Vegetable Fund

2017/18 ANNUAL REPORT

Hort Innovation
Strategic levy investment

VEGETABLE FUND

Content

The projects in this report have been funded by Horticulture Innovation Australia Limited using sources including the vegetable levy, Australian Government contributions and, in some instances, co-contributions from a variety of sources.

SUMMARY BY
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We're for growers

At Hort Innovation it's our job to work with industry to invest the vegetable levy and Australian Government contributions into initiatives to help growers be as productive and profitable as possible – and 2017/18 was another fantastic year of growing better, together.

With **more than $22 million invested by Hort Innovation into R&D for the vegetable industry during 2017/18, including into a host of new projects**, we're happy to be able to share with you all the key insights in this Hort Innovation Vegetable Fund Annual Report.

You'll find a top-level of all R&D investments from the year on **p6**. Among the new, ongoing and completed projects listed, just some of the highlights include the continued funding of key industry programs to bring practical information to vegetable growers, such as the Soil Wealth and Integrated Crop Protection initiatives, as well as the nation-wide VegNET extension program and industry communications program. There is also new and ongoing work in the trade space; research to help growers implement better on-farm practices, including integrated pest management; investments to bring vegetable research to the community, such as through the Veggycation initiative; support for grower scholarships in a range of programs, including Nuffield Scholarships; and so much more.

You can also explore a selection of research projects from the year in more detail from **p10**.

On a personal note, during the year it was great getting to connect with you about everything going on in the Vegetable Fund, to hear your thoughts, and to share ideas. With some team changes, including new Relationship Manager Jane Wightman coming on board, during 2018/19 we're looking forward to even more opportunities to connect in person, and we remind you that you can reach us any time on the contact details at the bottom of this welcome letter if there's something you'd like to ask or discuss around levy investments.

We also encourage you to explore the easy ways you can stay close to all of the good things your levy is achieving throughout the year...

- **Become a member**. Paying a levy doesn't automatically make you a Hort Innovation member, but signing up is free at **www.horticulture.com.au/membership**. As well as providing the opportunity for voting rights at the organisation's Annual General Meeting, Hort Innovation membership includes exclusive email alerts with industry-specific news and opportunities, direct invitations to explore investment updates and more.
- **Check out *Hortlink*.** This digital publication provides an update on investments in the Hort Innovation Vegetable Fund, including a spotlight on all new and recently completed projects. The latest edition is always available from the Vegetable Fund page at **www.horticulture.com.au/vegetable-fund**, while members have *Hortlink* sent straight to their inboxes.
- **Engage with your industry communications program.** The *Vegetable industry communication program 2016-2019* (VG15027) is dedicated to bringing the latest information and advice to growers, including news, outcomes and resources related to levy investments (look for the Hort Innovation Vegetable Fund logo to easily identify work related to your levy). The communications program is funded through the Hort Innovation Vegetable Fund and delivered by AUSVEG, with more info available on **p13**.

Here's to another great year of investments and connection in 2018/19,

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A NOTE OF THANKS FROM THE HORT INNOVATION BOARD

During 2017/18, the Hort Innovation Board of Directors appreciated the opportunity to connect with the industry, through AUSVEG. A September 2017 meeting with the Board of AUSVEG and its CEO James Whiteside was a chance to discuss matters of common interest – from trade activities and biosecurity issues to leveraging the Hort Frontiers strategic partnership initiative – and to further solidify the approach to working together for the interests of the Australian vegetable industry.

Making levy investments

Discover how the vegetable levy and Australian Government contributions are invested through the Hort Innovation Vegetable Fund in this quick recap.

Where do investment ideas come from?

Great investments start with great ideas, and Hort Innovation encourages all growers and other industry participants to share their thoughts and suggestions for the research initiatives they want to see.

Ideas can be submitted any time via Hort Innovation's simple Concept Proposal Form. Visit **www.horticulture.com.au/innovation-concept-pipeline**.

Ideas can be for your specific industry – to be funded by the industry levy and Australian Government contributions – or they can be for Hort Innovation's strategic partnership initiative, Hort Frontiers. Hort Frontiers projects address broader, longer-term and more complex issues facing Australian horticulture as a whole, and are funded through partnerships with co-investors. Visit **www.hortfrontiers.com.au** for more.

How are levy decisions made?

Let's talk 'SIPs' and 'SIAPs'!

Investments specific to the Hort Innovation Vegetable Fund are guided by the industry's Strategic Investment Plan (SIP), which was finalised by Hort Innovation in December 2017 after close consultation with growers and other industry stakeholders.

The SIP outlines key industry priorities for investment, with an 'at a glance' version available from **p3**. You can also download the full SIP document from the Vegetable Fund page at **www.horticulture.com.au/vegetable-fund**.

The SIP document is used like a 'roadmap' by the vegetable industry's Strategic Investment Advisory Panels (SIAPs) – panels made up of growers and other industry representatives that have a key role to play in the investment process. There are currently three SIAPs, one each for the vegetable investment pillars of Farm Productivity & Resource Use Management, Market & Value Chain Development and Consumer Alignment. The SIAPs discuss investment ideas at consultation meetings, with the SIP guiding them, in order to provide advice to Hort Innovation on potential levy investments.

Details of the SIAP panellists and summaries of the SIAPs' meetings can be found at **www.horticulture.com.au/vegetable-fund**.

What happens next?

The SIAPs' advice is used by Hort Innovation to work suitable ideas into project proposals. The proposals are then made public for potential delivery partners to submit responses. Current opportunities are always listed at **www.horticulture.com.au/delivery-partners**.

At the end of the process the responses are assessed, often with the assistance of industry, and the best delivery partner for the work is chosen. A contract is then issued and the work begins.

How can I keep track of investments?

