this series provides an update on carrot production.

The following Veggie Stats article has been developed specifically to give readers a detailed snapshot of the key facts and figures on carrots. Veggie Stats utilises data from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), funded by Horticulture Innovation Australia Limited using the research and development National Vegetable Levy and funds from the Australian Government.

It is important to note the data itself provides a broad indication of the performance of carrot growers and should be interpreted carefully. The data is presented at the national level and therefore does not account for differences among jurisdictions.

In addition to this, the information provided is not specific to every Australian grower since each enterprise operates differently from one another.

Integrated Pest Management site in the Northern Territory.

VEGNET CELEBRATES A SUCCESSFUL FIRST YEAR

As VegNET approaches the end of its first year, vegetable growers continue to benefit from 10 regionally-based extension projects. VegNET Industry Development Officers will share some of their success stories at Hort Connections 2017 on 17 May, while delegates can also find more VegNET information at the Trade Show. In the meantime, VegNET has provided some recent highlights from South Australia and the Northern Territory.

FLOOD RECOVERY ASSISTANCE AND DUTCH TECHNOLOGY ON SHOW IN SA

South Australian vegetable growers are being kept up-to-date with the latest R&D following the rollout of VegNET in South Australia. AUSVEG SA Industry Development Officer Hannah McArdle has been busy communicating with growers through newsletters, workshops and farm visits.

Soil recovery and soil borne disease management workshops were held after flooding devastated the Adelaide Plains in September 2016. The workshops were presented by RM Consulting Group's Dr Doris Blaesing, and have enabled growers to identify how to best manage their farms following the flood.

Dutch technologies in horticulture were also showcased during a visit from the Dutch Government in November. The technologies included irrigation, protected cropping and harvesting machinery. As a result of the workshop, some protected cropping growers are looking to invest further in capital that can improve their production systems.

This year, the South Australian VegNET team is focusing on the delivery of events and resources to assist grower needs in post-harvest management, weed control and biosecurity. Starting in late May, a series of grower meetings on weed management will be held with Chris Fyfe from the University of New England. These meetings are part of the project, *Strategic approach to weed management for the Australian Vegetable Industry*, which includes multiple trial sites in South Australia (see page 36 for more information).

Two workshops on post-harvest management of vegetables will be held in July and will be presented by Dr Jenny Ekman and Adam Goldwater from Applied Horticultural Research.

Project updates, upcoming events and summaries of the latest R&D can be found in the AUSVEG SA newsletter. To hear more about VegNET in South Australia or to sign up for events, please contact Industry Development Officer Hannah McArdle.

- Phone: 0408 475 995
- Email: hannah.mcardle@ausveg.com.au
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NT GROWERS GET SET FOR THE 2017 DRY SEASON

Northern Territory vegetable growers, melon growers and horticulture industry representatives met at the NT Department of Primary Industry and Resources (NT DPIR) Coastal Plains Research Farm (CPRF) to hear the latest on the cucumber green mottle mosaic virus (CGMMV) incursions across Australia. The group heard the latest NT regulatory requirements for cucurbit production and the progress of the national CGMMV research and development project that is being led by the NT DPIR plant pathology molecular biology unit. Printed workshop materials were available in English, Vietnamese and Cambodian.

The meeting was held at CPRF to introduce growers to the Integrated Pest Management (IPM) demonstration site. Insect resistance to chemical-only management programs has been increasing over the last 10 years, which is why the VegNET team has developed the IPM demonstration site. There is now increased enthusiasm by okra and snake bean growers to embrace IPM.

Growers visited a green manure crop of forage sorghum and were able to identify a number of pest and beneficial insects already at the site. Growers were encouraged to use the recently developed *Field Guide to Pests, Beneficials, Diseases and Disorders of Vegetables in Northern Australia* to identify different insects during the field walk and to consider how the use of a refuge area of sorghum or tall grasses can keep the existing beneficial insects on farm and ready to protect the vegetable crops. This field guide is available in English and Vietnamese and can be requested from the NT Industry Development Officers (details below).

The demonstration site will be used to further improve pest identification and monitoring skills, which will form the basis of a grower's own IPM program. Upcoming field activities at the site will include demonstrations of improved fertigation systems and soil moisture monitoring. Follow NT Farmers on Facebook to keep up-to-date with these future events.

To hear more about VegNET in the Northern Territory, please contact Industry Development Officers Greg Owens and Samantha Tocknell or follow them on Twitter and Facebook:

- Phone: 0437 092 551
- Email: greg@ntfarmers.org.au
- Twitter: @NTFarmers
- Facebook: @NTFarmersAssociation

R&D Drive Train

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

This project has been funded by Horticulture Innovation Australia Limited using the research and development National Vegetable Levy and funds from the Australian Government.

Project Number: VG15049

FOCUS ON TOMATO-POTATO PSYLLID INCURSION

In February, the destructive tomato-potato psyllid was discovered in a Perth backyard. After an incident definition phase lasting six weeks, this incursion is now in the response phase. AUSVEG Biosecurity Adviser Dr Kevin Clayton-Greene explains.

Much has been written about the tomato-potato psyllid (TPP; *Bactericera cockerelli*) and the threat that it poses to Australian horticulture. At the time of writing, a short-term Response Plan has been enacted by the National Management Group (NMG) following the detection of TPP in Western Australia.

The purpose of this Response Plan was to allow more time to gather critical information to determine the extent of the incursion and enable a more informed decision about eradication feasibility.

Importantly, it also allowed owner reimbursement costs to flow to those properties affected, however it needs to be kept in mind that this will only be to growers who are covered by a Plant Health Levy (for example, potato and capsicum). Tomato producers are excluded as they are not signatories to the Emergency Plant Pest Response Deed and do not have a levy.

At the conclusion of this Response Plan, the NMG decided that eradication was not feasible due to the widespread distribution of TPP in the Perth metropolitan area; that available treatments cannot guarantee eradication; and the difficulty in detecting TPP on crops when they exist in only small numbers.

As a consequence, a 12-month Transition to Management Program is being developed so that the impact of the pest can be both managed and minimised. This plan will be put together by the Department of Agriculture and Food, Western Australia with the involvement of all parties, both government and industry. Once developed, the Plan will be put through the Consultative Committee on Emergency Plant Pests and NMG process for approval.

ZEBRA CHIP UPDATE

At the time of writing, we have still not detected *Candidatus* Liberibacter solanacearum, the organism which causes zebra chip in potatoes, and plant death. However the organism only occurs in a low percentage of psyllids, therefore proving absence may take some time.

We do know that the type of TPP is the same as the one detected in New Zealand and in the western states of the United States (there are four known biotypes). However, it is not known how it arrived in Western Australia – and we probably never will know. It either arrived on produce, on clothing or was carried there naturally by wind.

TPP TRAPPING

Noting the seriousness of this pest and its multi-million dollar impact upon the vegetable and potato industries, it is incumbent for everyone to be especially vigilant for any sign of an unusual insect in crops.

Adult TPP is black with a white stripe on its back. It resembles a small winged cicada and is about three millimetres long. The adult psyllids are relatively easy to identify once caught, although catching them usually requires sticky traps as the adults fly a short distance as soon as foliage is disturbed.

Sticky traps can be purchased from outlets such as Bunnings or other nurseries. They should be erected about 30 centimetres above the crop and checked regularly – at least weekly – and if anything unusual is spotted, contact the Exotic Plant Pest Hotline (1800 084 881) and seek advice immediately.

R&D Farm Productivity, Resource Use & Management

INFO

For more information, contact AUSVEG on 03 9882 0277 or email info@ausveg.com.au.

This communication has been funded by Horticulture Innovation Australia Limited using the research and development National Vegetable Levy and funds from the Australian Government.

Project Number: VG15023

Greater Sydney Local Land Services' Matthew Plunkett, Love My Salad's Frances Tolson and NSW DPI's Dr Len Tesoriero and Sophie Parks.


Participants visit Joe Boustani's greenhouse during the Greater Sydney Local Land Services Protected Cropping Workshop and farm walk in May.

VEGETABLE EXTENSION UPDATES FROM AROUND THE NATION

Now in its second year, the National Vegetable Extension Network (VegNET) continues to provide growers with workshops and networking opportunities around the country. This update focuses on Lockyer Valley's new industry development officer, Pat Salter, while Sydney's Local Land Services hosted a successful protected cropping workshop.