Newly contracted projects are announced in Hort Innovation's *Hortlink* publication, with the latest edition emailed directly to members three times a year and always available from the Vegetable Fund page at **www.horticulture.com.au/vegetable-fund**. *Hortlink* also provides key information on ongoing investments and summaries of recently completed investments.

The industry communications program, run through the investment *Vegetable industry communication program 2016-2019* (VG15027), also provides regular information on levy-funded activity. See **p13** for more.

Strategic Investment Plan 2017-2021

The Vegetable Strategic Investment Plan was finalised mid-way through the financial year, in December 2017, after close consultation with industry. The document is used to guide Hort Innovation's strategic investment of the industry levy, ensuring investment decisions align with industry priorities. This at-a-glance version provides a top-level overview of the plan, with the full version available to download from the Hort Innovation Vegetable Fund page at www.horticulture.com.au/vegetable-fund.

Potential impact of the plan

$471.87 million

Based on an estimated investment of $90.68 million over the next five years

OUTCOMES	STRATEGIES
Increased demand and value of the domestic vegetable industry through improved grower knowledge of the market, product differentiation, increased food service revenue, improved food safety and increased consumer knowledge	Increase knowledge to better understand consumer trends and segments
	Identify value-adding opportunities such as pre-cut and improved packaging to achieve price premiums
	Improve stakeholder education for vegetables such as the identification and extension of the health benefits associated with vegetables
	Increase the market share for vegetables in food service such as the identification of potential product offerings specific to the sector
	Support product differentiation that align with Australian consumer needs
	Improve food safety standards and traceability

OUTCOMES	STRATEGIES
Export markets grown through increased understanding of opportunities available, improved market access, improved export capabilities, improved reputation and competitive advantage	Facilitate a united representation of the vegetable industry to international markets
	Better understand the export opportunities available to the vegetable industry
	Improve market access in priority markets for vegetables
	Improve the export capability of Australian vegetable growers
	Improve and capitalise on the opportunities available for inbound and outbound trade linkages
	Improve and capitalise on the use of e-commerce to export produce to existing priority markets
	Capitalise on Australia's geographic advantage to Asia and realise the export potential available in regional areas

OUTCOMES	STRATEGIES
Increased farm productivity and decreased production costs through better utilisation of resources, adaptation to climate, reduced impact of pests and diseases and better utilisation of advanced technologies on the farm	Reduce on-farm food waste including alternative uses such as value-added foods and beverages, biofuels and nutraceuticals amongst others
	Reduce major production costs through initiatives such as precision agriculture
	Adapt and improve current protected cropping and intensive production technologies to the Australian environment
	Protect the vegetable industry from both endemic and exotic pests and diseases that significantly impact the industry
	Introduce new cultivars that have favourable production related traits such as resistance to pests and diseases, severe weather conditions and varieties that allow for automation
	Enhance the sustainability of the industry and to help growers prepare and mitigate against the cost of climate change
	Improve the use and management of soil and water – critical inputs to commercial vegetable production
	Increase use of advanced technologies to improve farm productivity and/or reduce input costs for growers

OUTCOMES	STRATEGIES
Increased supply chain integration and development through improved supply chain management, development of collaborative models and partnerships	Improve supply chain integration and efficiencies
	Improve the product quality along the supply chain with the aim to increase returns for growers
	Support collaboration between growers and stakeholders along the supply chain to improve its efficiency
Improved capability of levy payers to adopt improved practices and new innovation through improved communication and extension programs, grower innovation support, professional development and workforce building programs, and through improved farm management and information systems	Improve the communication and extension of research outputs to address a geographically and culturally diverse vegetable industry
	Support innovation that advance and grow the vegetable industry
	Improve grower skills in all areas associated with commercial vegetable production
	Improve farm management practices and systems to assist growers in efficient and effective decision making
	Build skills in the vegetable industry workforce and attract new people to the industry

Major opportunities

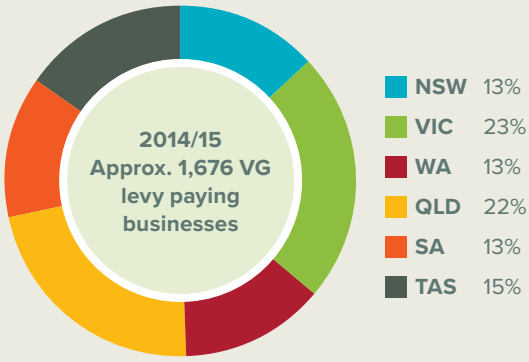
- Seasonal opportunities for export markets (southern hemisphere location)
- Close proximity to large and growing Asian markets
- Reputation for quality processes and standards
- Export of premium quality fresh vegetables into new markets
- Production capacity across diverse regions
- Increasing consumer aspirations for healthy eating
- Increasing investment in new and innovative technologies
- Increasing supply chain and industry integration and collaboration
- Adoption of consumer insights and use in business decision making
- Better exploitation of the significant investment in R&D.

Major challenges

- Environmental, pest and disease factors
- Wide climatic variability and biosecurity risks
- Competition from imports, particularly from low-cost countries
- Economic factors and increased global competition
- High production costs
- Lower farmgate margins
- Insufficient and rising cost of labour
- Slowing of productivity growth
- Impediments to exports such as trade barriers
- Limited uptake of industry knowledge and transfer of innovation
- Adoption of best-practice management models.

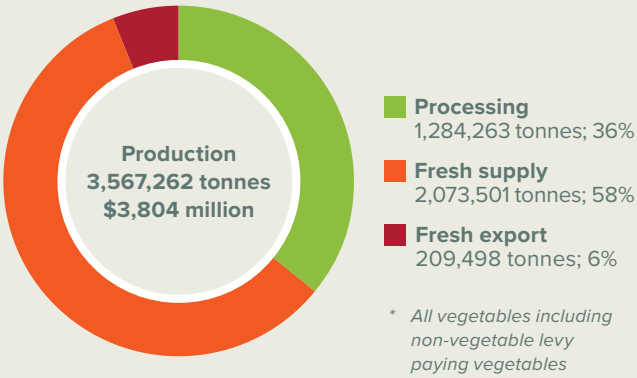
INDUSTRY SIZE AND PRODUCT DISTRIBUTION

Industry size and production distribution



(Calculated from data in Ashton D., and Weragoda A., 2017, *Australian vegetable growing farms: an economic survey,* 2014–15 and 2015–16, *ABARES research report 17.1*, Canberra, February. CC BY 3.0)

Vegetable* supply chain and value 2015/16



* *All vegetables including non-vegetable levy paying vegetables*

Source: *Australian Horticulture Statistics Handbook 2015/16*

R&D project list 2017/18

NEW INVESTMENTS IN 2017/18	
VG15068	Improving safety of vegetable produce through on-farm sanitation, using electrolysed oxidising (EO) water
VG16031	VegPRO sub-project: AusChem chemical accreditation level 3
VG16031	VegPRO sub-project: VegInnovations 2018 regional roadshow
VG16031	VegPRO sub-project: Chemical handling for vegetable crops
VG16031	VegPRO sub-project: Basic irrigation skills workshops
VG16037	Novel topical vegetable, cotton virus and whitefly protection
VG16042	Pathogen persistence from paddock to plate
VG16062	Field and landscape management to support beneficial arthropods for IPM on vegetable farms
VG16064	Tools and interventions for increasing children's vegetable knowledge
VG16068	Optimising cover cropping for the Australian vegetable industry
VG16071	Boosting vegetable consumption through diet
VG16075	Monitoring and evaluation of vegetable consumer data projects
VG16078	Soil wealth and integrated crop protection – phase 2
VG16080	Vegetable digital asset redevelopment – Veggycation
VG16081	Vegetable market price reporting pilot program – market data

NEW INVESTMENTS IN 2017/18 *(continued)*	
VG16084	Vegetable market price reporting pilot program – reporting
VG16085	Export facilitators
VG16086	Area wide management of vegetable diseases: viruses and bacteria
VG17000	Vegetable business benchmarking
VG17003	National Vegetable Protected Cropping Centre
VG17004	Vegetable knowledge transfer at the 2018 International Spinach Conference
VG17006	Strategic review of the Australian vegetable industry's extension and training programs
VG17013	Building the business case to grow domestic demand for vegetables in Australia
VG17014	Review of issues and options for preventing and removing redback spiders in broccoli
MT17010	World of Perishables, Dubai – Taste Australia attendance
MT17012	Minor use permit renewals
MT17017	Vegetable cluster consumer insights program*
MT17022	10th Australasian Soilborne Disease Symposium sponsorship
PH16000	Stingless bees as effective managed pollinators for Australian horticulture
ST17000	Generation of data for pesticide applications in horticulture crops 2018

* This multi-industry investment replaced another new investment for the financial year: *Vegetable consumer insights program* (VG16069)

ONGOING INVESTMENTS IN 2017/18	
VG13072	Export opportunities for carrots, sweet corn, beans, broccoli and baby leaf – symposia
VG14065	Nuffield scholarship
VG15002	Advanced stable fly management for vegetable producers
VG15003	Using autonomous systems to guide vegetable decision making on-farm
VG15004	VegNET – Bowen Gumlu and Far North Queensland
VG15009	Improving soilborne disease diagnostic capacity for the Australian vegetable industry
VG15010	A multi-faceted approach to soilborne disease management
VG15013	Improved management options for cucumber green mottle mosaic virus
VG15020	Strengthened biosecurity for the Australian vegetable industry – stage 2
VG15021	Sowing success through transformational technologies
VG15024	Vision systems, sensing and sensor networks to manage risks and increase productivity in vegetable production systems
VG15027	Vegetable industry communication program 2016-2019
VG15028	Vegetable industry education and training initiative (known as 'VegPRO')
VG15030	Growing Leaders
VG15032	Global Innovations in Horticulture Seminar
VG15034	Facilitating adoption of IPM through a participatory approach with local advisors and industry – training component
VG15035	Facilitating adoption of IPM through a participatory approach with local advisors and industry – coordination component
VG15036	Facilitating adoption of IPM through a participatory approach with local advisors and industry – evaluation component
VG15037	Optimising the benefits of vermiculture in commercial-scale vegetable farms

ONGOING INVESTMENTS IN 2017/18 *(continued)*	
VG15038	Investigating novel glass technologies and photovoltaics in protected cropping
VG15039	Precision seeding benefits for processing pea production
VG15040	VegNET – Wide Bay Burnett
VG15041	VegNET – Lockyer Valley and SE Queensland
VG15042	VegNET – NSW
VG15043	VegNET – WA
VG15044	VegNET – NT
VG15045	VegNET – SA
VG15046	VegNET – Tasmania
VG15047	VegNET – Gippsland
VG15048	VegNET – Victoria (South-East, West and Northern regions)
VG15049	VegNET – national coordination and linkage project
VG15054	Data analytics and app technology to guide on-farm irrigation
VG15059	Evaluating and testing autonomous systems developed in VG15003 in Australian vegetable production systems
VG15064	Improved management of pumpkin brown etch
VG15065	Review of the National Biosecurity Plan for the Vegetable Industry
VG15066	Improved knowledge of factors contributing to carrot rot
VG15067	Development of a vegetable education resource – stage 2
VG15070	A strategic approach to weed management for the Australian vegetable industry
VG15076	Creating value from edible vegetable waste
VG15077	Financial performance of Australian vegetable farms 2016-2017 to 2018-2019