NEW LOCKYER VALLEY IDO STRENGTHENS INDUSTRY TIES WITH NEXT GENERATION OF GROWERS

The VegNET project in south-east Queensland has a new Industry Development Officer.

Pat Salter has hit the ground running, quickly acquainting himself with many of the growers and industry partners in the region.

"His enthusiasm for the role is infectious and that rubs off on those around him," Lockyer Valley Growers Group President Michael Sippel said.

"I thank him for his efforts so far and would encourage growers to get to know Pat and utilise his role within your business."

Pat said his focus at present is helping to secure the future workforce for the region's vegetable industry by fostering closer ties between growers and industry partners, Lockyer Valley Council's economic development team, the University of Queensland's campus at Gatton and several local high schools.

"I met with the head of school at the University of Queensland, Neal Menzies, and that led to the uni's Agricultural Science students being invited to attend a Lockyer Valley Growers barbecue dinner at the campus in May," Pat said.

Fifty-five people came along to the event, which was held in the foundation building. Joining growers from Fassifern and the Kalbar region were their Stanthorpe counterparts, who travelled more than two hours to attend the function.

INDUSTRY ENGAGEMENT

At the high school level, Pat has been working on an industry engagement program.

"We held an event at a local high school's trade and agricultural unit, which was attended by industry leaders and also growers. The aim was to showcase the school's activities and syllabus for senior students. It was pleasing to see the growers conversing with the students," Pat said.

"We are now developing a 30-minute classroom presentation for agriculture students to help them engage with growers and industry specialists. From this base, we will work towards taking students to visit leading vegetable producers in the Valley, to enthuse them about the latest innovations in the horticulture industry. This program will also involve the University of Queensland offering advice about careers in the industry and tertiary study options.

"If successful, we will roll out the program to other high schools in the region."

In his industry development role, Pat has also been helping link young local growers with training providers to assist with identified issues, in particular on-farm occupational health and safety.

To find out more about VegNET activities and events in South East Queensland, please contact Pat Salter on 0456 956 340 or email ido@lockyervalleygrowers.com.au.

CROWDS FLOCK TO VEGNET PROTECTED CROPPING WORKSHOP IN SYDNEY

More than 100 growers and industry representatives turned out to the Greater Sydney Local Land Services Protected Cropping Workshop and farm walk on 31 May at Rossmore in Sydney.

Held on local grower Joe Boustani's farm, the event involved presentations from the New South Wales Department of Primary Industries (NSW DPI), Protected Cropping Australia and industry experts covering topics including Fusarium-resistant rootstocks for cucumbers, mite control and new technologies.

The workshop was one in a packed schedule of field days and farm walks being rolled out across the Greater Sydney, Central Tablelands, North Coast and Riverina regions as part of the NSW VegNET initiative.

A PRIMARY FOCUS

Industry Development Officer Matthew Plunkett said protected cropping was clearly a priority R&D area for the New South Wales horticultural industry.

"The great response we received to the Rossmore workshop gave us insight and direction into the areas we should prioritise as part of our project; it is excellent that the level of engagement from growers and industry ramps up as we roll out more events," he said.

Mr Plunkett said priority focus areas for the NSW VegNET team over the next few months would include effective management options for pests and diseases, spray application efficiency, cover crops and low cost protected covers.

"We are also working towards a major vegetable innovation field day in the Riverina region, which will showcase the use of drone and solar power technologies in irrigated vegetable production as well as demonstrations from the Robot for Intelligent Perception and Precision Application (RIPPA)," he said.

To find out more about the NSW VegNET project and details on upcoming events, visit the Greater Sydney Local Land Services website at greatersydney.lls.nsw.gov.au or contact Matthew Plunkett on 0428 978 390 or email matthew.plunkett@lls.nsw.gov.au.

R&D Drive Train

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

This project has been funded by Horticulture Innovation Australia using the vegetable research and development levy and funds from the Australian Government.

Project Number: VG15049

Ag robot RIPPA was on display at the Riverina Vegetable Innovation Field Day.

EXTENSION UPDATES: GIPPSLAND, VICTORIA AND NEW SOUTH WALES

The National Vegetable Extension Network (VegNET) has expanded to include Victoria's southern Gippsland region, with a launch taking place at the Gippsland Growers' Forum in July. Meanwhile, the Riverina region of New South Wales hosted an innovation field day which was well-attended by vegetable industry members. VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

GIPPSLAND GROWERS GATHER FOR PROJECT LAUNCH

The southern Gippsland region was officially welcomed into the wider National Vegetable Extension Network (VegNET) at a launch event held in conjunction with the Gippsland Growers' Forum at Korumburra on 27 July.

Around 50 people attended the launch and heard from Vegetable Industry Development Officer for Gippsland Shayne Hyman, East Gippsland Food Cluster Executive Officer Dr Nicola Watts and Cluster Deputy Chair Damien Gannon. Joining the trio at the launch was South Gippsland Shire Council Mayor Ray Argento.

There was a 'snapping of the snowpeas' to mark the occasion and Cr Argento noted that the vegetable industry was important to Gippsland, and those already based in the region needed to ensure its continued growth. The progression of the urban sprawl meant growing operations such as Schreurs & Sons (currently based in Clyde) were gradually relocating to Gippsland, where the region's soil and climate made it easier for vegetables to adapt to their new environment.

VEG PRESENTATIONS

Following the formalities, the Forum got underway with a number of presentations. AUSVEG Biosecurity Officer Callum Fletcher provided an update on the discovery of tomato-potato psyllid in Western Australia. He also spoke about 'DIY Biosecurity: Risk management for your farm' and how to develop an on-farm biosecurity plan.

Dr Watts outlined the Gippsland Regional Agrifood Employment Project (GRAEP), an initiative between Jobs Victoria's Employment Network and the East Gippsland Food Cluster, which aims to connect jobseekers and potential employers in agribusiness. Carl Larsen from RM Consulting Group spoke about VegPRO (VG15028), a strategic levy investment project under the Hort Innovation Vegetable Fund, which provides training programs custom-made to suit growers' needs.

The final presenter of the afternoon was Anton Zytnik, Senior OHS/WorkCover Consultant with the Victorian Chamber of Commerce. Using the vegetable industry as an example, Mr Zytnik spoke about the risks, reputation and hidden costs of an unsafe workplace.

INNOVATION IS THE WORD IN THE RIVERINA

A gloomy sky and piercing winds could not dampen the spirits of around 100 growers and industry members who flocked to Griffith, New South Wales for the Riverina Vegetable Innovation Field Day on 19 July.

On-farm biosecurity was a clear priority for Troy and Jennifer Millard, who hosted the event on their research, development and extension farm. Designated parking was available for all visitor vehicles and a footbath replaced a red carpet at the farm entrance.

Matt Plunkett, Vegetable Industry Development Officer for New South Wales, welcomed attendees and provided an overview of VegNET's priority areas for extension, including pest and soil borne disease management, cover crops, low-cost protected cropping, robotics, spray application techniques and biosecurity.

TECHNOLOGY STEALS THE SHOW

Innovation was the theme of the field day, with a range of agricultural technology on display.

University of Sydney Research Fellow Dr Zhe Xu presented the keynote address on RIPPA (Robot for Intelligent Perception and Precision Application). It was the first time RIPPA visited the growing region and attendees were keen to see the robot in action on a trial broccoli plot.

This was part of a broader trial, which evaluated specific functions of the robot and intelligent systems. This included autonomous operations, green-on-green weed detection and mechanical weeding using techniques that can be 'trained' to recognise weeds of various sizes and species, as well as mechanical weeding and data collection at night. RIPPA collected a large amount of data that will support further technology development.

John Cochrane from Glynncorp Electrical then presented on the use of solar power technology on-farm, including solar thermal options, small-scale and large-scale pumping systems, battery storage and off-grid systems.

GETTING A BIRD'S-EYE VIEW OF THE FARM

Deakin University's Dr John Hornbuckle also provided an overview of drone technology in vegetable production. He said agriculture was the second biggest industry for drones after infrastructure and a range of options were available for growers.