Continues >>

ONGOING INVESTMENTS IN 2017/18 *(continued)*	
VG16005	ProbiSafe – developing biocontrol agents to inhibit pathogen growth
VG16009	Adoption of precision systems technology in vegetable production
VG16020	Vegetable industry minor use program
VG16023	A review of leadership across the RDC landscape
VG16031	VegPRO sub-project: PMA A-NZ Produce Executive Program scholarships
VG16060	Vegetable agrichemical pest management needs and priorities
VG16061	Vegetable industry export program
VG16063	The EnviroVeg Program 2017-2022
VG16067	Impact of pesticides on beneficial arthropods of importance in Australian vegetable production
VG16070	Research and operations to trial innovative glass and photovoltaic technologies in protected cropping
LP15001	Global Masterclass in Horticultural Business

ONGOING INVESTMENTS IN 2017/18 *(continued)*	
LP15006	Attracting new entrants into Australian horticulture – promoting careers in horticulture
MT13059	SITplus: Developing and optimising production of a male-only, temperature-sensitive-lethal, strain of Qfly, *B. tryoni*
MT14052	Essential market access data packages
MT16004	RD&E program for control, eradication and preparedness for vegetable leafminer
MT16005	Enhanced National Bee Pest Surveillance Program
MT16010	Horticultural trade data 2017-2019
MT16011	Horticulture trade intelligence reporting 2017-2019
MT16018	National tomato potato psyllid (TPP) program coordinator
ST16006	Generation of residue, efficacy and crop safety data for pesticide applications in horticulture crops 2017
ST16008	AgVet collaborative forum

INVESTMENTS COMPLETED IN 2017/18	
VG12083	Understanding the nature, origins, volume and values of vegetable imports
VG13004	Innovating new virus diagnostics and planting bed management in the Australian sweetpotato industry^
VG13044	New end-point treatment solutions to control fruit fly (2)
VG13076	Soil condition management – extension and capacity building
VG13078	Extension of integrated crop protection information
VG13083	Identifying and sharing post-harvest best practice on-farm and online
VG13092	Improved skill for regional climate in the ACCESS-based POAMA model
VG13101	Effective management of parsley summer root rot
VG14010	Management and detection of bacterial leaf spot in capsicum and chilli crops
VG14039	Generation of residue data for pesticide minor use permit applications in vegetable crops
VG14062	Process improvements for preserving peak freshness in broccoli (2)
VG14063	Innovative solutions for management of tospoviruses of vegetable crops
VG15023	Consultancy services for strengthened biosecurity for the vegetable industry – phase 2 (VG15020)
VG15050	Regional capacity building to grow vegetable businesses (VegNET) – training and evaluation
VG15071	Understanding consumer triggers and barriers to consumption of Australian indigenous vegetables and Asian vegetables
VG15073	Characterisation of a carlavirus of French bean
VG15074	Export development of Australian vegetables to Japan
VG15701	2016-18 European Industry Leadership and Development Mission – Berlin Fruit Logistica
VG15702	USA Industry Leadership and Development Mission 2016-2018
VG15703	Vegetable Young Grower Development Mission and Women's Development Missions

INVESTMENTS COMPLETED IN 2017/18 *(continued)*	
VG16011	Improving processing vegetable yields through improved production practices
VG16016	Market opportunity for vegetable juices
VG16018	Educational opportunities around the perceptions and aversions to vegetables through digital media
VG16019	Removing barriers of food safety certification for vegetable exporters though GLOBALG.A.P. co-certification
VG16024	Gap analysis and economic assessment for protected cropping vegetables in tropical Australia
VG16025	Increasing consumption and sales by developing community awareness and benefits of vegetables
VG16026	Addressing vegetable consumption through foodservice organisations (chefs, TAFEs and other training institutions)
VG16028	On farm evaluation of vegetable seed viability using non-destructive techniques
VG16031	VegPRO sub-project: Developing valued, visible vegetable products
VG16031	VegPRO sub-project: VegWHS training resources
VG16031	VegPRO sub-project: Negotiation and influencing workshops
VG16031	VegPRO sub-project: Horticulture Code of Conduct workshops
VG16031	VegPRO sub-project: Veg inductions
VG16059	Retailer alignment regarding the use of manures in vegetables
VG16066	Mid-term review of the vegetable and potato communication projects
VG16079	China insights data for the Australia vegetable industry
VG16083	Gap analysis for the next generation of protected cropping in vegetables
MT15032	Monitoring and evaluation framework for the industry Strategic Investment Plan
MT15033	Strategic Investment Plan
MT16016	Surveillance of tomato potato psyllid in the Eastern States and South Australia

^ This project was funded by the vegetable levy in years previous to 2017/18. Its final year was funded by the recently established sweetpotato R&D levy.

During the 2017/18 financial year, all Australian levy paying horticulture industries also contributed to across-industry projects addressing issues that affect horticulture as a whole. Visit **www.horticulture.com.au/across-horticulture** for financial documents and information on this program.

R&D report

With more than 130 investments active in the Hort Innovation Vegetable Fund during 2017/18, take a closer look at just a sampling of the work in this brief report. You'll find top-level overviews of some of the new and ongoing projects from the year, as well as more detailed summaries from completed investments that delivered final reports.

A reminder that Vegetable Fund coverage including updates on new investments and all the key takeaways from completed projects can be found in Hort Innovation's *Hortlink* publication throughout the year. The latest edition is always available from your grower page, www.horticulture.com.au/vegetable-fund. Any resources from levy-funded projects – such as fact sheets, guides and more – are also published on Hort Innovation's Vegetable Resource Centre at www.horticulture.com.au/vegetable-resources as they become available.

Vegetable cluster consumer insights program (MT17017)

NEW IN 2017/18

Key research provider: The Nielsen Company

This multi-industry investment delivers the 'Harvest to Home' program, through which Hort Innovation is working with global information and measurement company Nielsen to bring growers the largest series of insights into market performance and shopping behaviour yet for the vegetable, sweetpotato and onion industries.

Launched in late 2017, the Harvest to Home online platform (www.harvesttohome.net.au) allows growers to quickly identify how well commodities are selling in each state, how often consumers are buying, how much they are spending on each occasion, and more. The information and insights, including case studies, are intended to help growers, among other things...

- Develop an improved understanding of the drivers and barriers to purchase of their produce
- Grow awareness of current and future usage and consumption trends
- Gain insights into perceptions of packaging, formats and freshness
- Identify opportunities and issues, such as emerging usage occasions.

Soil wealth and integrated crop protection – phase 2 (VG16078)

NEW IN 2017/18

Key research provider: Applied Horticulture Research

Contracted in December 2017 and due for completion in 2022, this project is continuing to provide vegetable producers with the latest information in soil and pest related areas, in formats that are readily accessible and easy to use. It brings into one investment the industry's well-respected Soil Wealth initiative – previously run under ***Soil condition management – extension and capacity building*** **(VG13076)** – and the industry's Integrated Crop Protection initiative, previously facilitated by ***Extension of integrated crop protection information*** **(VG13078)**.

The focus is on helping vegetable growers deal with future challenges posed by changes in the natural and business/market environment. Helping growers implement the efficient use of appropriate, trialled and tested new technologies as they become available, is also key.

Growers can visit www.soilwealth.com.au to make use of information and resources from the previous and current programs. The website also hosts program updates, information on upcoming workshops and other resources.

National Vegetable Protected Cropping Centre (VG17003)

NEW IN 2017/18

Key research provider: Western Sydney University

To develop the next crop of horticulture growers and meet rising food demand, Hort Innovation and Western Sydney University combined forces to launch the nation's first state-of-the-art vegetable glasshouse-production research centre in November 2017. The aim is to manipulate inputs to create the optimum environment to drive maximum harvest windows and overall yield for a variety of vegetables, then share this information with Australia's growers. Through this facility, industry also aims to attract new entrants to horticulture careers by offering students access to some of the most advanced technology currently available.

Just some of the work being conducted through the centre includes establishing benchmarks in productivity, water use and energy efficiency for key crops, and performing variety trails. The researchers are also investigating contrasting greenhouse cladding materials relating to light, crop growth and energy balance. Smart glass technologies are being employed to test effects on productivity, and a stingless bee pollination project is also underway within the glasshouse to measure how the insects perform in protected cropping conditions.

Improving safety of vegetable produce through on-farm sanitation, using electrolysed oxidising (EO) water (VG15068)

NEW IN 2017/18

Key research provider: University of South Australia

This investment began in mid-2017 to test whether 'electrolysed oxidising' or 'EO' water can be used to increase the quality of vegetable irrigation water. EO represents an electricity-charged sanitisation approach, with specific project activities including comparing the efficiency of EO water with that of other options for treating irrigation water for relevant water-borne pathogens; discerning whether EO water treatment can prevent potential microbial contamination of fresh produce pre-harvest; assessing the ability of EO water to control soil pathogens, and any effect on important soil microorganisms; and ultimately developing protocols for EO water adoption by Australia's vegetable growers.

Field and landscape management to support beneficial arthropods for IPM on vegetable farms (VG16062)

NEW IN 2017/18

Key research providers: Charles Sturt University in conjunction with IPM Technologies, the University of Queensland and NSW Department of Primary Industries

New in 2017/18, this 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 are tasked with capturing information, developing and testing strategies, and producing crop-specific and region-specific guidelines for field and landscape management to support beneficials.

Identifying and sharing postharvest best practice on-farm and online (VG13083)

NOW COMPLETE

Key research provider: Applied Horticultural Research

Beginning in 2014 and ending in 2017, this investment was responsible for documenting and communicating techniques and technologies to help vegetable growers achieve post-harvest efficiencies – finding ways to improve quality and shelf life, and to reduce cost, to allow growers to capture more value from the supply chain.

In compiling information on the latest post-harvest technologies for vegetables, where information was lacking or outdated the project team conducted trials. These focused on measuring storage life of different vegetables at a range of temperatures, and measuring the rate of weight loss due to temperature and relative humidity.

Surprisingly, the trials demonstrated that it may not always be necessary to cool product to the 'optimum' temperature to achieve the quality and shelf life required for transport and retail.

Another significant finding was that some chilling-sensitive products, such as capsicums, eggplant and zucchini, can be stored for several days or even longer at low temperature before damage occurs. In the case of red and green capsicums, storage life was longest at 2°C and 4°C respectively. It took longer for the development of chilling injury to reduce quality than the rots which inevitably develop at higher temperatures of 7°C or more.

The project developed models estimating daily potential moisture loss at a range of temperatures and humidity. This provides a tool for growers in determining an appropriate rate of over-pack for cartons or packages.

The information from the project was compiled into a series of extension materials, including the *Postharvest management of vegetables: Australian supply chain handbook*. For digital resources relating to the project, see the Postharvest Management of Vegetables website at **www.postharvest.net.au**.

Educational opportunities around perceptions of, and aversions to, vegetables through digital media (VG16018)

NOW COMPLETE

Key research provider: Edible Adventures

With a focus on Australian children, this industry initiative was all about increasing education around and attitudes towards vegetables. There was an earlier component that laid the groundwork – looking at school-aged children's perception of vegetables, and how to create positive behaviour change amongst educators, parents, caregivers and kids. The VG16018 investment was then tasked with developing and delivering digital food education resources based on this. It culminated in the launch of the 'Phenomenom' web series, published at **www.phenomenom.com.au**.

The series involves children's television host and chef Alice Zaslavsky and was produced with advice from a curriculum expert who has previously been involved with the Stephanie Alexander Kitchen Garden Foundation. Other supporting materials on the website are also intended to help encourage positive behaviours, attitudes and outcomes around vegetables with kids aged six to 14.