Dr Hornbuckle explained the differences between multispectral technology – often used for nitrogen management as it provides a more detailed image of the crop – and thermal technology for irrigation management. He advised that growers who are looking to invest in drone technology should think about the end use application and then choose a drone that meets these requirements.

Rombola Family Farms Agronomist Trent Sosso said the presentation on drone technology attracted him to the event.

"Technology is moving forward and we need to move forward with it and embrace it," he said.

"The way of the future is sensory robotics, and with better use of drone technology we can improve where we are going."

R&D | Drive Train

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

The project *Regional capacity building to grow vegetable businesses – national coordination and linkage project* 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: VG15049

Cherry Emerick, VegNET Industry Development Officer for Bowen Gumlu and far-north Queensland.

EXTENSION UPDATES: VICTORIAN REGIONS AND FAR-NORTH QUEENSLAND

This edition, the National Vegetable Extension Network (VegNET) provides an update on key focus areas for growers in Victoria's northern, western and south-eastern regions, while in far-north Queensland, growers who are still recovering from Cyclone Debbie are making plans for 2018. VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

VICTORIA

Pest and disease, biosecurity and waste have dominated the VegNET team's activities in Victoria's northern, western and south-eastern regions. In partnership with the AUSVEG biosecurity team led by Jessica Lye, VegNET has delivered a Farm Biosecurity Planning workshop in Victoria.

As discussed in the session, the main reasons why growers should develop a Farm Biosecurity Plan include to:

1. Develop a strategy to reduce the movement of pests on and off farm.
2. Provide confidence to authorities that industry has the appropriate controls in place.
3. Develop a farm level response plan.

Spray application efficacy has also been discussed through a workshop delivered in Clyde in Victoria's south-east, in partnership with Syngenta and the Integrated Crop Protection project (VG13078), a strategic levy investment under the Hort Innovation Vegetable Fund. The main things to consider include:

1. Check your water rate.
2. Use the correct adjuvant.
3. Take the time to calibrate your spray rig.

Post-production management has been in the spotlight, with the VegNET team supporting a Horticulture Code of Conduct Workshop prior to the AUSVEG VIC Annual General Meeting in October 2017.

Meanwhile, turning vegetable product waste into value-added, shelf stable, nutritious and high fibre 'extruded' snacks was on the menu for tasting when the VegNET project partnered with CSIRO. The CSIRO research team has produced extruded snacks, which have impressive nutritional values, including 30 per cent protein in 100 per cent extruded broccoli. Growers at the Werribee South demonstration were able to taste the products, which are currently being assessed for their market demand.

UPCOMING EVENTS

The upcoming 2018 training calendar in partnership with VegPRO (VG15028), a strategic levy investment under the Hort Innovation Vegetable Fund, is firming up and will be advertised through the existing monthly e-newsletter.

Future events and resources will be promoted through the newsletter. Existing resources are also available, including the popular precision agriculture technology in vegetable production systems webinar available at soilwealth.com.au. While online, you should check out the brief video case study of the 2017 Victorian R&D Adoption Award Winner Fragapane Farms (at youtu.be/jsde8JYo8A8), which was developed and supported by the VegNET project.

Feel free to get in contact with any of VegNET Victoria's field officers:

- Northern region – Ken Orr, 0428 502 936 or ken.orr54@bigpond.com.
- Western region – Clinton Muller, 0498 192 596 or clintonm@rmcg.com.au.
- South-eastern region – Carl Larsen, 0419 622 393 or carll@rmcg.com.au.
- Social media: Twitter @GrowingVegBizs
- Visit the website: growingvicveg.com.

BOWEN GUMLU AND FAR-NORTH QUEENSLAND

Far-north Queensland growers are making their plans for the 2018 season, but as always, in such a tropical and volatile weather climate, much is in the hands of the approaching cyclone season and the water allocation amounts, which won't be known until the next quarter.

Growers have set aside time from their busy season to keep up-to-date through a series of workshops ranging from biosecurity and Freshcare, to cyclone recovery seminars and regulation.

The grower response to such sessions was beyond expectation. It provides the region with a proactive stance on a range of topics so that our growers are better informed and can plan the coming months with greater certainty.

For those who haven't been able to make it to workshops on one of the region's most important subjects, Workplace Health and Safety (WHS), Hort Innovation has provided an easy-to-use carrot-shaped USB containing a wealth of information including forms, a suite of tools and training resources.

2017 SEASON IN REVIEW

The first half of 2017 was one of the most challenging for decades, with cyclonic conditions ripping apart farms during the planting season and the prices of some commodities falling sharply from an early summer, causing oversupply.

A number of growers are still recovering after Cyclone Debbie, which hit the Bowen region almost a year ago. Growers are resilient and Mareeba growers know well the damage that cyclones can cause after suffering such weather events in previous years.

Now is the time to contact Cherry Emerick, Industry Development Officer for Bowen Gumlu and far-north Queensland, if you would like to know about any assistance on offer and what R&D innovations can be of support and enhance your current farming system to a more sustainable future.

BIOSECURITY BEST PRACTICE

This year, growers were ever-vigilant for a range of diseases on-farm by placing insect traps, improved signage, staff training, introducing farm visitor protocols and improving management practices to comply with regulation and reduce cross-contamination.

A biosecurity consultant has spoken with stakeholders, using their input to produce a local plan. It will act as a guide to focus all government bodies and sections of the community on a whole-of-region action plan to protect what is a multi-million dollar industry.

SOUTH KOREA EXPORT MISSION

Recently, Cherry was part of a delegation of Queensland vegetable growers and stakeholders that travelled to Seoul to gain a greater insight into the supply chain and identify opportunities for exporting Queensland vegetables to South Korea. The relationships that were established may provide strong industry outcomes for Queensland and Australian vegetable growers in the near future. Importers, supermarket fresh produce buyers and trade officials were impressed with the high quality of produce that was presented, reinforcing the clean, green image that our industry is renowned for.

How to keep in touch:

- Industry Development Officer: Cherry Emerick, 0427 701 225 or idm@bowengumlugrowers.com.au
- Facebook: facebook.com/bowen.growers
- Online: bowengumlugrowers.com.au/home

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

Regional capacity building to grow vegetable businesses – national coordination and linkage project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG15049

Hort Innovation Strategic levy investment | VEGETABLE FUND

INDUSTRY IN THE MEDIA

The announcement of AUSVEG's intention to consult with industry to raise the Emergency Plant Pest Response (EPPR) levies for the vegetable and fresh potato industries dominated media coverage in late 2017.

AUSVEG CEO James Whiteside appeared in print media and said the decision, if approved, will contribute to paying costs relating to tomato potato psyllid eradication activities and the Transition to Management program. Mr Whiteside noted that federal and state governments were also contributing to the response.

AUSVEG National Manager – Science and Extension Jessica Lye also featured on radio saying that the EPPR levies are the industry's most important means of contributing to emergency plant pest responses.

AUSVEG CHAIR SETS FUTURE VISION

New AUSVEG Chair Bill Bulmer shared his vision for the future of the Australian vegetable industry in print media in December. With AUSVEG increasing its advocacy work in the new year, particularly through the appointment of a new National Public Affairs Manager, Mr Bulmer said he looks forward to working to help the vegetable and horticulture industries enter a prosperous and productive new era.

He said a stronger vegetable industry was a priority for AUSVEG and he was confident the company would lead the way in the development of a strong and united horticulture advocate.

ECONOMIC TRENDS

Following the release of data from the Australian Bureau of Agricultural and Resource Economics and Sciences, which showed that average farm cash income for vegetable growers had risen to its highest point in 10 years, Mr Whiteside appeared in print media to comment on the findings. He noted that while this is a positive sign, many smaller growers are struggling to stay competitive in an increasingly consolidated industry.

INFO

Communication of R&D projects in the Australian vegetable industry has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG15027

Hort Innovation Strategic levy investment | VEGETABLE FUND

Banna grass windbreaks are established near vegetable crops in the Northern Territory to provide a functioning eco system for beneficial insects and predators such as spiders and frogs. Image courtesy of NT Farmers.

Adam Goldwater from Applied Horticultural Research captivates participants at the postharvest workshop in South Australia.

EXTENSION UPDATES: NORTHERN TERRITORY AND SOUTH AUSTRALIA

In this edition, the National Vegetable Extension Network (VegNET) examines the importance of bio-refuge barriers for Integrated Pest Management in the Top End, while VegNET SA has a new home and is looking ahead to another productive year. VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

NORTHERN TERRITORY

Why in the Northern Territory are we spending so much time on our Banna grass windbreaks and bio-refuges?