On farm evaluation of vegetable seed viability using non-destructive techniques (VG16028)

NOW COMPLETE

Key research provider: The University of Queensland

Vegetable crops that are field-established from seed need seed to be high quality for maximum return on investment. To this end, this short project, beginning and ending in 2017, aimed to provide the Australian vegetable industry with a range of recommendations to overcome poor seed quality and viability on farm.

The researchers interviewed growers, conducted farm visits and surveys, and undertook a comprehensive literature review, looking at available technologies that may assist in screening seed viability on-farm; how these technologies can be used within the Australian vegetable industry; and providing recommendations for new technology for real-time, on-farm grading of seed viability pre-planting.

You can learn more about the grower survey results and find information on on-farm issues at **www.bit.ly/2zXwlkd**.

Understanding the nature, origins, volume and values of vegetable imports (VG12083)

NOW COMPLETE

Key research provider: RMCG

This investment was established to help growers and the industry at large understand the nature, origin, volume and value of vegetable imports coming into Australia. In its course, it examined data from a range of sources and produced annual summaries, with fact sheets detailing top imported vegetable products. These remain available to download from the Hort Innovation Vegetable Fund page at **www.horticulture.com.au/vegetable-fund**.

Results from the project's overall analysis showed that the major import volumes are occurring in the frozen sector, followed by the preserved (tinned) sector, with relatively few imports of fresh vegetables. Where they occur, fresh imports reflect a demand by consumers for product throughout the year (counter-seasonal) and for specific products at specific times that may not be available domestically.

Frozen and preserved vegetables made up the majority of vegetable imports due to their low price and availability to meet market demands. Industry analysis found that while consumers and retailers do have a preference for domestically sourced fresh vegetables, they seek low-cost frozen and processed vegetables. The analysis showed frozen and processed goods were typically supplied from countries that are low-cost producers to meet this consumer demand and preference.

In terms of overall volumes, peas were the only crop where the volume of imports exceeded the estimated volume of domestic production, and this was primarily due to a well-established supply chain of frozen peas from New Zealand.

Improving processing vegetable yields through improved production practices (VG16011)

NOW COMPLETE

Key research provider: University of Tasmania

In the face of rising competition from imported processed vegetables, this project was tasked with identifying, assessing and bringing to growers new innovations for increasing yields or reducing input costs for processing vegetable crops in Australia. It had a specific focus on broccoli, carrots, green beans, cauliflower and sweet corn.

In their research, the project team looked at what leading processing vegetable growers are doing that others may not be. This included conducting interviews with Simplot growers who had already met or exceeded the company's targets set for average yields by the year 2020. There was also a research review of best practice and recent innovations for the project's target crops.

Continues >>

The result of the project was five fact sheets for growers, based on the information collected by the researchers:

- Maximising uniformity at harvest maturity in processing broccoli, available at **www.bit.ly/2pSQG4h**
- Optimising crop establishment in processing carrots, available at **www.bit.ly/2RMhTCy**
- Sclerotinia rot of green beans, available at **www.bit.ly/2CMMj3a**
- Irrigation management in sweet corn, available at **www.bit.ly/2QOFRfi**
- Winter crane fly, available at **www.bit.ly/2yCiloD**.

Creating value from edible vegetable waste (VG15076)

ONGOING THROUGH 2017/18

Key research provider: CSIRO

Do 'broccoli lattes' ring a bell? Showcased at 2018's Hort Connections and throughout the media, these coffee drinks made with broccoli powder illustrate just one possible use for imperfect vegetables that would otherwise go to waste – uses that are being explored through this ongoing investment. Addressing the issue of vegetable wastage on-farm and post-farm-gate, this project is developing new knowledge and processes to improve recovery of edible material. Avenues of exploration 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 has a focus on brassica vegetables and carrots. Learn more about the work in Hort Innovation's quick video at **www.vimeo.com/271415168**.

Vegetable industry communication program 2016-2019 (VG15027)

ONGOING THROUGH 2017/18

Key research provider: AUSVEG

This ongoing program is responsible for effectively communicating the findings of levy-funded R&D and other relevant industry news, issues and data to growers and other industry stakeholders, to allow on-farm adoption of new learnings and technologies.

A number of regular communication channels continue to be produced and maintained by the program, including but not limited to...

- Weekly e-newsletter *Weekly Update*
- The bi-monthly *Vegetables Australia* magazine, with current and back issues available from **www.ausveg.com.au/news-media/publications**
- Vegenotes factsheets, also available from **www.ausveg.com.au/news-media/publications**
- Annual publication *Grower Success Stories*, also available from the above links
- InfoVeg services (**www.ausveg.com.au/infoveg**)
- Social media updates in AUSVEG channels including Twitter.

The program also provides media relations for R&D-related news, including the production and distribution of media releases.

Photo: CSIRO.

National Vegetable Extension Network (VegNET) – multiple projects

ONGOING THROUGH 2017/18

Key research provider: Applied Horticultural Research delivers an overarching coordination component, with various research providers delivering the region-based IDO roles

VegNET was established in 2016 and aims to keep growers informed about current R&D activities, results and resources – supporting the adoption of industry best practice and bolstering vegetable production in key growing areas across the country. The program involves multiple projects that fund the positions of industry development officers (IDOs) in key vegetable-growing regions, who are responsible for the delivery of specialised events and distribution of R&D materials in those areas.

The current VegNET IDOs and their contact details are available below. The levy-funded *Vegetables Australia* magazine also carries special features on upcoming events related to the program, and events are also communicated in other relevant industry channels, but growers are welcome to contact their local IDO for updates and information at any time.