That's something we ask a lot when we're out in the heat of the NT wet season, with the humidity building just before a monsoonal downpour. Establishing the barrier grass is hot and sweaty work in the wet, but the perfect weather for bugs to flourish.

What we've learnt thus far is that these refuges are an essential part of our Integrated Pest Management (IPM) program in more ways than one. Bio-refuges are the critical link in the chain to the IPM program being developed by VegNET NT. Often the crops are grown in fully cleared paddocks that have no permanent diverse vegetation nearby to act as a source or home to beneficial organisms.

Providing a functioning eco system in a metre-wide row provides a sanctuary that allows beneficial bugs and general predators, such as spiders and frogs, to flourish. What VegNET has found is that the Northern Territory already has a wide range of beneficial organisms in the environment.

The trick is to have enough of them in close proximity to the crop when they are needed. Hoverfly and ladybirds are excellent examples of this – they build up in numbers on the maize aphid, which is not a pest of most vegetables, but is found in these tropical grasses. These predators are then present in substantial numbers when other pest aphids try to establish themselves in the vegetable crops.

AN IMPORTANT BARRIER

The barrier grass row serves as a filter where the windborne pests land and a majority are taken out by these beneficial bugs before they can have any substantial impact on the crop being grown.

The Banna grass has other benefits as a wind break, reducing wind damage and evapotranspiration from the dry south easterlies that blow through the Top End growing season.

They protect against over-spraying from other crops nearby and spray drift carried by the wind from neighbouring properties.

Why Banna grass? Because it's very easy to establish. To produce runners, just add water and it will shoot from any of the nodes. Once established, management is relatively low; just slash beside it and run a mower over the row at 50 centimetres once a year to maintain the ideal height. It grows just as vigorously as most weeds do in the Top End and the torrential monsoonal downpours don't hold it back.

The hardest argument of all is to convince farmers that these rows of tall – sometimes a little untidy – cane grasses are not a cost or a waste of space, but a critical tool in best practice management for the Top End vegetable farming.

HOW TO KEEP IN TOUCH:

- Industry Development Officer: Laura Cunningham, 08 8983 3233 or ido@ntfarmers.org.au.
- Facebook: facebook.com/NTFarmersAssociation.
- Online: ntfarmers.org.au.

SOUTH AUSTRALIA: NEW BEGINNINGS

It's been a fresh start among the fresh veggies at the South Australia Produce Markets in Pooraka for the team at AUSVEG SA this year.

"We moved our office from the Adelaide CBD in December and it's been a success in so many ways," VegNET South Australia Industry Development Officer (IDO) Hannah McArdle said.

"Now we are easily accessible to growers and it has been great to see so many more people attending our workshops."

Some of the most well-attended workshops have featured AUSVEG National Manager – Science and Extension Dr Jessica Lye, who provided participants with a greater understanding of the threat of the incursion of cucumber green mottle mosaic virus (CGMMV), and a management plan to tackle the plant pest.

To prepare for another serious biosecurity threat, the tomato potato psyllid (TPP), VegNET SA held successful workshops and information sessions to help South Australian vegetable growers understand the threat and management of this tiny sap-sucking, winged insect that affects capsicum, chilli and eggplant crops.

The Postharvest Roadshow with Dr Jenny Ekman and Adam Goldwater from Applied Horticultural Research (AHR) was another winner. Over 40 people at several venues enjoyed and benefited from the exchange of ideas on diverse topics, from cooling systems to the physiology of a zucchini.

"We are working closely with Sophie Lapsley from VegPRO, the national vegetable training initiative, to ensure our vegetable growers are receiving the training and information they want," Hannah said.

Growers can look forward to an irrigation workshop in May and the renowned VegInnovations (for value-adding to vegetables) workshop, which is scheduled for August.

To sign up for events, or hear more about VegNET in South Australia, please contact Industry Development Officer Hannah McArdle:

- Phone: 0408 475 995.
- Email: hannah.mcardle@ausveg.com.au.
- Twitter: @AUSVEG_SA or @hannahmcardle11.

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

Regional capacity building to grow vegetable businesses – national coordination and linkage project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG15049

Bundaberg growers watch cos lettuces being harvested at Koala Farms in Queensland.

Attendees at the Horticulture Code of Conduct Information Workshop at Carnarvon, Western Australia.

EXTENSION UPDATES: BUNDABERG AND WA

Through the National Vegetable Extension Network (VegNET) project, Bundaberg Fruit and Vegetable Growers has been working closely with industry groups to maximise grower engagement in the Wide Bay-Burnett region, while over in the west, vegetablesWA has been busy with grower workshops and its Grower Group Tour and Industry Summit. VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

ENGAGING WORK IN THE WIDE BAY-BURNETT REGION

Since the VegNET project commenced, Bundaberg Fruit and Vegetable Growers (BFVG) has coordinated small-group grower workshops, undertaken one-on-one farm visits with growers, held a two-day bus tour which included farm visits, paddock walks, and an industry breakfast, and recently adopted some new social media tools – a VegNET blog and Instagram feed. Interest from growers and industry stakeholders has been impressive, involving 130 growers, 57 industry stakeholders, 20 government/tertiary representatives, and connecting with almost 300 people through social media (followers and blog 'views').

BFVG considers collaboration with other industry bodies, such as Growcom, as key to engaging effectively with growers. The two *Horticulture Code of Conduct Roadshow for Growers* workshops that were held in the Wide Bay-Burnett region, for example, were a collaborative effort between Growcom and BFVG.

Growcom and the Australian Competition and Consumer Commission (ACCC) presented on this very important piece of legislation to assist growers in understanding their rights and responsibilities under the code. These workshops were extremely well attended by both growers and industry stakeholders, involving both private and government industry representatives.

INDUSTRY WORKING TOGETHER

The *Postharvest Management of Vegetables* workshop in September is another example of the effectiveness of collaborating to achieve a high level of industry engagement. This workshop featured industry experts from Applied Horticultural Research (AHR) and Orora Packaging, and involved practical, hands-on presentations by AHR, a behind-the-scenes tour of the Orora Packaging facility in full operation and networking opportunities.

This workshop was attended by more industry and supply chain stakeholders than growers, and nearly a quarter of the participants represented tertiary institutions. Feedback from participants was extremely positive, with 94 per cent of participants scoring the workshop as being "beneficial to very beneficial".

To find out more or to connect with BFVG, follow the VegNET blog at bfvgblog.wordpress.com, like us on Instagram (@bundyfruitveggrowers) and Facebook (@BFVG4670), or subscribe to Fresh Pickings (a fortnightly e-newsletter).

For more information, please contact VegNET Industry Development Officer Michelle Haase at michelle.haase@bfvg.com.au or BFVG Managing Director Bree Grima at bree.grima@bfvg.com.au or phone 07 4153 3007, or visit bfvg.com.au.

ALL HAPPENING IN THE WEST

As the rain clouds fade away and the sun is finally allowed to shine, the vegetablesWA team has been looking forward to a rather busy end of the year. With the warm weather came a flurry of activity in the form of workshops, a summit and a grower tour.

Our Horticulture Code of Conduct Information Workshops have been up and running, and the south west region is where it all began. The team then headed north to the red dirt and warmth of Carnarvon and Geraldton before returning to Gingin, Perth's metropolitan region, Baldivis and Myalup. vegetablesWA Chief Executive Officer John Shannon delivered the workshops with the support of Market Development Manager Claire McClelland, Industry Extension Officer – Vietnamese Truyen Vo and Industry Extension Officer – English Sam Grubisa. The transfer of information in regards to the Horticulture Produce Agreements and follow-up support of our growers is of primary importance to the vegetablesWA team.

VALUABLE NETWORKING FOR GROWERS

The end of October brought to the fore one of the highlights of the vegetablesWA calendar: our Grower Group Tour and Industry Summit, which was held on 27 October.

The VegNET team and growers boarded a bus to Sativa Farms in Gingin for a field walk, and this was followed by a tour of Loose Leaf Lettuces' processing facility where a Q&A session with owners Maureen, Barry and Kevan Dobra was held. The group then returned to Perth, where the Industry Summit took place.

At the Summit, Allan McKay from the South Australian Research and Development Institute (SARDI) provided an overview of *Adoption of precision systems technology in vegetable production* (VG16009), a strategic levy investment under the Hort Innovation Vegetable Fund, while Jennie Francheschi from Fresh Produce Alliance provided first-hand information about value-adding.

Bryn Edwards and Paul Omodei from Planfarm then explained its benchmarking project, and Dr Jessica Lye from AUSVEG gave an integral biosecurity presentation. Each session was followed by a panel discussion which allowed the audience to ask questions of those in the know. The day concluded with networking and canapes for attendees and presenters.

For further details on vegetablesWA events, please contact Rebecca Blackman on 08 9481 0834 or email rebecca.blackman@vegetableswa.com.au.

R&D Drive Train

INFO

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

Regional capacity building to grow vegetable businesses – national coordination and linkage project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG15049

The vegetablesWA Leafy Variety Trial was held at the Loose Leaf Lettuce Company and attracted growers, seed company representatives, resellers and input suppliers. Image courtesy of Grant Swan.

SPOTLIGHT ON SOIL HEALTH: DISEASE MANAGEMENT, BIOFUMIGATION AND REDUCED TILL

The Soil Wealth and Integrated Crop Protection (ICP) project works with growers nationally to put soil management and plant health research into practice. This edition provides an update from demonstration sites in Western Australia, and outlines practical tips and tools on biofumigation and reduced till in vegetable production. Project VG16078 is a strategic levy investment under the Hort Innovation Vegetable Fund.

UPDATE FROM CARNARVON, GINGIN AND MYALUP, WA

Dr Doris Blaesing and Dr Len Tesoriero from the Soil Wealth ICP team headed to Western Australia recently with a full program of events and trial updates.

The week was organised by the National Vegetable Extension Network (VegNET) team from vegetablesWA, with the first stop in Carnarvon. Here, Doris and Len engaged with growers on better managing soilborne diseases, soil health, crop nutrition and the importance of area wide biosecurity and farm hygiene. In addition to the evening workshops, a number of farms were visited during the day.

It was then off to the Gingin project demonstration site, which is looking at a new humus-like product (Novihum), set up by Center West Exports. This column will provide updates on the trial over the coming months.

Doris and Len also attended the vegetablesWA Leafy Variety Trial at the Loose Leaf Lettuce Company and engaged with growers, seed company representatives, resellers and input suppliers to collect new information and project ideas. Len reported on soilborne disease trials with baby leaf spinach (project VG15009 – *Improving soilborne disease diagnostic capacity for the Australian vegetable industry*), while Doris introduced the new Phase 2 Soil Wealth ICP project.

Next up was a visit to the University of New England (UNE) cover crop trial at Ivankovich Farms in Myalup. This is a great example of cooperation between researchers and industry, with Chris Fyfe from the UNE leading the project alongside contributions from the cover crop project; South Australian Research and Development Institute (SARDI) disease diagnostics; Soil Wealth ICP; and importantly agronomist David Gray (monitoring), and the host grower and team on-farm.

The trip concluded with a visit to Swan Systems to investigate smart irrigation management technology, and Organic Farming Systems to learn about new biological products.

These discussions will continue with potential linkages to the demonstration sites in Western Australia and other states.

BIOFUMIGATION IN FOCUS

Biofumigation is the use of specialised cover crops, which are grown, mulched and incorporated into the soil prior to cropping. High biomass, especially roots, can provide the traditional benefits of green manure crops and, if done right, naturally-occurring compounds from the biofumigant plants can suppress soilborne pests, diseases and weeds.

A fact sheet has been developed by the project team that covers common biofumigant crops, benefits and how to best manage them in your rotation.

REDUCED TILL IN VEGETABLE PRODUCTION

Reduced till is a system change that relies on keeping the soil in a healthy condition through the use of permanent beds, controlled traffic, cover cropping and crop rotations rather than frequent cultivation.

A fact sheet is available on this topic and outlines the benefits and challenges of reduced till, including a case study from the Cowra, New South Wales demonstration site.

You can access all the resources in this article, as well as news and events from around the country, at soilwealth.com.au.

INFO R&D

For more information, 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

Growers attend a farm walk at Houston's Farm in Cambridge, Tasmania.

EXTENSION UPDATES: TASMANIA AND NEW SOUTH WALES

In this edition, Tasmania Industry Development Officer Emma Egan and her New South Wales counterpart Matthew Plunkett provide an update on the activities that have been undertaken in their respective states through the National Vegetable Extension Network (VegNET). VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

TASMANIA

In April 2018, VegNET facilitated a Vegetable Industry Research, Development and Extension (RD&E) Prioritisation Meeting in partnership with the Tasmanian Farmers and Graziers Association. More than 30 growers, researchers, advisers and processors gathered in Port Sorell to discuss future needs of the industry and regional RD&E priorities.

The purpose of the workshop was to seek input from growers, researchers, processors and advisers on research needs, so that projects can be developed to address these needs. RD&E ideas put forward encompassed a range of topics, from quality assurance systems to measuring soil health and irrigation supply gaps to Integrated Pest Management.

The identified RD&E outcomes provide direction for industry stakeholders, including researchers, to develop projects that address regional industry priorities.

A Women in Vegetable Businesses Lunch was also held in April with Allison Clark of Optimum Standard, which provided the opportunity to learn about product development and consumer insights. In the south, a farm walk was held at Houston's Farm to visit a cover crop trial and local growers also attended an informal discussion about vegetable diseases.

We are currently seeking expressions of interest for a tour to Victoria in early August 2018. The tour will provide the opportunity to visit markets, logistics companies and farm businesses in Melbourne and surrounds.

FUTURE EVENTS

Upcoming VegPRO training courses include chemical handling and irrigation training. Head to vegpro.com.au for further details.

If you're interested in attending the Victorian tour or would like to subscribe to the VegNET Tasmania mailing list, contact Industry Development Officer Emma Egan on 0448 214 745 or emmae@rmcg.com.au.

NEW SOUTH WALES

The 2017-18 financial year has been a busy one for the New South Wales VegNET team, delivering 40 events that attracted more than 800 participants across the Greater Sydney, North Coast and Central Tablelands regions.

VegNET NSW Industry Development Officer Matthew Plunkett said the events centred on growing areas of interest for the vegetable industry including protected cropping, pest and disease management, spray application efficiency, soil health and biosecurity.

"The Greater Sydney Local Land Services Demonstration Farm has been a huge centre point for many of our events, including a series of successful cover cropping and low cost protective covers farm walks," Matt said.

"We also hosted our first group of Chinese growers at the farm to showcase the results of a successful parsley variety trial."

UPSKILLING GROWERS

Other highlights include the delivery of targeted training to Sydney-based Vietnamese vegetable growers on Integrated Pest Management and greenhouse hydroponics. The group was also taken to an Austral protected cropping facility, which features an efficient and effective water recycling system that has dramatically decreased input costs.

"We have had several growers report on-farm practice change as a result of this training, and over the next six months we will provide further technical support to encourage more of this," Matt said.

Following on from that event, VegNET NSW teamed up with Protected Cropping Australia to run a sold out two-day tour of thriving protecting cropping enterprises throughout the Central Coast.

Participants were taken to low-, medium- and high-tech facilities including the five-hectare Family Fresh Farms at Somersby and the New South Wales Department of Primary Industries research facility at Ourimbah.

Well-known plant pathologist Dr Len Tesoriero took part in the tour, providing the latest information on soilborne diseases with a focus on grafting to control fusarium wilt in cucumbers.

With 10 more events set to be delivered in the next 12 months, please contact Matt on 0428 978 390 to find out more.

INFO R&D

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

Regional capacity building to grow vegetable businesses – national coordination and linkage project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project Number: VG15049


Growers discuss water availability in Stanthorpe, Queensland.


Growers pictured observing a capsicum crop at Kirra Pines in Queensland.


Capsicums in a packing shed in Queensland.