REGION	IDO	CONTACT DETAILS
Lockyer Valley and South East Queensland	Pat Salter	ido@lockyervalleygrowers.com.au
New South Wales	Matthew Plunkett	matthew.plunktt@lls.nsw.gov.au
Western Australian	Truyen Vo Samantha Grubisa	truyen.vo@vegetableswa.com.au sam.grubisa@vegetableswa.com.au
Northern Territory	Greg Owens Laura Cunningham	greg@ntfarmers.org.au ido@ntfarmers.org.au
South Australia	Hannah McArdle	hannah.mcardle@ausveg.com.au
Tasmania	Emma Egan Theresa Chapman Donna Lucas	emmae@rmcg.com.au theresac@rmcg.com.au donnal@rmcg.com.au
Gippsland	Shayne Hyman	shayne.hyman@ eastgippslandfoodcluster.com.au
Victoria (South-East, West and Northern regions)	Carl Larsen (South-Eastern region) Clinton Muller (Western region) Ken Orr (Northern region)	carll@rmcg.com.au clintonm@rmcg.com.au ken.orr54@bigpond.com
Bowen Gumlu and Far North Queensland	Cherry Emerick	idm@bowengumlugrowers.com.au
Wide Bay Burnett	Bree Grima Adam Harber	bree.grima@bfvg.com.au vegnet@bfvg.com.au

Vegetable industry minor use program (VG16020)

ONGOING THROUGH 2017/18

Key research provider: Hort Innovation

Through this ongoing project, levy funds and Australian Government contributions are used to submit renewals and application for new minor use permits for the vegetable industry, as required. These submissions are prepared and submitted to the Australian Pesticides and Veterinary Medicines Authority (APVMA). When approved by the APVMA, the permits provide growers with access to safe and effective chemicals for the management of pests, weeds and diseases.

Meanwhile, the generation of pesticide residue, efficacy and crop safety data is required to support label registration and minor use permit applications made to the APVMA. The data-generation investments ***Generation of data for pesticide applications in horticulture crops 2018*** **(ST17000)**, ***Generation of residue, efficacy and crop safety data for pesticide applications in horticulture crops 2017*** **(ST16006)** and others facilitate this work. The two named projects are supported by grants awarded through the Australian Government's Access to Industry Uses of Agricultural and Veterinary (AgVet) Chemicals program, plus levy contributions.

All current minor use permits for the industry are searchable at portal.apvma.gov.au/permits. Permit updates are also circulated in Hort Innovation's *Growing Innovation* e-newsletter, which levy-paying members receive monthly. Not a member? Sign up to our membership program for free at www.horticulture.com.au/membership.

For more on minor use permits, see p17.

Improving soilborne disease diagnostic capacity for the Australian vegetable industry (VG15009)

ONGOING THROUGH 2017/18

Key research provider: South Australian Research and Development Institute (SARDI)

This ongoing investment is using world-leading DNA testing technology to provide growers with a way to assess the risk of soilborne diseases caused by select pathogens prior to planting, such as those that cause club root in brassicas and cavity spot and forking in carrots. This knowledge, when applied with sound disease and soil health management strategies, will contribute to a reduction in losses from soil-borne diseases. The investment has close links with ***A multi-faceted approach to soilborne disease management*** **(VG15010)**, which has been running since late 2015 to provide vegetable growers with the skills, tools and solutions needed to manage the risk of crop losses due to soilborne diseases. Its work includes the use of best-practice demonstration sites, field days, workshops, videos, fact sheets and other digital resources, as well as integration with the Soil Wealth and Integrated Crop Protection programs (www.soilwealth.com.au) to extend results.

Strengthened biosecurity for the Australian vegetable industry – stage 2 (VG15020)

ONGOING THROUGH 2017/18

Key research provider: AUSVEG

This ongoing investment supports the activities of the Vegetable Industry Biosecurity Advisor at AUSVEG. The advisor coordinates industry input into a range of biosecurity matters, and helps ensure effective communication of relevant technical information on biosecurity to growers. During the course of 2017 and into 2018, the advisor had a strong focus on providing advice around tomato potato psyllid (TPP). In relation to the pest, industry awareness, coordination and surveillance efforts were also strengthened in 2017/18 through the now-completed multi-industry investment ***Surveillance of tomato potato psyllid in the Eastern States and South Australia*** **(MT16016)** – which provided growers with access to sticky traps for participation in a national TPP surveillance program – as well as the multi-industry investment ***National tomato potato psyllid (TPP) program coordinator*** **(MT16018)**, which saw the appointment of a national program coordinator for the pest in October 2017. This role is responsible for coordinating the development and implementation of a national TPP management strategy, helping ensure R&D, engagement and other response efforts are coordinated, prioritised and strategic across the various industries and areas it affects.

Sowing success through transformational technologies (VG15021)

ONGOING THROUGH 2017/18

Key research provider: The University of Queensland

This investment is bringing together and further evaluating transformational precision technologies that have been developed through previous levy-funded work. These include new natural compounds to enhance crop establishment, growth and resilience; precision delivery technologies to deliver compounds and nutrients to seeds or crops exactly when and where they're needed, at the right dose; and new technologies such as membranes and micro-encapsulation to surround seeds or plant roots to enhance water and compound uptake.

Vegetable industry export program (VG16061)

ONGOING THROUGH 2017/18

Key research provider: AUSVEG

Beginning in mid-2017, this investment will help position the industry to achieve the target of growing exports by 40 per cent – to the value of $315 million – by 2020. This target was announced in 2017, with the release of the *Vegetable Industry Export Market Development Strategy 2020*. You can read more about the strategy at **www.bit.ly/2RzZj0v** and contact AUSVEG on (03) 9882 0277 to access a copy of the full strategy document. Expanding on previous export development work, activities under this program broadly include market development and market access work, plus export readiness, training and education for growers and other stakeholders, to prepare the industry to take advantage of export opportunities.