EXTENSION SPOTLIGHT ON SOUTHERN QUEENSLAND AND GIPPSLAND

In this edition, Southern Queensland Industry Development Officer Pat Salter and his Gippsland counterpart Shayne Hyman provide an update of R&D workshops in their regions, and future events occurring through the National Vegetable Extension Network (VegNET). VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

SOUTHERN QUEENSLAND

As we roll into 2018, the Southern Queensland region of VegNET is focusing on facilitating a number of training/workshops from current levy-funded research and development projects, which are designed to continually broaden and strengthen the vegetable industry.

With the delivery of the young grower tour in 2017, we are still seeing a significant amount of collaboration with the next generation of growers – not only within their own growing regions but also branching out into other areas. In March 2018, the Stanthorpe region extended an invitation to the growers of the Fassifern and the Lockyer Valley to attend farm tours across the region. This experience provided an insight into the different farming practices between the regions and addressed the limitations that the growers face in Stanthorpe.

Under the VegNET project, the Lockyer Valley Growers Inc. is investing time in facilitating the delivery of best-known practice training programs to all horticultural growers within the region. This initiative is driven by growers directly due to their hunger to expand their knowledge and remain current with the latest research. In collaboration with Hort Innovation and the VegPRO project, the industry can assist with the delivery of a flexible training calendar for the region.

FUTURE EVENTS IN THE REGION IN MAY AND JULY

- Industry workshop for Logan growers, focusing on building resilience within their businesses and bouncing back after a significant weather event. This workshop is being supported by Growcom, Rural Solutions Queensland and other industry partners and will be held in May 2018.
- Lockyer Valley Growers' barbecue is scheduled for 16 May 2018.
- Chemical handling training for the Stanthorpe region and VegInnovation 2018 Regional Roadshow for the Lockyer Valley is scheduled for July 2018. Both of these events are being delivered under VegPRO.

For more information on future events in the region, please contact Industry Development Officer – Southern Queensland Pat Salter on 0456 956 340 or email ido@lockyervalleygrowers.com.au.

GIPPSLAND

Vegetable growers across Gippsland, from Phillip Island's hydroponic producers through to those growing murnong around Mallacoota and every other grower in between – are warmly invited to get involved in Gippsland's 'year of training' for the vegetable industry. VegNET Gippsland is working side-by-side with VegPRO, the vegetable industry's national training initiative, to deliver the first class training that growers have been asking for at no cost. This training will be funded by the vegetable research and development levy and contributions from the Australian Government.

March and April saw the Horticulture Code of Conduct Information Sessions run in Lindenow and Maffra while Irrigation Basic Skills Training was held on-farm at Newry, and a HARPS Awareness Session for growers across Victoria was staged at the Melbourne Markets in Epping.

More to come in May and June

- Communication by influencing and negotiating over two full days – Thursday 31 May and Thursday 7 June at Sale (venue TBC).
- Chemical handling for southern Gippsland at Wonthaggi (venue TBC) over two full days – Tuesday 5 June and Wednesday 6 June.
- Postharvest Management of Vegetables for eastern Gippsland at Lindenow (venue TBC) and for southern Gippsland on Wednesday 4 July (location TBC).

Also, don't forget all the learning that takes place at Hort Connections 2018 in Brisbane from 18-20 June!

FURTHER TRAINING OPPORTUNITIES

July and August won't disappoint with the rollout of training in process mapping in eastern and southern Gippsland, chemical handling in Lindenow, pest and disease in baby leaf vegetables, and the much sought-after VegInnovations workshop in Sale.

The second Gippsland Women in Horticulture Advance will be held in the Latrobe Valley on Thursday 23 August.

It's time to mark the dates in your mobile calendar, work planner or personal diary, then watch out for details on how to register in VegNET Gippsland's monthly eNews. You can also call Industry Development Officer Shayne Hyman on 0417 330 081 or send an email to shayne.hyman@eastgippslandfoodcluster.com.au to subscribe to the newsletter to find out more information.

INFO R&D

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

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Project Number: VG15049

Hort Innovation Strategic levy investment | VEGETABLE FUND

vegetablesWA Vegetable Industry Development Officer Sam Grubiša with an eggplant crop at Kuzmicich Farm in Carnarvon, WA.

MEET THE VEGETABLE INDUSTRY'S EXTENSION OFFICERS: SOUTH-EASTERN VICTORIA AND WA

This is the first in a series of profiles of Vegetable Industry Development Officers, who have the job of effectively extending R&D and relevant information to growers through 10 regionally-based extension projects that are part of the National Vegetable Extension Network (VegNET). VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

VegNET South-Eastern Victoria Field Officer Carl Larsen.

MEET CARL LARSEN, FIELD OFFICER – SOUTH-EASTERN VICTORIA

Science communication and sustainable agriculture are my two passions. Coming from a rural background in western Victoria, I've always been involved in agriculture in some way. This has allowed me to work in research positions and more recently consultancy to understand the practical implications of policy and science on communities and agriculture.

My involvement in the horticulture sector has spanned vegetables, apples and pears, stone fruit, strawberries, citrus and wine grapes, working on a wide variety of research, development and extension topics over almost 10 years. This has predominately related to farm productivity, resource management, strategic planning, evaluation and business case development for government agencies, industry groups, Research and Development Corporations and individual farmers.

Working with people to solve problems and putting research into practice are some of the key highlights of the current VegNET project that RM Consulting Group (RMCG) is delivering. I've really enjoyed working with growers and other industry representatives on the sheer breadth of issues this dynamic industry faces – ranging from productivity, resource use, business management, markets and consumers, as well as technology. There's a real drive for innovative technologies with the growers we work with, such as precision agriculture and IoT (internet of things), as well as adapting some practices from other industries and the past, for example cover cropping and organic amendments.

The main opportunities VegNET provides growers and the Victorian industry is connection to the latest research information, advice and practical know-how. We're doing this by:

- Meeting the needs of the growers in each region: there are always differences in what growers need, when and how, and we're tailoring our approach in the north, west and south-east to suit these differences.
- Offering practical training and events: workshops, grower groups, webinars, one-on-one farm visits.
- Keeping you informed through fact sheets, technical notes, case studies and communications such as e-newsletters, the AUSVEG VIC website, social media, local newspapers and SMS alerts.

One of the great achievements of our VegNET project is not only connecting levy payers to research that has been completed, but research that is currently underway. The process of linking growers with researchers delivers great benefits for the industry – more informed research, delivering on the biggest pain points and gain points of growers.

Want to be involved in VegNET in your region or find out more about how the program can benefit you? Get in touch with me at carll@rmcg.com.au.

INTRODUCING WA'S SAM GRUBIŠA

For 10 years previous to my appointment as the Western Australia Vegetable Industry Development Officer, I worked on the family farm. I tried my hand in other areas such as pathology, however when growing is in your blood, the pull of the land is too strong to ignore.

As the first daughter in three generations to pass through the farm gates, I was treated no different to the sons who came before me. I was thrown into all areas of the farm. This ranged from ground prep, planting, harvesting and packing, through to being the delivery truck driver and the face-to-face contact with our traders. My days often started in the dark and finished when the sun was setting. It wasn't easy, but I loved it.

As my passion for the land grew so did my network of contacts, interest in the larger industry and the factors that influenced it. This led to me becoming a vegetablesWA Committee of Management member. When the position of Industry Development Officer became available, I thought, "I can do that and make an impact!" The vegetablesWA CEO and Committee of Management President agreed and 18 months on, I have made the position my own. With my grower background, I am able to appropriately match growers with the R&D and information relevant to their crop and innovation objectives. Also, being able to convey the perspective and priorities of growers during my interactions with colleagues from vegetablesWA, the VegNET project and other industry bodies allows me to express the complexity and depth of knowledge those on the land possess. This in turn aids in providing a more targeted and tangible approach from industry to grower.

Covering an area from Broome to Albany and crops from artichoke to zucchini, my curiosity is never dulled. There is always a new farm to visit, crop to understand, opinion to consider or experience to share. The extensive network of skill and knowledge that is VegNET means there is never a shortage of research and information, and as I live in the biggest state in the country I doubt I'll run out of people to engage with.

The opportunities to learn from my colleagues within vegetablesWA combined with the support and R&D offered through the VegNET project will hopefully allow me to continue engaging with, supporting and reinforcing the innovation and hard work of the WA grower.

For more grower perspective, you can contact me at sam.grubisa@vegetableswa.com.au or 08 9486 7515.