Export activities are also the focus of ***Export facilitators* (VG16085)**, a new collaborative program supporting growers to capitalise on commercial business opportunities relating to export. It funds the roles and activities of export facilitators across Australia's vegetable growing regions, establishing a facilitator network across Australia. The facilitators are tasked with helping create export plans in conjunction with vegetable growing businesses, promoting collaboration within the industry, and providing linkages across the supply chain. During 2017/18, facilitator roles were established in Tasmania (Ian Locke, **ian.locke@tasfruitveggroup.com.au**), Queensland (Peter Hockings, **phockings@growcom.com.au**) and Western Australia (Claire McClelland, **claire.mcclelland@vegetableswa.com.au**).

The EnviroVeg Program 2017-2022 (VG16063)

ONGOING THROUGH 2017/18

Key research providers: AUSVEG, with additional components with Growcom and Freshcare

The EnviroVeg Program is the industry's environmental best management practice (BMP) program, and has existed in evolving forms since 2000. It involves a range of resources and services so that Australian vegetable growers can benchmark and improve their BMPs and showcase their environmental credentials through certification. This latest iteration is working to align components from EnviroVeg, Hort360 and Freshcare Environmental to deliver a clear pathway to environmental assurance for Australian vegetable growers, as it continues to support and improve environmental management on-farm and develop environmental recognition for industry participants.

This new iteration also includes the EnviroVeg Pilot Program, a funded pathway through EnviroVeg to reach Freshcare Environmental certification and attain the best practice benefits of environmentally responsible, sustainable vegetable production.

You can find more information on EnviroVeg, sign up for free, and complete a self-assessment at **www.enviroveg.com**. The website also includes quarterly updates on the program and resources including case studies and how-to guides.

Full details of completed research can be found in project final reports which, when finalised, are available to order at **www.horticulture.com.au/final-report-order-form**. Final reports are free to Australian horticulture levy payers, registered Hort Innovation members and industry representative bodies.

Minor use permits

Why minor use permits?

While the use of pesticides and other chemicals in the horticulture industry is being modified through the increasing uptake of integrated pest management approaches, there remains a need for the strategic use of specific chemicals.

Chemical companies submit use patterns for product label registrations to the Australian Pesticides and Veterinary Medicines Authority (APVMA). But what happens when chemical companies consider the market size too small to generate adequate commercial returns on these label registrations, based on the R&D investment required? This is where minor use permits come into play. The APVMA's national permit system adds some flexibility to the approval process and provides a legal framework that can allow access to products for minor use purposes.

Permits in 2017/18

During the 2017/18 period, close to 50 new permit and permit renewal applications were prepared by Hort Innovation and submitted to the APVMA for the vegetable industry, facilitated through the *Vegetable industry minor use program* (VG16020). A number of these applications were supported by data from the projects *Generation of residue, efficacy and crop safety data for pesticide applications in horticulture crops 2017* (ST16006) and the older *Generation of residue data for pesticide minor use permit applications in horticulture crops 2015/16* (ST15027).

Current permits

At the time of writing, there were close to 200 minor use permits available to the vegetable industry. You can access a table of these permits at **www.bit.ly/2QNODKr**.

Please note, this downloadable document is current only as of September 19, 2018 – and while all efforts have been made to provide the most complete and accurate information on the permits, you should always confirm all details on the APVMA website at portal.apvma.gov.au/permits. Details of the conditions of use associated with these permits can also be found on the APVMA site.

Minor use permit updates are circulated in Hort Innovation's e-newsletter, ***Growing Innovation***, which levy-paying members receive monthly. Not a member? Sign up for free at **www.horticulture.com.au/membership**.

Connect with Hort Innovation! Become a member at **www.horticulture.com.au/membership**

Financial statement

Financial operating statement 2017/18

	R&D ($)	TOTAL ($)
	2017/18 July – June	2017/18 July – June
OPENING BALANCE	**6,026,436**	**6,026,436**
Levies from growers (net of collection costs)	8,749,063	8,749,063
Australian Government money	13,794,136	13,794,136
Other income*	86,792	86,792
TOTAL INCOME	**22,629,992**	**22,629,992**
Project funding	22,057,714	22,057,714
Consultation with and advice from growers	241,791	241,791
Service delivery – Base	921,657	921,657
Service delivery – Shared	1,418,917	1,418,917
Service delivery – Fund specific	1,711,649	1,711,649
TOTAL EXPENDITURE	**26,351,728**	**26,351,728**
Levy contribution to across-industry activity	563,245	563,245
CLOSING BALANCE	**1,741,454**	**1,741,454**
Levy collection costs	352,465	352,465

At the end of 2016/17, the industry's pro rata share of levy funds were committed to strategic reserves ($1,541,574 for R&D), and so have been deducted from the 2017/18 opening balance.

* Interest, royalties

Service delivery costs explained

Base service delivery (flat rate) = keeping the lights on
This figure contributes to the standard fixed costs that are incurred with the running of the business (for example, costs relating to rent, utility bills, equipment). These costs are calculated on a monthly basis and are based on actual program expenditure.

Shared service delivery (flat rate) = related to program delivery
Shared costs are related to program delivery and include costs that are incurred in supporting activities relating to R&D and marketing programs that are not attributable to any one levy industry (for example, costs relating to procurement and information technology activities). These costs are calculated on a monthly basis and are based on actual program expenditure.

Fund specific service delivery (flat rate for 2017/18) = direct servicing costs
These are the actual costs for activities and services that are directly incurred in the administration of levy program expenditure, and which are identifiable and attributable to a specific levy investment fund (for example, costs around direct relationship, marketing and fund management, and logistical costs around industry advisory meetings and activities). From 2018/19 these costs will be charged at cost on a monthly basis.

For more information explaining the costs in the financial summary, visit **www.bit.ly/2x7ERLC**.

Hort Innovation

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