INFO R&D

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

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Hort Innovation Strategic levy investment | VEGETABLE FUND

L-R: Jo van Niekerk, Maree McPherson, Emma Germano, Dr Nicola Watts, Dr Jessie Horton and Kate Wallis at the Gippsland Women in Horticulture event.

UPDATE ON VEGETABLE EXTENSION NETWORK ACTIVITIES

Recently, the Tasmanian branch of the National Vegetable Extension Network (VegNET) collaborated with the Tasmanian Institute of Agriculture (TIA) to deliver the Vegetable Research Facility Open Day, while in Churchill, Victoria, the second annual Gippsland Women in Horticulture event brought women together to celebrate participation, productivity and innovation in the region.

The Tasmanian Institute of Agriculture (TIA) Vegetable Research Facility once again held its Open Day, with delegates arriving at the Forthside site on 10 October 2018 to hear from speakers and see the latest in field R&D.

This year's event was hosted by TIA in conjunction with the National Vegetable Extension Network (VegNET Tasmania – VG15046) project.

The discussion throughout the day focused on farm production practices including research into seed management; biosecurity; soil health; and strip tillage.

Mark Boersma from TIA and Dr Doris Blaesing from RM Consulting Group opened the biosecurity discussion with an overview of managing risks on-farm. This included the importance of soil health and the value of knowing the difference between good seed and bad seed.

Harvest Moon Agricultural Director Mark Kable shared his on-farm experiences of improving soil health, such as the process of fixing the soil's organic matter and pH as well as the positive impact that the change to controlled traffic farming has delivered.

Blue Moon Potatoes Director Darryl Smith – the first Western Australian grower to find tomato-potato psyllid (TPP) on his property – described the impact that the TPP incursion had on growers in the initial stages. Meanwhile, AUSVEG Biosecurity Adviser Dr Kevin Clayton-Greene dissected the lessons learnt from the response to the incursion.

After lunch, attendees headed to the field to hear from researchers about a range of projects, including integrated weed management in vegetable production; biofumigation and cover crops in one of the world's longest-running research trials; and the impact of row spacing on processing pea production.

The paddock walk was a fantastic opportunity for growers and agronomists to see R&D in action, talk to researchers about their projects, and network with other industry members who are interested in agronomy.

WOMEN IN HORT: PUTTING LEADERSHIP ON THE AGENDA

Held on 23 August 2018 in Churchill, VegNET Victoria – Gippsland (VG15047) hosted the annual Gippsland Women in Horticulture event. Around 30 members of the local vegetable industry were in attendance and they heard from a number of inspiring speakers.

Each presenter highlighted past challenges and opportunities for female leaders in the Gippsland region, as well as the importance of understanding and recognising what drives people to lead.

The event also highlighted that leadership is not simply a position in an organisation, but a way of thinking and an approach to every aspect of life. It helped attendees think about how to identify situations in their workplaces where they should take initiative and lead, as Boomaroo Nurseries Territory Manager Jo van Niekerk observed: "We all step in and out of leadership every day."

I Love Farms Managing Director and Victorian Farmers' Federation Horticulture Group President Emma Germano told her story of overcoming challenges in the horticulture industry, and her advice for the audience was simple: just do it.

"Don't think about the reasons you should be counted *out*, think about the reasons why you should be in counted *in*," Emma said.

Many speakers, including East Gippsland Food Cluster Chief Executive Officer Dr Nicola Watts, discussed the importance of telling provenance stories around seeds, plants and food from Gippsland.

After lunch, participants broke into groups to discuss special interest areas including health and wellbeing; leadership and advocacy; and organic and local food. For 30 minutes, the groups discussed things that were being done well, highlighted areas that require improvement and brainstormed ways to overcome issues affecting future success.

There were many ideas to emerge from these varied groups, including ways to engage with growers in the mental health space; encouraging people to attend extension events so they can understand what is happening in their industry; and ideas around supporting and mentoring local businesses to develop their own local systems.

Once again, this event gave participants the opportunity to reflect on and celebrate Gippsland's horticulture industry and raise awareness of the opportunities available for women in the industry, as well as provide valuable networking opportunities for industry members.

INFO R&D

Regional capacity building to grow vegetable businesses – national coordination and linkage project 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: VG15049

Hort Innovation Strategic levy investment | VEGETABLE FUND

IMPLEMENTING TECHNOLOGY TO MEET FRESH PRODUCE REQUIREMENTS

There are many challenges facing the fresh produce sector, including increasing costs and compliance requirements as well as fewer resources. To assist producers in their decision-making, a resource planning system has been developed with a focus on efficiency, reducing labour costs, meeting quality assurance requirements and ensuring traceability throughout the supply chain.

Since its humble beginnings in Haymarket, Sydney in 1956, N&A Group has expanded to include growing, packing, distribution and export of fresh produce, including organics.

As the company can attest, the fresh produce industry is notoriously fast-paced and dynamic. Often, customer orders come through in the morning and need to be delivered that day. To meet these changing needs – and to make accurate pricing decisions amid this volatility – producers need the ability to think on their feet.

N&A Group was finding it difficult to keep up with the pace of change.

"We were very top-heavy on the admin side of things, weighed down by a manual, paper-based system where multiple employees handled transactions multiple times. It wasn't efficient, nor was it sustainable," N&A Group Chief Information Officer Duncan Ritchie said.

Stock control suffered as a result, as did quality control. Without visibility into where orchard deliveries were sitting, the holy grail of 'first in, first out' was difficult to achieve. It was also taking too long to produce management reports, making it difficult to react to problems and rectify them.

"We needed a single touch data entry system to reduce labour costs, greater traceability for compliance with our quality assurance obligations and better visibility throughout our supply chain," Mr Ritchie said.

MEETING EXPECTATIONS

When it comes to technology, the fresh produce industry has unique requirements. The attributes of fresh produce are complex – with classes, sizes and colours dictating price and order quantity. Throw in a multi-faceted operation that covers growing, pre-packing, distribution and more, and the complexity grows.

Given this, N&A Group Chief Financial Officer Tony Kelly set to work exploring Enterprise Resource Planning (ERP) solutions that would cater to the company's specific needs. The company eventually engaged Dialog to implement LINKFRESH™ – a real-time ERP system that provides complete visibility, traceability and accountability for all goods on an ongoing basis.

Dialog worked with the company to initially deploy the system in the wholesale distribution division. Next, it was deployed into its pre-pack business. The organics and export businesses followed, as did the orchards.

"With the support of LINKFRESH™ and Dialog, the implementation was very doable. It was easy to get information into the databases and get up and running," Mr Kelly said.

Since implementing the suite, N&A Group has experienced significant savings and efficiencies. Previously, eight clerical staff were inputting orders each day and labour costs have more than halved through increased automation. Stocktakes also take less than an hour, compared to over four hours previously.

"What we have now is a single-entry system – a transaction is entered once, and that's it. It flows right through all of our stock control and financial systems, giving us information that's current, reliable and up-to-date. We can react quicker to changing conditions and fix things like margins in real-time," Mr Ritchie said.

"Plus, the traceability allows us to track a product from harvest through to storage on a farm, and then to packing and distribution to the end user. It is a true end-to-end system."

INFO

For more information, please visit dialog.com.au or linkfresh.com.

Northern Territory Vegetable IDO Laura Cunningham.


Queensland Vegetable IDO Cherry Emerick.

EXTENDING KNOWLEDGE AND SUPPORT TO GROWERS ACROSS NORTHERN AUSTRALIA

Our series of Vegetable Industry Development Officer (IDO) profiles continues in this edition of *Vegetables Australia*, with Laura Cunningham and Cherry Emerick introducing themselves to readers. After originally living and working in Victoria, Laura and Cherry shifted north to further their careers in horticulture before transitioning to the National Vegetable Extension Network (VegNET) IDO role. VegNET is a strategic levy investment under the Hort Innovation Vegetable Fund.

MEET LAURA CUNNINGHAM

Growing up in south-west Victoria, agriculture was part of life. The family property on the Bellarine Peninsula was where I spent a lot of my time. My family grew fruit, vegetables and had Angus cattle on the property.

I furthered my agricultural career by working in the livestock industry, gaining valuable knowledge through short courses and practical on-farm experience, which helped me learn more about cropping, pasture and pasture renovation, cattle husbandry, handling, selection and sales skills.

I moved to the Northern Territory in 2010, where I transitioned to Rural Services comprising horticultural, agronomy and irrigation sales. My experience in the Northern Territory has taught me a great deal in a very short time, but with the wonderful support of many business owners, I have been welcomed and mentored by very experienced government and industry leaders who have been willing to give up their valuable time to teach me the ways of the NT.

PROBLEM SOLVING

My appointment to the NT Farmers Industry Development Officer (IDO) role, funded by Hort Innovation, is a wonderful opportunity for me to give something back to the community. It has helped to expand my knowledge and career by assisting with problems and issues encountered at the farm level. I have assisted in areas such as pest and disease issues; water licensing and land clearing applications; compliance requirements; and general grower concerns.

My IDO role offers growers a support network and facilitates training programs to the NT's predominately non-English speaking Vietnamese and Cambodian vegetable growers through grower levies. Translators are provided to help achieve best practice standards and certification for food safety requirements.

The VegNET program provides scientific, research-based information in many different contexts to help growers gain the knowledge and confidence required to effectively implement practice change to their businesses for a sustainable industry and more profitable outcomes for the community and the NT economy.

You can get in contact with me on 08 8983 3233 or at ido@ntfarmers.org.au.

INTRODUCING CHERRY EMERICK

I was a hands-on vegetable grower for over 10 years across Queensland and prior to that, Victorian growing regions. My learning has been straight from the paddock to the shed, and each day in my conversations with growers and stakeholders I often draw on experiences. My strengths lay in food safety quality; supply chain management; facilitating projects; and fostering vital relationships locally and nationally within the industry. As well as working closely with growers, I find myself advocating and often providing a growers' perspective to stakeholders.

When the VegNET Industry Development role came up, I couldn't pass up the opportunity to support growers. I arrived in a bit of a whirlwind, with Tropical Cyclone Debbie hitting our region within weeks of commencing the role. Thrown into the deep end, my role very quickly became about supporting, communicating and helping growers recover. It was a stressful period, but it gave me an opportunity to develop some valuable relationships, and I learned a lot very quickly.

SUPPORTING INDUSTRY

I'm passionate about the industry, helping people and trying to support them so they can grow profitable and sustainable businesses. I'm quite zealous about women in horticulture and will take the chance whenever I can to encourage and support them to upskill, step up into leadership roles, and grab the opportunities that are available to them with both hands – this is something close to my heart. I'd also love to see more young people on-farm taking on career roles. With the support of our VegNET Industry Development Officers, it all becomes achievable.

R&D, innovation, value-add and export are key to success and growth for our growers and are the stable menu to my day; however, just like the farm and packing sheds, no day is the same for me. This role is like being on a roller coaster some days. You have your challenges and successes with a few thrills and spills along the way, but working for you (the grower) makes me want to go that extra mile and deliver positive outcomes – with a smile of course.

My area covers Cooktown to Mackay, which encompasses some significant vegetable growing areas and a lot of kilometres. The Bowen Gumlu Growers Association hosts me – Bowen and Gumlu is the largest winter vegetable production region in Australia and I've lived in the region since 2002. I'm a steadfast local, proud and passionate.

If you've got a question about the industry or your farm and/or packing shed, please get in touch with me at idm@bowengumlugrowers.com.au or on 0427 701 225.

INFO R&D

For more information on the National Vegetable Extension Network and upcoming events, please contact Adam Goldwater on 02 8627 1040 or adam.goldwater@ahr.com.au.

Regional capacity building to grow vegetable businesses – national coordination and linkage project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

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Gippsland and Lockyer Valley reflect on successful extension project

L-R: Matt Busch, Shayne Hyman and Chris, Lex and Kane Busch from Busch Organics, Lindenow and Stratford. In fond memory of Lex Busch, an industry stalwart and gentleman.

It has been three years since the launch of the National Vegetable Extension Network (VegNET), which aims to effectively extend important research-based information to growers. Since then, many events and field days have taken place around the nation. Vegetable Industry Development Officers Shayne Hyman and Pat Salter report on the highlights from their regions.

Shayne Hyman – Gippsland, Victoria

The project to build capacity in vegetable businesses across Gippsland has been a pivotal part of a renaissance in the origins of food and fibre. It has taken place as Australians, and those from around the world who enjoy food and beverages from Australia, move their thinking from what's being grown to how it's being grown. It is a very exciting time to be working alongside vegetable growers, enlisting the support of stakeholders, and building the bridge between research and on-farm application.

VegNET Gippsland has achieved success well beyond the VegNET project parameters because Gippsland growers care, not only about their levy-paying neighbours, but all those along the value chain. Levy-payers of today and tomorrow have been involved in events, taken part in training and proactively networked because they know "we're all in this together".

There is no doubt that the highlight of the project was the East Gippsland Vegetable Innovation Days. This was held in Lindenow in May 2017 where more than 600 growers, industry stakeholders and enthusiasts converged on "Maddie's Paddock" to see trials of the newest, favourite and best-in-class vegetables, growing in all their glory over three sunlit days. Politicians shook hands; chefs cooked up a feast; the Lindenow Hall was bursting at its seams during the dinner event; schoolchildren came on field trips; and Second Bite harvested and distributed what was left. All the while, an entire township warmly welcomed visitors from interstate, New Zealand and the Netherlands.

The East Gippsland Vegetable Innovation Days will return in May 2020 and they will be preceded by the International Spinach Conference. Stick a note on your calendar now!

Bringing women together

The VegNET Gippsland project has actively supported diversity and inclusion principles in the vegetable industry, most notably through the Gippsland Women in Horticulture conferences of 2017 and 2018, where women shared knowledge, developed skills and gained new experiences to support their increasing and active participation along the supply chain. There's talk of forming a Gippsland Women in Horticulture group in 2019.

An indelible footprint has been stamped in Gippsland by the VegNET initiative; fingers crossed our industry leaders celebrate its success and build the VegNET brand for every grower in Australia in the interests of a prosperous, passionate industry that's ready for the future.

Pat Salter – Lockyer Valley

Southern Queensland has had a fantastic opportunity under the banner of Lockyer Valley Growers Inc. to deliver direct benefits to vegetable producers across the region. The project has embraced the concept of being an active conduit in transferring knowledge of the latest research and development within the industry. This is a two-way relationship providing a direct portal of the thoughts from the vegetable producers directly.

Most of the deliverables were undertaken in the social setting of grower barbecue evenings. These events incorporated the delivery of one or more existing Hort Innovation vegetable levy-funded projects and provided a platform for growers to receive an update. The evenings serviced multiple purposes, but one of the most critical functions was the social aspect and wellbeing of the growers themselves. The evenings enabled them to socialise with each other on a neutral footing and just chew the fat over a cold refreshment.

Forging connections

In 2017, the project had a strong focus on the exposure and the socialisation of the younger growers (the next generation) across the regions. This was successfully achieved by conducting an industry-led tour showcasing the supply chain across two days. During the event, the growers engaged in conversations about different farming practices across the regions. This led to some growers embarking on a trip from the Lockyer Valley to the Stanthorpe region. It was well-received by all, leaving some of the Lockyer growers bewildered by the extreme difference in farming practices. It would be fair to say that the connections made on the tour have led to a broadening of knowledge and bonds across the region.

The East Gippsland Vegetable Innovation Days held in May 2017 in Lindenow, Victoria were a highlight of the VegNET regional project.

The participants of the 2017 Young growers tour at Brisbane's Woolworths Distribution Centre.

After the dust had settled, and all the feedback was collated, it was identified that some of the growers across the regions felt left out and missed the opportunity to experience the tour. This was rectified at the end of 2018 with 23 growers attending a day trip to the Brisbane Markets and Lindsay Fresh Logistics as well as enjoying additional presentations. Many of the growers had never been to the markets as most dealings are undertaken with their agents and are by phone or email.

We are in the development phases of another adventure – a women in horticulture tour interstate. Discussions are in place with only the fine-tuning to be completed.

Over the past three years, VegNET has supported the current and future needs of the growers through the delivery of workshops and presentations. This in turn has provided a firm foundation for future work in extension.

Find out more R&D

Please contact Shayne Hyman at shayne.hyman@eastgippslandfoodcluster.com.au or Pat Salter at ido@lockyervalleygrowers.com.au.

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